Berwick Mooring & Co Perth

REPORT
OF THE
DEPARTMENT OF MINES
FOR THE YEAR
WESTERN · 1928. · AUSTRALIA

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

1929.

WESTERN AUSTRALIA.

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FOR THE YEAR

1928.

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

[FIFTH SESSION OF THE THIRTEENTH PARLIAMENT.]

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1929.

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ANNUAL REPORT OF THE DEPARTMENT OF MINES, WESTERN AUSTRALIA, 1928.

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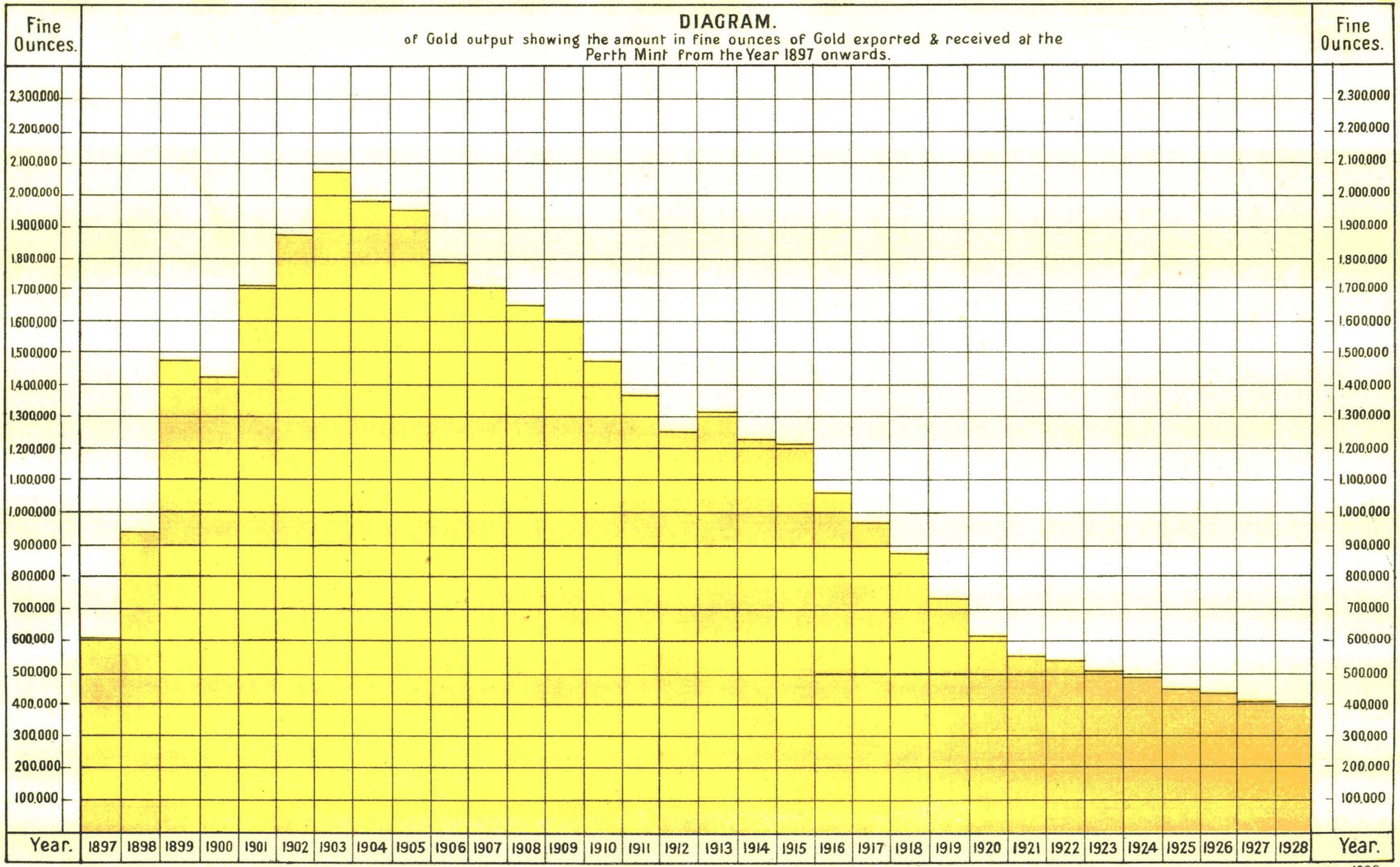
of Gold output showing the amount in fine ounces of Gold exported & received at the Perth Mint from the Year 1897 onwards.



1928

STATE OF WESTERN AUSTRALIA.

Report of the Department of Mines for the State of Western Australia for the Year 1928.

To the Hon. the Minister for Mines.

Sir,

I have the honour to submit the Annual Report of the Department for the year 1928 with summaries of reports from the Wardens and other officers, together with various comparative tables furnishing statistics relating to the Mining Industry of the State.

Reports from the officers controlling the various sub-departments are also submitted.

I have, etc.,

M. J. CALANCHINI,

Under Secretary for Mines.

Department of Mines,

Perth, 30th March, 1929.

DIVISION I.

Summary by the Under Secretary for Mines.

PART I.—GENERAL REMARKS.
II.—MINERALS RAISED.
III.—LEASES AND OTHER HOLDINGS UNDER VARIOUS ACTS RELATING TO MINING.
IV.—MEN EMPLOYED.
V.—ACCIDENTS.
VI.—STATE AID TO MINING.
VII.—REMARKS ON THE GOLDFIELDS AND MINERAL DISTRICTS, AND SUMMARIES OF WARDENS' AND OTHER OFFICERS' REPORTS.
VIII.—EXISTING LEGISLATION.
IX.—INSPECTION OF MACHINERY.
X.—SCHOOL OF MINES.

PART I.—GENERAL REMARKS.

The value of the Mineral output of the State for the year 1928 was £2,128,179, being £74,258 less than that for the previous year. Tin and Silver showed increases, but Lead a decrease.

The value of the Gold yield was £1,671,093, being 78·52 per cent. of the total output.

The value of the Coal output was £420,145, Silver £6,638, Tin £15,002, and Lead £4,198.

The Dividends paid by Mining Companies amounted to £31,250, a similar amount to that paid in the preceding year.

The total Dividends paid to the end of 1928 amounted to £28,729,680. To the same date, the total Mineral production was £171,009,321, and the total Gold production £159,333,503.

GOLD.

The Gold yield shows a decline, being 14,945 fine ounces less than in 1927, which was 28,990 fine ounces less than in 1926.

The average value per ton of ore treated in the State as a whole has risen from 49·32 shillings in 1927 to 51·18 shillings in 1928; and in the East Coolgardie Goldfield, which produced over 75 per cent. of the State's reported yield, it rose from 53·47 shillings to 56·64 shillings.

Comparing the tonnage of ore treated in 1927 and 1928, there was a decrease of 50,469 tons in the latter year, during which 645,482 tons were treated.

There were increases in Yalgoo, North Coolgardie, Mount Margaret, Dundas and Murchison of 8,482, 8,080, 4,854, 2,866 and 1,343 tons respectively. All the others treated less tonnage, the largest decreases being in East Coolgardie, Yilgarn, Broad Arrow, East Murchison, North-East Coolgardie and Coolgardie of 32,601, 23,236, 13,349, 3,546, 1,585, and 586 tons respectively.

There were increases in the production from Ashburton, Coolgardie, Dundas, North Coolgardie and Yalgoo; the others reported decreases.

The acreage held under mining lease for all minerals is 53,218 acres, being a decrease of 168 acres when compared with 1927. The area leased for gold mining is less by 175 acres, and for other minerals by 7 acres.

The area held under prospectiong areas is 25,025 acres, including 17,160 acres for Coal.

This is an increase of 9,223 acres on the area held in 1927, the area held for Coal being greater by 8,160 acres, and for other minerals by 1,063 acres.

The number of men engaged in all classes of mining was 4,853, a decrease of 183 on the number employed in 1927. The number of men engaged in mining for minerals other than gold showed an increase of 10, due to improved figures for tin and coal. In lead mining there was a falling-off, but for other minerals little alteration.

In gold mining there was a decrease of 193. The average value of gold produced per man employed on gold mines was £431·95 in 1927, and £438·62 in 1928.

The average tonnage raised per man was 171·39 tons, and in the previous year 175·17 tons.

The third periodical examination under the provisions of the Miner's Phthisis Act of persons employed in the mines commenced on the 9th March, 1928, and was completed on the 30th November, 1928. The results are as classified below, and for the purpose of comparison the figures for the preceding examinations are also appended:—

1925–26.				
Total number of men examined				**4,023**
Suffering from—		per cent.		
Miners' Phthisis—Early ...	459	=	11·4	
Advanced ...	183	=	4·5	
" " plus tuberculosis	131	=	3·3	
Tuberculosis only	11	=	·3	
Normals, etc.	3,239	=	80·5	
	4,023	=	100·0	
				4,023
1927.				
Total number of men examined				**3,728**
Suffering from—				
Miners' Phthisis—Early ...	381	=	10·25	
Advanced ...	93	=	2·5	
" " plus tuberculosis	128	=	3·4	
Tuberculosis only	10	=	·3	
Normals, etc....	3,116	=	83·6	
	3,728	=	100·0	
				3,728
1928.				
Total number of men examined				**3,483**
Suffering from—		per cent.		
Miners' Phthisis—Early ...	362	=	10·4	
Advanced ...	98	=	2·8	
" " plus tuberculosis	42	=	1·2	
Tuberculosis only	4	=	·1	
Normals, etc.	2,977	=	85·5	
	3,483	=	100·0	
				3,483

It is gratifying to note that the 1928 figures indicate on the whole a considerable improvement as compared with those for 1927.

Of the 2,977 Normal cases 2,738 were previously reported as Normal, while 239 are new cases, that is, cases reported for the first time.

Of the 362 cases of Miners' Phthisis Early, 303 were previously reported as suffering from Miners' Phthisis Early, 47 as Normal, while 12 are new cases.

Of the 98 advanced cases, 79 were previously reported as advanced, 16 as Early, 1 as Normal, and 2 are new cases.

Out of the total of 460 Early and Advanced cases of Miners' Phthisis 62 were fresh cases, comprising 60 Early and 2 advanced, as compared with 71 fresh cases (63 Early and 8 advanced) out of 474 in the 1927 examinations.

Of the 42 cases of Miners' Phthisis plus Tuberculosis, 10 were previously reported as suffering from Miners' Phthisis Advanced, 14 from Miners' Phthisis Early, 10 as Normal, while 3 are new cases and 5 are outside the provisions of the Act.

The 4 cases of Tb only comprise 3 who were previously reported as Normal, and one does not come within the provisions of the Act.

Since the Miners' Phthisis Act was proclaimed on the 7th June, 1925, 326 men have been reported to be suffering from Tuberculosis. Of this number 81 have died, 128 are totally incapacitated from work, 2 have been repatriated, 31 do not come within the provisions of the Act, 10 cases are pending medical examination as to their fitness for other suitable employment, and 74 are fit for ordinary or light work and have been placed in suitable occupations.

The number of beneficiaries in receipt of compensation in respect of themselves and their dependants is 240, and the aggregate amount of compensation paid to the 31st December, 1928, was £83,670. The total number of dependants of the deceased and totally incapacitated men still eligible for compensation is 463, comprising 82 wives, 77 widows, and 304 children under 16 years of age, while the dependants of the men who are fit for work number 130, including 52 wives and 78 children.

It is intended to continue the examinations, and the next periodical examination will commence early in 1929.

In the East Murchison field there was a decrease.

In the Black Range district there was a little activity at Birrigrin, where some rich dollying stone was recovered, but no development of a permanent character. At Montague several parties were at work.

At Sandstone mining was very dull.

There were outputs reported from Maninga Marley, Hancocks, and Youanmi.

In the Lawlers district there was no activity of note.

In the Wiluna district development work was steadily carried out on the property of the Wiluna Gold Mines, and the erection of treatment plant is promised so soon as the railway from Meekatharra, to be commenced early in the New Year, is completed. It is then expected that the output from this centre will be substantially augmented.

The Murchison field had a decrease.

In the Meekatharra district, although there was a lessened production, the position was well maintained.

In the various outlying centres mining was very quiet.

In the Cue district there was a decrease. At Reidy's, diamond drilling on the Mararoa Company's leases indicated the probable continuance of payable ore bodies, and it is expected that development and production on a large scale will follow shortly.

At Cuddingwarra boring on the Big Bell is yielding encouraging results. At Poona mining for Emeralds is still going on, but the stones so far recovered are mostly of low value. An improvement is expected at depth.

Prospecting in this district was retarded as a result of the very dry season.

In the Day Dawn district there was a decrease. The bulk of production was from the old Fingall Mine. A small amount was reported from Lake Austin where several prospectors were working.

In the Mount Magnet district there was also a decrease. The main production was from holdings in the vicinity of Mount Magnet. At Lennonville there was a small production, and a few prospectors are still working. Also, one crushing was reported from Moyagee, but this centre is now deserted.

The Mount Margaret field recorded a small decrease.

In the Mount Margaret District there was a falling-off, but the general position was little changed. The principal production was from the treatment of sands on the Lancefield at Laverton, and the King of Creation at Duketon.

In the Mount Morgans district there was a decrease, due to a general falling-off.

The principal output was from the Westralia Mount Morgans Mine. A small amount of prospecting was in evidence.

In the Mount Malcolm district there was only a small decrease. Practically the whole production comes from the Sons of Gwalia Mine at Leonora, which has been worked steadily throughout the year. It is being financially helped by the Government very largely, and although the margin of profit is small it is well handled, and evidences of improvement are forthcoming which make the outlook hopeful. No new finds were reported, and very little prospecting was being done.

The Coolgardie field showed an increase.

In the Kunanalling district a couple of mines were regular producers and there were some good crushings. At Gibraltar a small amount of work was going on, mostly on the old "Lloyd George" Mine.

At Burbanks rather encouraging results were got from the diamond drilling carried out by the Government and it now remains for some one to follow up the disclosures by development work.

At Widgiemooltha a few prospectors were at work, but no discovery was reported.

At St. Ives good returns were reported from a new discovery; otherwise matters were very quiet.

In the immediate vicinity of Coolgardie only a few prospectors were working.

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 1928

FIG. 1.

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

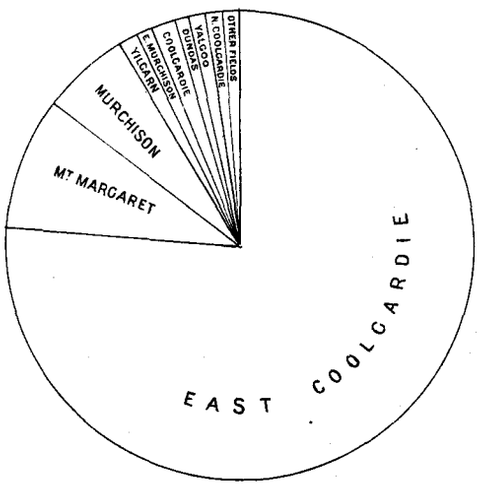


FIG. 2.

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

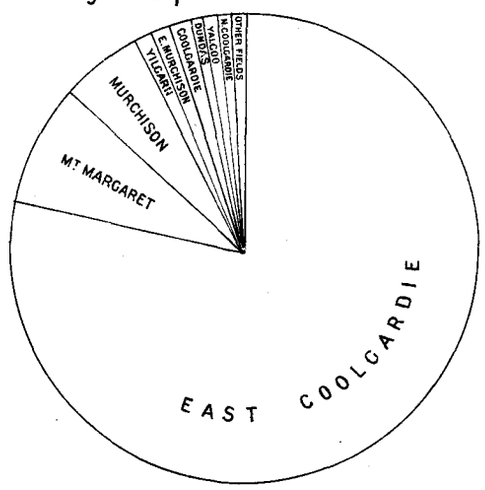


FIG. 3.

Value of Gold and other Minerals.

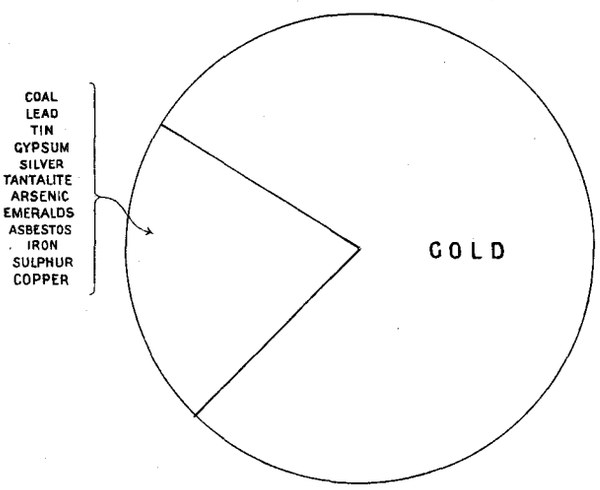


FIG. 4.

Value of Minerals other than Gold.

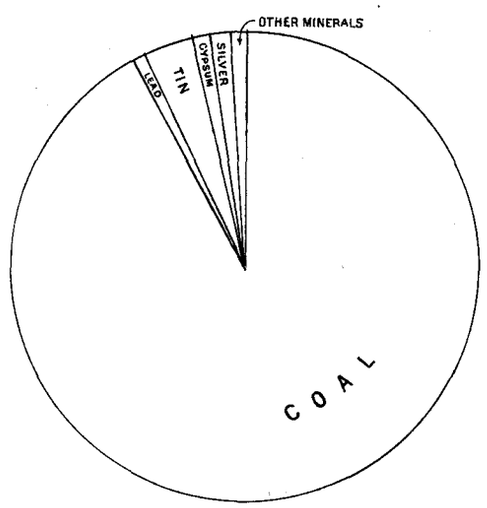


FIG. 5.

Areas of Land leased for Goldmining on various Goldfields.

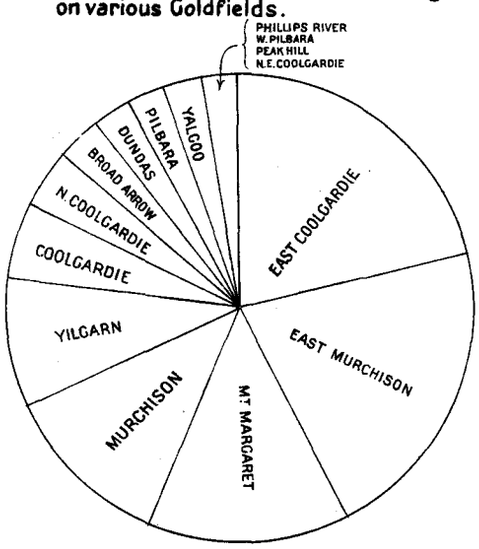


FIG. 6.

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

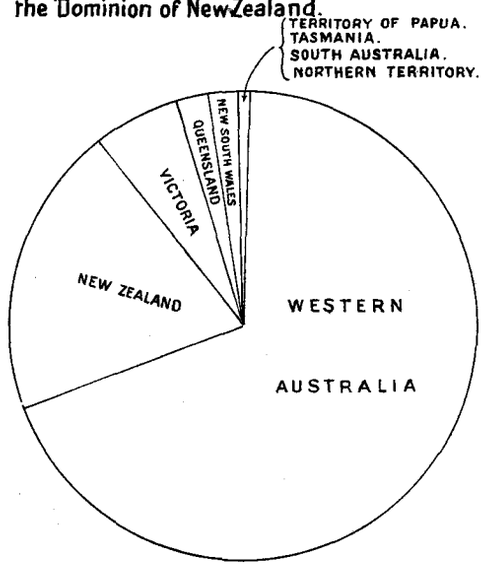


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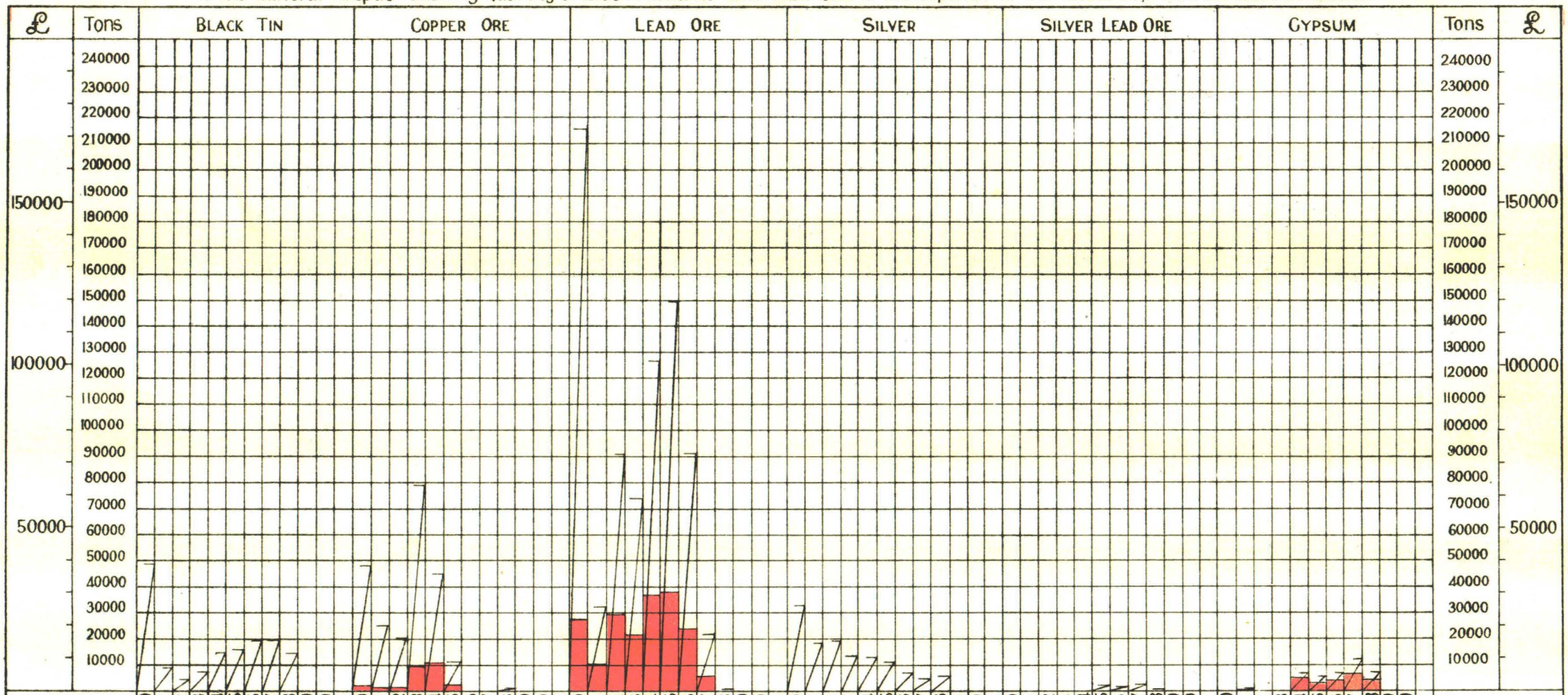
DIAGRAM

of the Mineral Output - shewing Quantity & Value of Minerals other than Gold & Coal reported to the Mines Dep^{t} from the Year 1920 onwards



Year		1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931
Value	£	38065	7238	3839	5984	11517	12373	15572	15773	11526			
Quantity	Tons	232	67	41	52	81	79	97	96	90			

Year		1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931
Value	£	37945	20162	16133	63184	36011	8952	NIL	NIL	400			
Quantity	Tons	1962	1150	1195	9873	10755	2470	NIL	NIL	45			

Year		1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931
Value	£	172483	25649	72338	59194	100219	119299	72872	17347	315			
Quantity	Tons	27716	10330	29603	21635	36750	37866	23973	5809	112			

Year		1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931
Value	£	26230	14770	15172	10930	10135	8736	5710	3659	4460			
Quantity	Ozs.	95744	89140	98050	76124	66341	60529	44263	31230	37042			

Year		1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931
Value	£	NIL	NIL	NIL	NIL	NIL	1898	1305	1971	293			
Quantity	Tons	NIL	NIL	NIL	NIL	NIL	81	90	96	18			

Year		1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931
Value	£	NIL	622	16	NIL	5278	4118	5618	9818	5425			
Quantity	Tons	NIL	664	63	NIL	4237	3060	3918	6674	4214			

NOTE:- The Pink denotes Quantities produced & Diagonal lines Values thereof

Minerals not shown above

Tantalite	9 tons	Value £ 2213
Asbestos	12 "	" £ 783
Emeralds		" £ 910
Fireclay	373 "	" £ 92

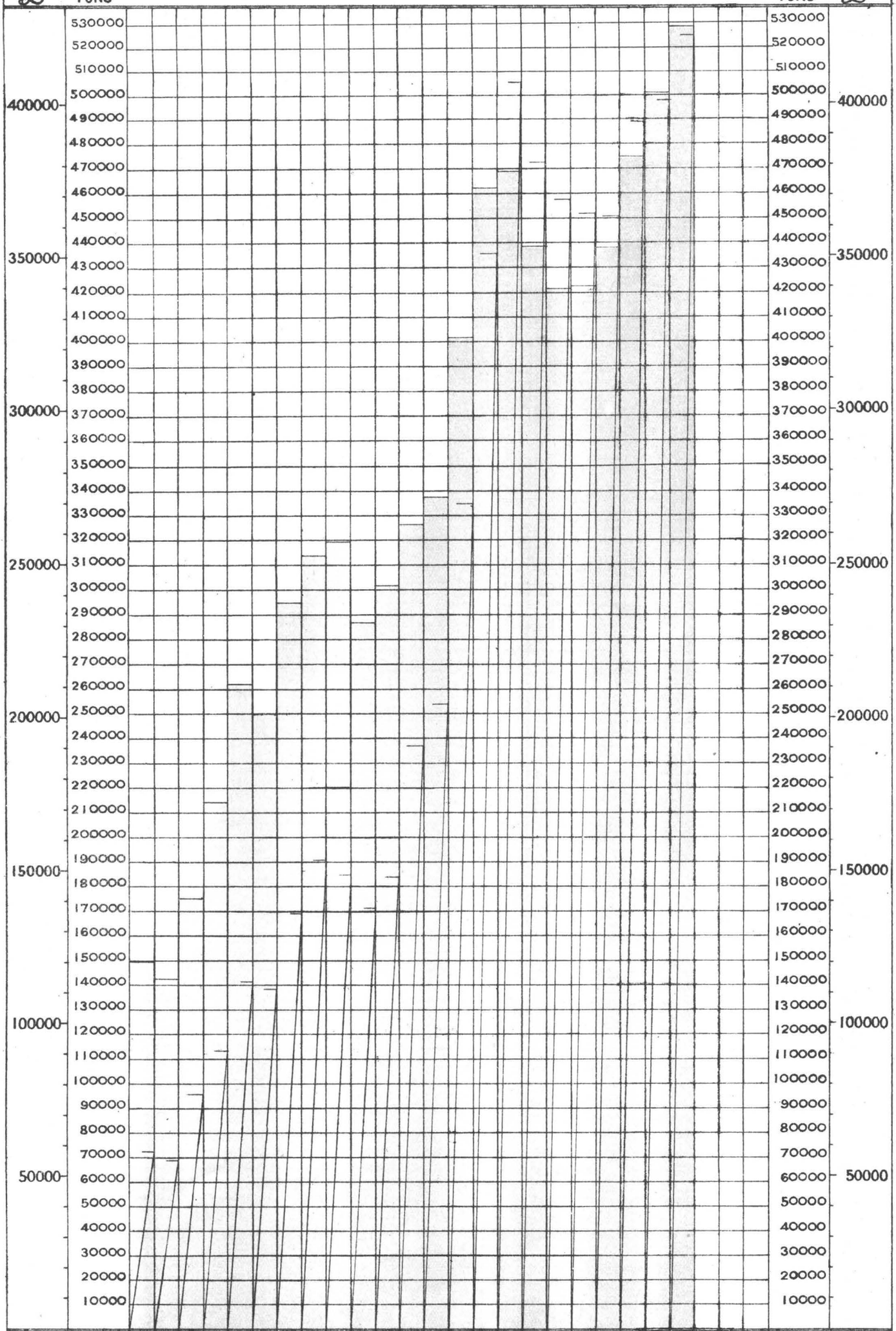
Previous to 1920 the Quantity & Value of various Minerals reported amounted to

Black Tin	16043	Tons	£1,373,883
Copper	225824	"	1,562,440
Ironstone	57830	"	36,695
Lead	213451	"	626,604
Asbestos	96	"	3,197
Pyritic Ore	58,470	"	26,146
Silver Lead	2884	£	33,987
Tantalite	102		15,268
Limestone	93706		18,290
Silver	2122812	Ozs	280,572
Other Minerals			3,905

1928

DIAGRAM

Of the Coal Output – Shewing Quantity & Value as reported to Mines Dept from 1906 onwards



Year	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	Year
Value £	57998	55158	75694	90965	113699	111154	135857	153614	148684	137589	147823	191822	204319	270355	350346	407117	381555	368949	363255	363203	394400	407967	420145	Value £
Quantity Tons	149765	142373	175248	214302	262166	249890	295079	313818	319210	286666	301526	326550	337039	401713	462021	468 817	438443	420714	421 864	437461	474819	501505	528420	Tons Quantity

1928

The North Coolgardie field had a good increase.

In the Menzies district a great improvement was recorded. A very promising discovery was reported from the old "Crusoe" Mine, and a trial crushing therefrom was very satisfactory.

The Golden Age continued to yield excellent results.

At Comet Vale the Sand Queen-Gladstone was working and producing regularly.

At Goongarrie and Mount Ida mining was exceedingly quiet.

In the Ularring district work was re-commenced on the Old Riverina South Mine, but developments were not encouraging, and towards the close of the year shortage of capital caused a suspension of operations. The mine is now let on tribute. Elsewhere in the district no mining was in evidence.

In the Yerilla district mining was quite non-existent.

In the Niagara district a discovery at a locality known as Twin Hills, about 22 miles West of Kookynie and 15 miles North East of Menzies, caused quite a revival. Several leases and prospecting areas have been taken up and it is thought that one or two payable mines may be developed.

The North East Coolgardie Goldfield had a decrease. No big mines were working and only a small amount of prospecting was going on.

In the Kurnalpi district mining is at a standstill.

The Broad Arrow field had a decrease, largely consequent on the suspension of operations on the Associated Northern Company's Mine at Ora Banda. Operations generally were much retarded as a result of the small ranfall for the year. No discoveries of note were reported.

In the East Coolgardie Goldfield the number of men engaged in mining was 1,981, and in 1927, 1,900; a decrease of 9. This goldfield gave employment to over 51 per cent. of the number of men employed in gold mining, and the reported production during the year was 294,955 fine ounces, over 75 per cent. of the total reported yield.

The tonnage treated was 441,552 tons, being 32,601 tons less than in 1927. The yield showed a decrease of 4,301 fine ounces on the preceding year. The average grade of the ore per ton rose from 53.47 shillings in 1927, to 56.64 shillings in 1928.

A regular output was maintained by most of the large mines, the chief contributors being the Great Boulder and Lake View and Star. The Oroya Links was acquired by the North Kalgurli, which has done considerable exploratory work prior to commencing operations on a large scale. The Golden Horseshoe Company succeeded in raising further capital, but nothing had transpired in regard to its future policy at the end of the year. A large number of tributers were working on some of the mines, many with very satisfactory results.

A geological examination of the "Golden Mile" by Dr. Stillwell was completed in December and his report will be published as early as possible.

In the Bulong district several good returns were reported from Mount Monger, where mining was active.

In the Yilgarn Goldfield there was a decrease. At Westonia there was quite a revival and options were taken over several properties. At Burbidge, Marvel Loch and Holleton, matters were exceedingly quiet. At Bullfinch a lot of prospecting was going on, and a public crushing plant, subsidised by the Government, was erected. At Manxman the Radio maintained its output.

Around Southern Cross only a little prospecting was being done.

In the Dundas field there was an increase. One mine had regular and satisfactory crushings and two others were also producing. Several prospecting areas are held and generally there is an improvement in the outlook.

The Phillips River field had a decrease. Very little gold mining was done and there was no production of copper, the result of the low price ruling. A marked improvement towards the close of the year may cause a revival, but the mining outlook is not promising.

In the Northern Goldfields, Kimberley, West Kimberley, West Pilbarra, Ashburton and Gascoyne, no development of note was reported.

In the Pilbarra field there was a decrease, and gold mining, as in the previous year, was very quiet.

TIN.

The quantity of Tin exported was 85 tons, valued at £15,002; an increase in tonnage of 8 tons, and in value of £1,686.

The Greenbushes tinfield produced 54.54 tons, valued at £6,355; a decrease in tonnage of 3.80 tons, and in value of £3,189.

The Pilbara field produced 35.48 tons, valued at £5,171; a decrease in tonnage of 1.96 tons, and in value of £1,058.

TANTALITE.

The production of 8.76 tons, valued at £2,213 was reported from the Pilbarra field. This is a decrease in tonnage of 6.52 tons, and in value of £1,595 on the previous year.

COPPER.

There was no production of this metal reported for the year.

COAL.

The output of Coal was 528,420 tons, being 26,915 tons more than in 1927. All the production was from Collie, where five (5) collieries were producing. One other was working but the production was limited to sufficient for boiler purposes. The deposits at Wilga were not worked during the year. At Eradu a good deal of boring was done, but operations were suspended towards the close of the year, as the drill was required elsewhere.

The number of men employed, 798, is greater by 50 men than in 1927, and the output per man was in 1927, 670 tons and in 1928, 662 tons.

OIL.

Boring operations, subsidised by the Federal Government, were in progress on the area held by the Freney Kimberley Oil Company in West Kimberley. An oil bearing strata was entered, but consequent on an influx of water drilling operations were suspended in October and action taken to obviate any risk. The services of an expert driller have been secured and early satisfactory results are hopefully anticipated. No drilling for oil is being done elsewhere in the State at present.

ASBESTOS.

From the Pilbarra field the production was reported of 11.70 tons, valued at £782; an increase on the previous year in tonnage of one (1) ton, and in value of £478. None was produced elsewhere.

OTHER MINERALS.

The quantity of Silver obtained as a by-product and exported was 55,554 ounces, valued at £6,638, and in the preceding year 49,895 ounces, valued at £5,829; an increase of 5,659 ounces and £809.

Lead and Silver Lead amounting to 248 tons, valued at £4,198; a decrease in tonnage of 1,165 tons, and in value of £20,394, was exported. Also one (1) ton of Iron, valued at £1, and 70 tons of Sulphur, valued at £70.

In addition, the production was reported of 4,214 tons of Gypsum, valued at £5,425; a decrease in tonnage of 2,461 tons, and in value of £4,393; also Emeralds to the value of £910.

MINING GENERALLY.

South Australia, the least producer, was the only State of the Commonwealth to record an increase in gold mining, viz.: from 418 to 532 fine ounces, the remaining States and also New Zealand and the Territory of Papua all recorded decreases.

The Western Australian production was 68.27 per cent. of the total for Australasia, and in the preceding year 64.72 per cent.

Legitimate assistance in every possible direction has been extended by the Government with a view to pushing forward the Industry by the development of existing mines and the discovery of fresh deposits, so that if possible the gold output may be augmented and the long continued decline arrested.

A considerable amount of diamond drilling was done during the year and in two instances the results have been satisfactory and encouraging. Both are on gold deposits the capital necessary for developing which, it is hoped, will be readily forthcoming.

The special relief accorded mine owners by freeing them from the payment of premiums necessary to cover the liability for occupational diseases under the Third Schedule of the Workers' Compensation Act was continued throughout the year, the amount involved being, to the 31st December, £31,475 3s. 3d.

The concessions in regard to reduced charges for water and for treatment of ore at State batteries have been continued.

The special geological investigations at Kalgoorlie recommended by the Technical Committee of the Commonwealth Development and Migration Commission and for which purpose they made available the services of a highly trained officer, were completed at the end of the year, and a report submitted. The report is a very valuable one and contains recommendations as to future operations likely to attain satisfactory results. It will be published as a Geological Bulletin.

It is intended that some Geophysical investigations will shortly be undertaken in this State by one of the parties at present engaged elsewhere in Australia under the control of the Commonwealth Council for Scientific and Industrial Research. The Government is rendering all possible assistance, and will carry out any boring that may be deemed advisable.

In mining for base metals the continued low prices ruling for many of them militated against any marked improvement.

The assistance to prospectors, by way of sustenance, loans of equipment and transport facilities, was continued. The Board dealing with this matter granted 192 applications, representing 282 men, and approved of 132 extensions of existing cases, affecting 177 men. The expenditure involved was £6,603 4s., being £1,436 16s. in excess of that for the previous year. From the 1st September, 1919, when the State Prospecting Board came into existence, 1,438 parties, embracing 2,300 men (including 5 specially selected State prospecting parties), have been assisted at a total cost of £54,770 16s. 8d. The assisted prospectors' operations extended throughout the mineral bearing portions of the State and several of them reported good crushings. Throughout the year, however, weather conditions were not too favourable, several reports received having made reference to scarcity of feed and shortage of water in the localities traversed.

The area under prospecting areas, for gold and minerals, apart from coal, viz.:—7,865 acres, is 1,083 acres in excess of that held during the preceding year and indicates that prospecting is still active.

The expenditure incurred in rendering assistance to mine owners and the Industry generally under the provisions of the Mining Development Act totalled £80,666 4s. 3d., and in the preceding year £81,686 7s. 11d.

In addition, guarantees were given to Banks on behalf of several mine owners, the liability of the Government at the close of the year in respect of these being £51,500.

PART II.—MINERALS RAISED.

TABLE 1.

Quantity and Value of all the Minerals produced during 1927 and 1928.

Description of Minerals.	1927.		1928.		Increase or Decrease for Year compared with 1927.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
		£		£		£
1. Arsenical Ore (exported) statute tons	*	819	*	401	...	— 418
2. Asbestos (reported), statute tons	11	304	12	782	+ 1	+ 478
3. Coal (raised), statute tons	501,505	407,967	528,420	420,145	+ 26,915	+ 12,178
4. Copper { Ore (exported), statute tons	...	...	100	765	+ 100	+ 765
4. Copper { Ingot, Matte, etc. (exported), statute tons	2	101	...	...	— 2	— 101
5. Emeralds (reported), carats (cut)	200	421	†	910	...	+ 489
6. Gold (exported and minted), fine ozs.	408,353	1,734,571	393,408	1,671,093	— 14,945	— 63,478
7. Gypsum (reported), statute tons	6,675	9,818	4,214	5,425	— 2,461	— 4,393
8. Iron (exported), statute tons	...	...	1	1	+ 1	+ 1
9. Lead and Silver Lead (exported), statute tons	1,413	24,592	248	4,198	— 1,165	— 20,394
10. Manganese (exported), statute tons	30	303	...	...	— 30	— 303
11. Mica	4	536	...	...	— 4	— 536
12. Pottery Clay (exported), statute tons	35	114	...	...	— 35	— 114
13. Silver (exported), fine ounces	49,895	5,829	55,554	6,638	+ 5,659	+ 809
14. Sulphur (exported), statute tons	...	...	*	70	...	+ 70
15. Tantalite (exported), statute tons	17	3,746	11	2,749	— 6	— 997
16. Tin (exported), statute tons	77	13,316	85	15,002	+ 8	+ 1,686
Total Values	...	2,202,437	...	2,128,179	...	—74,258

* Contained in Gold ore. † Not cut.

TABLE 2.

Value and Percentage of Mineral Exports in relation to the Value of Total Exports from Western Australia.

Year.	Total Exports.	Mineral Exports (exclusive of Coal).	Percentage.
	£	£	
1901	8,515,623	6,920,118	81·27
1902	9,051,358	7,530,319	83·20
1903	10,324,732	8,727,060	84·53
1904	10,271,489	8,625,676	83·98
1905	9,871,019	7,731,954	78·33
1906	9,832,679	7,570,305	76·99
1907	9,904,860	7,544,992	76·17
1908	9,518,020	7,151,317	75·13
1909	8,860,494	5,906,673	66·66
1910	8,299,781	4,795,654	57·78
1911	10,606,863	7,171,638	67·61
1912	8,941,008	5,462,499	61·09
1913	9,128,607	4,608,188	50·48
1914	8,406,182	3,970,182	47·23
1915	6,291,934	2,969,502	47·19
1916	10,878,153	6,842,621	62·92
1917	9,323,229	5,022,694	53·87
1918	6,931,834	2,102,923	30·34
1919	14,279,240	6,236,585	43·67
1920	15,149,323	3,096,849	20·44
1921	10,331,405	1,373,810	13·30
1922	11,848,025	2,875,402	24·27
1923	11,999,500	3,259,476	27·16
1924	13,808,910	1,424,319	13·24
1925	13,642,852	173,126	1·27
1926	14,668,184	1,597,698	10·89
1927	15,805,120	472,041	2·99
1928	16,911,932	996,099	5·88
Total since 1900	303,402,356	132,159,720	43·56

TABLE 3.

Showing for every Goldfield the amount of Gold reported to the Mines Department as required by the Regulations; also the percentage for the several Goldfields of the total reported and the average value of the Gold per ton of ore treated.

Goldfield.	Reported Yield.					
	1927.	1928.	Percentage for each Goldfield.		Average Value of Gold per ton of Ore treated.	
			1927.	1928.	1927.	1928.
	fine ozs.	fine ozs.			shillings.	shillings.
1. Kimberley	194	40	·05	·01	...	...
2. West Kimberley	...	...	...	...	...	...
3. Pilbara	2,023	1,946	·50	·49	155·11	192·75
4. West Pilbara	53	15	·01	·01	14·80	...
5. Ashburton	15	36	·01	·01	...	...
6. Gascoyne	79	60	·02	·02	...	...
7. Peak Hill	1,689	1,034	·41	·26	56·29	52·52
8. East Murchison	6,025	4,758	1·48	1·21	91·49	181·16
9. Murchison	27,886	23,636	6·86	6·03	48·50	39·93
10. Yalgoo	2,394	6,206	·59	1·58	73·83	46·99
11. Mt. Margaret	36,698	35,224	9·03	8·98	29·05	26·60
12. North Coolgardie	2,055	5,774	·51	1·47	158·94	51·96
13. Broad Arrow	7,570	1,190	1·83	·30	42·80	91·78
14. North-East Coolgardie	2,487	1,298	·61	·33	59·21	57·01
15. East Coolgardie	299,256	294,955	73·62	75·23	53·47	56·64
16. Coolgardie	5,786	6,104	1·42	1·56	98·49	99·11
17. Yilgarn	9,227	5,338	2·27	1·36	29·05	122·23
18. Dundas	2,739	4,341	·67	1·11	63·50	56·51
19. Phillips River	284	113	·07	·03	86·37	118·52
State generally	10	10	·01	·01	...	94·33
Totals and averages	406,470	392,079	100·00	100·00	49·32	51·18

The total gold yield of the State is as shown in Table 1, being the amount of gold exported, and also that lodged at the Royal Mint, which total includes alluvial gold and gold not reported to the Department.

When comparisons are made as to the yield from any particular field with the preceding year, the figures reported to the Department are used.

TABLE 4.

Averages of Gold Ore raised and treated, and Gold produced therefrom, per man employed on the several Goldfields of the State, during 1927 *and* 1928.

Goldfield.	1927.				1928.			
	Tons of Gold Ore raised and treated.		Fine ounces of Gold produced therefrom.		Tons of Gold Ore raised and treated.		Fine ounces of Gold produced therefrom.	
	Per man employed under ground.	Per man employed above and under ground.	Per man employed under ground.	Per man employed above and under ground.	Per man employed under ground.	Per man employed above and under ground.	Per man employed under ground.	Per man employed above and under ground.
	tons.	tons.	fine ozs.	fine ozs.	tons.	tons.	fine ozs.	fine ozs.
1. Kimberley	...	...	...	...	...	...	...	...
2. West Kimberley	...	...	...	...	...	...	...	...
3. Pilbara	38·37	25·58	70·03	46·69	52·34	29·91	118·69	67·82
4. West Pilbara	...	...	...	...	...	...	...	...
5. Ashburton	...	...	...	...	...	...	...	...
6. Gascoyne	...	...	...	...	...	...	...	...
7. Peak Hill	145·00	74·84	96·08	49·59	156·90	71·32	96·93	44·06
8. East Murchison	42·39	17·85	45·65	19·23	20·70	8·39	42·79	17·90
9. Murchison	253·36	132·19	144·58	75·43	245·43	128·83	115·18	60·56
10. Yalgoo	56·70	27·03	49·28	24·39	200·07	112·04	110·64	61·96
11. Mt. Margaret	414·65	238·26	141·80	81·48	499·26	280·99	156·33	87·99
12. North Coolgardie	51·50	15·91	96·40	29·77	199·17	91·53	121·81	56·60
13. Broad Arrow	256·60	119·75	129·25	60·24	22·19	10·21	23·97	11·03
14. North-East Coolgardie ...	100·09	47·87	69·76	33·36	81·80	37·34	54·91	25·07
15. East Coolgardie	435·82	241·05	274·28	151·71	408·84	216·07	272·59	150 84
16. Coolgardie	52·93	24·35	61·35	28·22	60·33	27·45	70·38	32·03
17. Yilgarn	420·64	186·95	143·86	63·94	55·00	27·10	79·13	39·00
18. Dundas	99·03	48·21	74·02	36·03	171·84	89·45	114·00	59·34
19. Phillips River	39·00	11·37	39·65	11·56	11·57	3·37	16·19	4·72
Total Averages	335·88	175·17	194·99	101·69	324·69	171·39	195·61	103·26

The average value of gold produced per man above and under ground was £431·95 in 1927 and £438·62 in 1928. The average tonnage of ore raised shows a decrease from 175·17 tons to 171·39 tons. The average tonnage raised per man is highest in the East Coolgardie Goldfield, *viz.*, 216·07 tons, average value £640·73, the next being Mount Margaret Goldfield with 280·99 tons, average value £373·76.

TABLE 5.

Output of Gold from the several States of Australia, the Northern Territory, Papua, and the Dominion of New Zealand during 1928.

State.	Output of Gold.	Value.	Percentage of total Output of Australasia.
	Fine ozs.	£	
1. Western Australia	393,408	1,671,093	68·27
2. Victoria	33,917	144,068	5·88
3. Queensland	13,275	56,387	2·30
4. New South Wales	12,831	54,503	2·23
5. Tasmania...	3,603	15,306	0·63
6. South Australia	532	2,258	0·09
7. Papua	1,225	5,203	0·21
8. Northern Territory	105	448	0·02
9. New Zealand	117,362	498,523	20·37
Total	576,258	2,447,789	100·00

TABLE 6.

Dividends paid by Western Australian Gold Mining Companies during 1928 and Total to date.

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

Goldfield.	Name of Company.	Capital.				Dividends.		
		Authorised	No. of Shares.	Par Value Shares.	Paid up to.	Paid in 1928.		Grand Total paid to end of 1928.
						No.	Total Amount.	
		£		£ s. d.	£ s. d.		£	£
Peak Hill ...	Various Companies ...	...	...	...	...	...	...	160,666
East Murchison...	Various Companies ...	...	...	...	...	...	...	437,968
Murchison ...	Various Companies ...	...	...	...	...	...	...	1,992,670
Mt. Margaret ...	Various Companies ...	...	...	...	...	...	...	1,504,701
North Coolgardie	Various Companies ...	...	...	...	...	...	...	575,032
North-East Coolgardie	Various Companies ...	...	...	...	...	...	...	89,854
East Coolgardie...	South Kalgurli Consolidated, Ltd.	150,000	250,007	0 10 0	0 10 0	2	31,250	440,001
Do. ...	Other Companies	...	...	...	...	...	...	22,453,469
Coolgardie ...	Various Companies ...	...	...	...	...	...	...	339,495
Yilgarn	Various Companies ...	...	...	...	...	...	...	513,199
Dundas	Various Companies ...	...	...	...	...	...	...	222,625
	Total Dividends paid during 1928	...	...	...	...	...	31,250	...
	Total Dividends paid to end of 1928	...	...	...	...	...	...	28,729,680

TABLE 7.

Value of Gold Production and Percentage of Dividends paid.

Year.	Value of Gold Production.	Dividends paid by Gold Mining Companies.	Dividends % of Total Production.	Value of Gold Production by Gold Mining Companies only.	Dividends % upon Production by Gold Mining Companies.
	£	£	%	£	%
Previous to 1919	137,611,514	27,086,420	19·68	...	...
1919	3,118,113	338,244	10·85	2,337,433	14·23
1920	2,624,427	429,083	16·35	2,212,711	19·39
1921	2,352,098	306,958	13·05	1,787,721	17·17
1922	2,286,325	191,251	8·36	1,789,879	10·69
1923	2,143,028	73,750	3·44	1,730,712	4·26
1924	2,060,298	124,771	6·06	1,623,588	7·68
1925	1,874,320	55,224	2·94	1,526,248	3·62
1926	1,857,716	61,479	3·31	1,495,388	4·11
1927	1,734,571	31,250	1·80	1,435,572	2·18
1928	1,671,093	31,250	1·87	1,394,942	2·24
Total ...	159,845,695	28,729,680	17·97	*17,334,194	*9·48

* Last ten years only.

TABLE 8.

Quantity and Value of Minerals, other than Gold and Coal, reported to the Mines Department during 1928.

Goldfield, District, or Mineral Field.	1928.		Increase or Decrease for Year compared with 1927.	
	Quantity.	Value.	Quantity.	Value.
	tons.	£	tons.	£
BLACK TIN.				
Pilbara Goldfield (Marble Bar District)	35·48	5,171	— 1·96	— 1,058
Greenbushes Mineral Field	54·54	6,355	— 3·80	— 3,189
Total	90·02	11,526	— 5·76	— 4,247
TANTALITE.				
Pilbara Goldfield (Marble Bar District)	8·76	2,213	— 6·52	— 1,595
COPPER ORE.				
West Pilbara Goldfield	45·00	400	+ 45·00	+ 400
LEAD ORE.				
Northampton Mineral Field	112·00	315	—5,697·50	— 17,032
SILVER-LEAD ORE.				
Ashburton Goldfield	...	...	— 60·00	— 1,179
Pilbara Goldfield (Marble Bar District)	17·85	293	— 18·15	— 499
	17·85	293	— 78·15	— 1,678
ASBESTOS.				
Pilbara Goldfield (Marble Bar District)	5·70	600	+ 5·70	+ 600
Do. do. (Nullagine District)	6·00	182	— 4·80	— 122
	11·70	782	+ ·90	+ 478
GYPSUM.				
Yilgarn Goldfield	1,214·00	1,214	+ 515·75	+ 516
State generally	3,000·00	4,211	—2,976·25	— 4,909
	4,214·00	5,425	—2,460·50	— 4,393
EMERALDS.				
	Carats (rough).			
Murchison Goldfield (Cue District)	17,564·00	910	*	+ 489

* The production in 1927 was 200·43 carats (cut).

The output of black tin shows a decrease in tonnage of 5.76 tons and in value of £4,247. Tantalite also shows decreases in tonnage of 6.52 tons and in value of £1,595. Copper ore showed a slight increase due to the fact that none was produced in the previous year while a small parcel of 45 tons valued at £400 was obtained in 1928. Lead ore decreased by 5,697.50 tons and £17,032, and silver lead ore shows decreases in tonnage of 78.15 tons and in value of £1,678. The production of asbestos was 11.70 tons valued at £782 being a decrease in tonnage of .90 tons and in value of £478. Gypsum shows a decrease in tonnage of 2,460.50 tons and in value of £4,393. The value of emeralds produced increased by £489 being 17,564 carats rough against 200.43 carats cut stones in the previous year.

The production of tin was again confined to Pilbara and Greenbushes Fields, and tantalite came from Pilbara Goldfield. Copper ore came from West Pilbara Goldfield, while lead ore came from Northampton Mineral Field and silver-lead ore from Ashubrton and Pilbara Goldfields. Asbestos came from Pilbara Goldfield and gypsum from Yilgarn Goldfield and from the State generally. Emeralds were produced from Murchison Goldfield.

TABLE 9.

Quantity of Coal raised during 1927 and 1928, 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	1927	501,505	407,967	177	571	878	670
	1928	528,420	420,145	198	600	881	662

The number of men employed at collieries has increased by 50, and the output has increased by 26,915 tons, and the value by £12,178.

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

TABLE 10.

Total Number and Acreage of Leases held for Mining on 31st December, 1927 and 1928.

Description of Leases.	1927.		1928.	
	No.	Acreage.	No.	Acreage.
Gold mining leases on Crown land	385	6,247	380	6,072
„ „ „ private property	1	6	1	6
Mineral leases on Crown land	262	46,880	253	46,938
„ „ „ private property	8	253	6	202
	656	53,386	640	53,218

The total number of leases held for mining purposes decreased by 16 and the area by 168 acres, as compared with the year 1927. The number of leases for gold mining decreased by 5 and the area by 175 acres. The number of mineral leases decreased by 11 and the area increased by 7 acres.

TABLE 11.

Number and Acreage of Gold Mining Leases in force each year for the Five Years ending the 31st December, 1928.

Goldfield.		District.		1924.		1925.		1926.		1927.		1928.		Percentage of Total Acreage.		Increase or Decrease in Acreage for 1928 compared with 1927.		Goldfield.
Name.	Proclaimed.	Name.	Pro-claimed.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	1927.	1928.	Increase	Decrease	
West Kimberley ...	19-3-20	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	West Kimberley.
Kimberley ...	20-5-86	...	...	...	...	...	...	...	...	2	48	...	...	·77	...	...	48	Kimberley.
Yilgarn	1-10-88	...	...	40	665	34	544	33	619	39	739	31	541	11·91	9·00	...	198	Yilgarn.
		(Private Property)	...	...	...	1	24	...	...	1	6	1	6					
Pilbara	1-10-88	Marble Bar ...	6-11-96	17	167	10	85	11	91	10	98	11	88	3·01	2·53	...	34	Pilbara.
		Nullagine ...	6-11-96	3	30	3	30	2	12	5	90	4	66					
Ashburton ...	11-12-90	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Ashburton.
Murchison	24-9-91	Cue	7-12-94	11	149	14	198	10	137	15	234	12	192	11·42	11·85	6	...	Murchison.
		Meekatharra ...	7-12-94	28	449	22	356	20	310	20	293	22	323					
		Day Dawn ...	10-1-96	9	79	7	73	6	64	6	64	6	64					
		Mount Magnet ...	7-12-94	11	92	10	91	16	151	12	123	14	141					
Dundas	31-8-93	...	...	13	147	8	108	8	90	8	104	11	158	1·66	2·59	54	...	Dundas.
Coolgardie ...	6-4-94	Coolgardie ...	7-12-94	33	521	30	474	14	250	16	283	18	304	5·25	5·47	4	...	Coolgardie.
		Kunanalling ...	18-8-97	12	160	10	133	10	133	4	45	2	28					
East Coolgardie ...	1-10-94	East Coolgardie	7-12-94	123	1,847	112	1,673	87	1,302	86	1,276	83	1,240	21·32	21·34	...	36	East Coolgardie.
		Bulong	19-2-96	2	45	3	69	3	57	3	57	3	57					
Yalgoo	23-1-95	...	...	18	285	16	239	14	166	11	146	10	142	2·33	2·33	...	4	Yalgoo.
North Coolgardie	28-6-95	Menzies	19-2-96	20	330	19	295	16	270	9	94	9	83	2·89	4·28	79	...	North Coolgardie.
		Ularring	19-2-96	3	56	...	...	2	48	3	60	3	60					
		Yerilla	19-2-96	10	149	3	51	4	42	2	27	2	27					
		Niagara	10-3-97	2	17	2	17	2	17	...	...	8	90					
East Murchison ...	28-6-95	Lawlers	1-6-04	16	248	12	178	8	155	4	73	3	13	19·89	21·06	36	...	East Murchison.
		Black Range ...	1-6-04	8	165	5	86	6	89	4	62	3	56					
		Wiluna	23-2-10	80	1,710	51	1,067	48	986	54	1,109	59	1,211					
North-East Coolgardie	19-2-96	Kanowna ...	19-2-96	16	256	13	165	12	162	9	116	4	32	1·86	·53	...	84	N.E. Coolgardie.
		Kurnalpi ...	19-2-96	...	...	1	24	3	72	...	...	...	...					
Broad Arrow ...	11-11-96	...	...	16	257	16	274	13	218	11	185	12	189	2·96	3·11	4	...	Broad Arrow.
Peak Hill ...	19-3-97	...	...	6	32	8	42	9	55	8	49	6	39	·78	·64	...	10	Peak Hill.
Mount Margaret	10-3-97	Mount Margaret	10-3-97	12	254	9	182	7	134	7	134	7	150	12·46	14·19	83	...	Mount Margaret.
		Mount Malcolm...	10-3-97	29	595	25	547	24	529	24	529	28	625					
		Mount Morgans...	23-3-02	11	186	6	102	7	111	7	116	5	87					
West Pilbara ...	1-11-95	...	...	1	6	1	6	2	30	2	30	2	30	·48	·49	...	...	West Pilbara.
Phillips River ...	14-9-00	...	...	6	88	7	94	6	88	4	63	2	36	1·01	·59	...	27	Phillips River.
Other Localities ...	...	...	...	...	...	9	156	11	192	...	...	...	...	...	...	...	...	Other Localities.
Gascoyne	17-3-97	...	...	4	24	2	12	...	...	...	...	...	...	...	...	...	...	Gascoyne.
Totals ...	... ...	... ...	...	560	9,009	469	7,395	414	6,580	386	6,253	381	6,078	100·00	100·00	266	441	

Decrease for the Year 1928—Leases 7 ; acres 175. The largest percentages of the area leased for Gold Mining purposes is in the respective order :—East Coolgardie, 21·34 ; East Murchison, 21·06 ; Mt. Margaret, 14·19 ; Murchison, 11·85 ; Yilgarn, 9·00 ; Coolgardie, 5·25.

TABLE 12.

Number and Acreage of Mineral Leases in force 31st December each year, for the Five Years ending 31st December, 1928.

Mining District.		Sub-District.		1924.		1925.		1926.		1927.		1928.		Increase or Decrease in Acreage for 1928, compared with 1927.		Mining District.
Name.	Proclaimed.	Name.	Proclaimed.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage	Increase.	Decrease.	
Ashburton	11-12-90	...	...	3	87	1	15	3	75	1	15	...	...	...	15	Ashburton.
Murchison	24-9-91	Cue	7-12-94	...	...	...	...	2	42	14	296	21	452	156	...	Murchison.
		Meekatharra ...	7-12-94	...	...	...	...	...	...	...	...	...	...			
		Day Dawn ...	10-1-96	...	...	...	...	...	...	...	...	...	...			
		Mt. Magnet ...	7-12-94	...	...	...	...	...	...	...	...	...	...			
Greenbushes ...	7-4-92	...	...	6	107	5	97	7	152	8	176	10	209	33	...	Greenbushes.
Pilbara	16-6-92	Marble Bar ...	16-6-92	14	447	16	509	27	752	26	561	31	859	258	...	Pilbara.
		Nullagine ...	6-11-96	4	30	3	21	...	...	1	40	...	...			
Yalgoo	23-1-95	...	...	2	96	...	...	...	...	...	...	...	...	...	...	Yalgoo.
Yilgarn	22-3-95	...	...	1	10	...	...	...	...	1	48	...	...	...	48	Yilgarn.
Coolgardie	22-3-95	Coolgardie ...	22-3-95	2	28	2	28	2	28	2	28	1	6	...	22	Coolgardie.
		Kunanalling ...	1-9-97	...	...	...	...	...	...	...	...	...	...			
East Coolgardie ...	22-3-95	East Coolgardie	22-3-95	1	1	1	1	2	13	1	1	1	1	...	...	East Coolgardie.
		Bulong	19-2-96	...	...	...	...	...	...	...	...	...	...			
East Murchison ...	28-6-95	Lawlers	1-6-04	...	...	...	...	...	...	...	...	...	...	...	...	East Murchison.
		Black Range ...	1-6-04	...	...	...	...	...	...	...	...	...	...			
		Wiluna	23-2-10	...	...	...	...	...	...	...	...	...	...			
North Coolgardie ...	16-8-95	Menzies	19-2-96	...	...	...	...	...	...	...	...	...	...	...	...	North Coolgardie.
		Ularring	19-2-96	...	...	...	...	...	...	...	...	...	...			
		Yerilla	19-2-96	...	...	...	...	...	...	...	...	...	...			
		Niagara	10-3-97	...	...	...	...	...	...	...	...	...	...			
West Pilbara ...	1-11-95	...	...	21	778	14	588	11	476	14	614	15	646	32	...	West Pilbara.
Dundas	27-12-95	...	...	...	...	2	36	2	36	2	36	2	36	...	...	Dundas.
Collie	21-2-96	...	...	125	38,059	117	35,619	117	35,619	126	38,379	126	38,379	...	...	Collie.
North-East Coolgardie	19-2-96	Kanowna ...	19-2-96	1	10	2	106	2	106	1	10	1	10	...	...	North-East Coolgardie.
		Kurnalpi ...	19-2-96	...	...	...	...	...	...	...	...	...	...			
Broad Arrow ...	11-11-96	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Broad Arrow.
Northampton ...	16-12-96	...	...	13	278	19	387	19	371	14	292	8	148	...	147	Northampton.
		(Private Property)	...	5	191	8	251	9	275	6	203	5	200			
Peak Hill	19-3-97	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Peak Hill.
Mt. Margaret ...	10-3-97	Mt. Margaret ...	10-3-97	...	...	...	...	...	...	...	...	...	...	...	...	Mt. Margaret.
		Mt. Malcolm ...	10-3-97	...	...	...	...	...	...	...	...	...	...			
		Mt. Morgans ...	23-3-02	...	...	...	...	...	...	...	...	...	...			
Gascoyne	17-3-97	...	...	1	48	...	...	...	...	...	...	...	...	...	...	Gascoyne.
Phillips River ...	14-7-99	...	...	17	398	19	373	18	323	17	275	3	83	...	192	Phillips River.
Other localities ...	...	...	...	25	6,820	25	6,860	25	6,890	24	5,661	24	5,661	...	...	Other Localities.
		(Private Property)	...	6	166	2	68	2	50	2	50	1	2	...	48	
West Kimberley ...	19-3-20	...	...	10	448	10	448	10	448	10	448	10	448	...	...	West Kimberley.
Totals ...	...	...	...	257	48,002	246	45,407	258	45,656	270	47,133	259	47,140	479	472	

In the Collie Mineral Field the largest area is held, viz.:—35,619 acres, worked entirely for Coal; then follow Pilbara, 859 acres for Tin, Tantalite, Lead, Vanadium, Silver-Lead and Asbestos; West Pilbara, 646 acres for Copper and Asbestos; Murchison, 452 acres for Emerald; West Kimberley, 448 acres for Iron; Northampton, 348 acres for Lead and Coal; Greenbushes, 209 acres for Tin.

TABLE 13.

Number and Acreage of Mineral Leases in force on 31st December, 1928, showing Minerals for which they are worked.

Goldfield or Mineral Field.	District.	Mineral. Coal.		Tin.		Copper.		Iron.		Emerald.		Ochre.		Silver and Lead.		Asbestos.		Vanadium.		Clay.		Mineral Oil.	
		Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.
Yilgarn	... ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Pilbara	Marble Bar ...	...	...	11	248	...	...	...	...	...	...	...	...	6	194	4	182	1	48	...	...	...	...
Murchison	Cue	...	...	...	...	...	...	...	...	21	452	...	...	...	...	...	...	...	...	...	...	...	...
West Pilbara ...	... ...	...	...	...	...	8	352	...	...	...	...	...	...	...	...	7	294	...	...	...	...	...	...
Dundas	... ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
East Coolgardie ...	... ...	...	...	...	...	...	...	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...	...
Coolgardie	... ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
North-East Coolgardie	Kanowna ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Phillips River ...	... ...	...	...	...	...	3	83	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Collie	... ...	126	38,379	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Greenbushes ...	... ...	...	...	10	209	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Northampton ...	... ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	(Private Property	1	100	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Outside Proclaimed Fields	... ...	18	5,440	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	93
	(Private Property)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	2	...	...
West Kimberley ...	... ...	...	...	...	...	...	...	10	448	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Totals	145	43,919	21	457	11	435	10	448	21	452	1	1	6	194	11	476	1	48	1	2	3	93

Goldfield or Mineral Field.	District.	Mineral. Alunite.		Tantalite.		Lead.		Gypsum.		Felspar.		Manganese.		Total.	
		Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.
Yilgarn	... ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Pilbara	Marble Bar ...	...	...	7	91	2	96	...	...	...	...	...	...	31	859
Murchison	Cue	...	...	...	...	...	...	...	...	...	...	...	...	21	452
West Pilbara ...	... ...	...	...	...	...	...	...	...	...	...	...	...	...	15	646
Dundas	... ...	...	...	...	...	...	...	2	36	...	...	...	...	2	36
East Coolgardie ...	... ...	...	...	...	...	...	...	...	...	...	...	...	...	1	1
Coolgardie	... ...	...	...	...	...	...	...	...	...	1	6	...	...	1	6
North-East Coolgardie	Kanowna ...	1	10	...	...	...	...	...	...	...	...	...	...	1	10
Phillips River ...	... ...	...	...	...	...	...	...	...	...	...	...	...	...	3	83
Collie	... ...	...	...	...	...	...	...	...	...	...	...	...	...	126	38,379
Greenbushes ...	... ...	...	...	...	...	...	...	...	...	...	...	...	...	10	209
Northampton ...	... ...	...	...	...	...	8	148	...	...	...	...	...	...	8	148
	(Private Property)	...	...	...	...	4	100	...	...	...	...	...	...	5	200
Outside Proclaimed Fields	... ...	1	40	...	...	...	...	1	40	...	...	1	48	24	5,661
	(Private Property)	...	...	...	...	...	...	...	...	...	...	...	...	1	2
West Kimberley ...	... ...	...	...	...	...	...	...	...	...	...	...	...	...	10	448
	Totals	2	50	7	91	14	344	3	76	1	6	1	48	259	47,140

Table 14.

Number and Acreage of Miscellaneous Leases in force on 31st December, 1928.

Goldfield.	District.	Leases.								Total.	
		Tailings.		Tramway.		Water.		Machinery.			
		No.	Acres.	No.	Acres.	No.	Acres.	No.	Acres.	No.	Acres.
West Pilbara	... ...	...	...	2	25	...	...	...	...	2	25
North Coolgardie	Menzies	1	12	...	...	1	5	...	...	2	17
East Coolgardie	... ...	13	269	...	...	...	...	1	1	14	270
Coolgardie	... ...	1	7	...	...	1	13	...	...	2	20
Phillips River	... ...	...	...	...	...	...	...	1	10	1	10
	Total	15	288	2	25	2	18	2	11	21	342

TABLE 15.

Claims and Authorised Holdings, under "The Mining Act, 1904," and Regulations, existing on 31st December, 1927 and 1928.

Goldfield or Mineral Field.	District.	Prospecting Areas.				Water Rights.				Lode Claims.		Alluvial Claims.		Mineral Claims.		Dredging Claims.		Residence Areas.		Business Areas.		Machinery Areas.		Tailings Areas.		Garden Areas.		Washing Areas.		Quarrying Areas.	
		Number.		Acreage.		Number.		Acreage.																							
		1927.	1928.	1927.	1928.	1927.	1928.	1927.	1928.	1927.	1928.	1927.	1928.	1927.	1928.	1927.	1928.	1927.	1928.	1927.	1928.	1927.	1928.	1927.	1928.	1927.	1928.	1927.	1928.	1927.	1928.
Kimberley	... ...	...	1	...	24	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
West Kimberley ...	... ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Northampton ...	... ...	5	1	78	24	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Pilbara	Marble Bar ...	27	8	512	95	2	3	25	27	...	...	2	2	6	72	...	...	...	...	8	5	1	1	...	...	5	4	...	...	...	...
Do.	Nullagine ...	10	5	190	108	...	2	...	2	...	...	...	...	5	8	...	...	3	5	...	...	1	...	...	...	3	2	...	...	...	...
West Pilbara ...	... ...	1	1	12	12	1	...	5	...	...	...	...	...	...	...	...	...	3	...	9	10	2	...	...	...	3	2	...	...	...	...
Ashburton	... ...	1	1	24	6	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1	1	...	...	...	...	...	...	...	...	...	...
Peak Hill	... ...	6	8	98	129	1	1	10	10	...	...	...	...	10	8	...	...	1	1	...	...	...	...	3	2	...	1	...	...	...	...
East Murchison ...	Lawlers	1	3	24	46	3	3	6	6	...	...	...	...	...	...	...	...	...	...	...	...	2	2	8	8	1	2	...	...	...	...
Do.	Wiluna	35	21	732	437	7	7	11	11	...	...	...	...	...	...	...	...	1	14	1	...	...	...	1	1	3	3	...	...	...	...
Do.	Black Range ...	10	22	160	379	...	...	...	...	...	...	...	...	...	...	...	...	1	1	...	...	...	...	...	...	1	1	...	...	...	...
Murchison	Cue	12	21	166	322	4	5	19	22	...	...	...	...	3	9	...	...	1	1	...	...	...	...	...	...	1	1	...	...	...	...
Do.	Meekatharra ...	23	18	335	232	1	1	10	10	...	...	...	...	...	...	...	...	4	4	2	2	1	1	1	1	1	1	...	...	...	...
Do.	Day Dawn ...	4	5	40	57	3	3	4	4	...	...	...	...	...	...	...	...	...	...	...	...	1	1	...	...	...	...	...	...	...	...
Do.	Mt. Magnet ...	19	41	213	536	1	1	1	1	...	...	...	...	...	...	...	...	...	...	1	1	1	1	...	...	5	5	...	...	...	...
Yalgoo	... ...	13	35	213	701	...	...	...	...	...	...	...	...	...	...	...	...	3	3	6	5	2	1	1	1	...	1	...	...	...	...
Mt. Margaret ...	Mt. Morgans ...	5	6	60	126	4	4	9	9	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1	...	...	...	...
Do.	Mt. Malcolm ...	3	5	60	84	19	18	174	172	...	...	...	...	...	...	...	...	...	...	3	3	...	...	1	1	11	10	...	...	...	...
Do.	Mt. Margaret ...	7	23	138	509	10	10	11	11	...	...	...	...	...	...	...	...	...	...	1	...	2	2	3	...	4	4	...	...	...	...
North Coolgardie ...	Menzies	10	8	124	120	4	4	12	12	...	...	...	...	...	...	...	...	...	...	...	2	1	1	...	...	3	4	...	...	...	...
Do.	Ularring	1	2	24	30	5	5	5	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Do.	Niagara	1	13	12	286	3	2	3	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	...	...
Do.	Verilla	1	2	24	48	3	6	4	10	...	...	...	...	...	...	...	...	2	...	...	1	...	...	...	...	1	1	...	...	...	...
Broad Arrow ...	... ...	10	20	158	311	4	5	17	22	...	...	...	...	1	1	...	...	1	...	3	3	...	...	1	1	...	...	...	...	...	...
N.E. Coolgardie ...	Kanowna ...	5	9	84	175	...	...	...	...	...	...	1	...	1	1	...	...	...	...	...	...	1	1	...	...	3	3	...	...	...	...
Do.	Kurnalpi ...	9	3	189	60	...	...	...	...	...	...	1	1	...	...	...	...	...	...	...	...	2	2	...	...	...	...	...	...	...	...
East Coolgardie ...	... ...	36	61	577	896	5	5	19	18	1	...	1	1	...	...	...	...	...	...	...	...	4	4	11	12	16	16	...	...	...	...
Do.	Bulong	5	6	108	108	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Coolgardie	... ...	29	28	445	456	9	9	39	39	...	...	1	1	...	1	...	...	2	2	3	3	1	1	2	2	...	...	...	...	...	...
Do.	Kunanalling ...	8	9	114	174	6	6	40	40	...	...	...	...	...	...	...	...	1	1	2	2	...	...	...	...	...	...	...	...	...	...
Yilgarn	... ...	68	53	1,449	1,094	1	...	2	...	...	1	...	...	...	...	...	...	17	15	18	13	1	...	...	...	1	1	...	...	...	...
Dundas	... ...	5	9	78	168	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	2	...	...	...	...	...	...	...	...
Phillips River ...	... ...	4	5	63	110	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1	1	1	3	3	...	...	...	...
Collie	... ...	1	5	3,000	6,904	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Greenbushes ...	... ...	...	1	...	24	4	6	10	13	...	...	10	11	...	...	13	18	20	...	18	...	2	2	...	...	14	14	...	...	...	...
Cascoyne	... ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	...	...	...	...	...	...	...	...	...	...	...
Outside Proclaimed Fields ...	... .	13	26	6,278	11,114	...	...	...	...	...	...	...	...	38	8	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Totals ...	388	485	15,782	25,025	100	106	436	446	1	1	16	16	52	108	15	18	61	48	59	51	28	23	35	30	80	83	...	...	...	...
Increase or Decrease for 1928 compared with 1927		+ 97		+ 9,223		+ 6		+ 10		...		...		+ 56		+ 3		— 13		— 8		— 5		— 5		+ 3		...		...	

For the Year 1927 the numbers of prospecting areas held was 388, the total acreage being 15,782, which included 3 areas of 9,000 acres for coal. For the Year 1928 the number held was 485 of a total acreage of 25,025, including 8 areas of 17,160 acres for coal.

Table 16.

Miners' Rights issued during 1927 and 1928.

Place of Issue.	Miners' Rights.		Place of Issue.	Miners' Rights.	
	1927.	1928.		1927.	1928.
Albany	2	...	Norseman	32	2
Boulder	9	5	Northampton	27	14
Bridgetown	6	3	Northam	7	4
Broome	1	7	Nullagine	16	24
Bunbury	5	1	Onslow	13	14
Busselton	6	...	Ora Banda	27	...
Carnarvon	32	1	Payne's Find	1	...
Collie	3	16	Peak Hill	25	30
Coolgardie	97	94	Perth	337	...
Cue	79	99	Port Hedland	41	9
Derby	12	6	Ravensthorpe	43	24
Esperance	1	2	Roebourne	27	16
Geraldton	8	3	Sandstone	34	40
Greenbushes	65	65	Southern Cross	170	139
Hall's Creek	29	8	St. Ives	5	...
Kalgoorlie	360	503	Wagin	6	...
Laverton	107	116	Westonia	5	...
Lawlers	26	34	Wiluna	128	68
Leonora	73	87	Wyndham	3	5
Marble Bar	109	63	Yalgoo	47	47
Meekatharra	123	129	Yarri	2	...
Menzies	62	105			
Merredin	8	3	Total	2,387	1,930
Mount Magnet	106	139			
Mullewa	...	5			
Narembeen	55	...			

Table 17.

Number and Acreage of Miners' Homestead Leases in force on 31st December, 1927 and 1928.

Goldfield.	District.	1927.		1928.		Increase.		Decrease.	
		Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.
West Pilbara	... ...	...	...	...	...				
Greenbushes	... ...	6	522	6	522				
Pilbara	Marble Bar ...	...	...	...	...				
	Nullagine	...	...	...	...				
Dundas	... ...	18	1,078	19	1,099	1	21		
Broad Arrow	... ...	1	4	1	4				
Yilgarn	... ...	14	411	14	411				
Mt. Margaret ...	Mt. Malcolm ...	7	1,260	8	1,265	1	5		
	Mt. Margaret ...	12	325	12	325				
Murchison ...	Cue	4	1,204	4	1,204				
	Day Dawn ...	2	25	2	25				
	Meekatharra ...	10	1,665	10	1,665				
	Mt. Magnet ...	1	236	1	236				
Yalgoo	... ...	4	710	4	710				
Coolgardie ...	Coolgardie	21	891	21	891				
	Kunanalling ...	3	530	3	530				
East Coolgardie ...	... ...	77	2,526	71	2,055	...	...	6	471
Phillips River	... ...	124	17,401	124	17,401				
Peak Hill	... ...	5	547	5	547				
North-East Coolgardie ...	Kanowna	12	702	12	702				
North Coolgardie	Menzies	5	690	5	690				
	Yerilla	1	10	1	10				
	Niagara	1	20	1	20				
	Ularring	1	20	1	20				
East Murchison...	Lawlers	6	1,115	6	1,115				
	Black Range ...	2	327	...	...	2	...	...	258
	Wiluna	3	39	7	108				
	Total ...	340	32,258	338	31,555	4	26	6	729

As compared with the Year 1927, the number of leases held has decreased by 2 and the area by 703 acres.

PART IV.—MEN EMPLOYED.

TABLE 18.

Average number of Men engaged in Mining during 1927 and 1928.

Goldfield.	District.	Reef or Lode.		Alluvial.		Total.	
		1927.	1928.	1927.	1928.	1927.	1928.
1. Kimberley		...	...	4	4	4	4
2. West Kimberley		...	...	...	...	...	...
3. Pilbara	Marble Bar	36	22	4	7	40	29
	Nullagine	6	6	1	1	7	7
4. West Pilbara		...	...	2	2	2	2
5. Ashburton		...	...	2	2	2	2
6. Gascoyne		...	2	2	2	2	4
7. Peak Hill		31	22	5	5	36	27
8. East Murchison	Lawlers	23	19	6	6	29	25
	Wiluna	236	165	...	...	236	165
	Black Range	52	55	1	1	53	56
	Cue	83	86	...	...	83	86
9. Murchison	Meekatharra	178	187	5	9	183	196
	Day Dawn	27	27	...	...	27	27
	Mt. Magnet	80	88	2	2	82	90
10. Yalgoo		97	100	1	...	98	100
11. Mt. Margaret	Mt. Morgans	61	27	...	...	61	27
	Mt. Malcolm	347	336	...	...	347	336
	Mt. Margaret	41	35	...	...	41	35
12. North Coolgardie	Menzies	39	64	1	...	40	64
	Ularring	9	16	...	...	9	16
	Niagara	7	15	...	...	7	15
	Yerilla	13	4	1	...	14	4
13. Broad Arrow		120	100	5	9	125	109
14. North-East Coolgardie	Kanowna	52	30	3	2	55	32
	Kurnalpi	17	16	1	1	18	17
15. East Coolgardie	East Coolgardie	1,928	1,920	21	29	1,949	1,949
	Bulong	39	31	2	1	41	32
16. Coolgardie	Coolgardie	158	125	14	12	172	137
	Kunanalling	42	31	...	...	42	31
17. Yilgarn		144	136	...	1	144	137
18. Dundas		76	73	...	...	76	73
19. Phillips River		24	24	...	1	24	25
State generally		7	4	...	...	7	4
Total—Gold Mining		3,973	3,766	83	97	4,056	3,863
MINERALS OTHER THAN GOLD.							
Tantalite	Marble Bar	14	13	...	...	14	13
Tin	Greenbushes	38	39	...	...	38	39
	Cue	...	10	...	...	...	10
	Marble Bar	31	40	*37	*30	68	70
Copper	West Pilbara	...	2	...	...	...	2
	Phillips River	9	8	...	...	9	8
Lead Ore	Northampton	41	2	...	...	41	2
Coal	Collie River	748	798	...	...	748	798
Asbestos	Marble Bar	...	6	...	...	...	6
	Nullagine	5	4	...	...	5	4
Gypsum	Yilgarn	4	10	...	...	4	10
	State Generally	21	15	...	...	21	15
Silver-Lead Ore	Marble Bar	10	3	...	...	10	3
Emeralds	Cue	22	10	...	...	22	10
	Total—Other Minerals	943	960	37	30	980	990
	GRAND TOTAL	4,916	4,726	120	127	5,036	4,853

*Classified elsewhere as employed at mines.

TABLE 19.

Average Number of Men employed at Mines during 1928.

Mineral.	Above ground.	Under ground.	Total.	Percentage of total men employed.	Increase or decrease compared with 1927.
Asbestos	4	6	10	·21	+ 5
Coal	198	600	798	16·78	+ 50
Copper	7	3	10	·21	+ 1
Gold	1,778	1,988	3,766	79·19	— 207
Gypsum	25	...	25	·53	...
Lead	1	1	2	·04	— 39
Silver-Lead Ore	2	1	3	·06	— 7
Tantalite	8	5	13	·27	— 1
Tin	*113	6	119	2·50	+ 13
Emeralds	4	6	10	·21	— 12
Total	2,140	2,616	4,756	100·00	— 197

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

The above table deals with men working their own mines, or employed on wages, and is compiled from returns furnished to the Department by mine-owners.

TABLE 20.

Average Number of Men employed at Gold Mines during 1928, 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 1927.	Percentage of total Men employed.	
					1927.	1928.
1. Kimberley	...	...	...	...	...	...
2. West Kimberley	...	...	...	...	...	...
3. Pilbara	12	16	28	— 14	1·06	·75
4. West Pilbara	...	...	...	...	...	...
5. Ashburton	...	...	...	...	...	...
6. Gascoyne	1	1	2	+ 2	...	·05
7. Peak Hill	12	10	22	— 9	·78	·58
8. East Murchison	139	100	239	— 72	7·83	6·32
9. Murchison	184	204	388	+ 20	9·26	10·30
10. Yalgoo	44	56	100	+ 3	2·44	2·66
11. Mt. Margaret	174	224	398	— 51	11·30	10·57
12. North Coolgardie	53	46	99	+ 31	1·71	2·63
13. Broad Arrow	54	46	100	— 20	3·02	2·66
14. North-East Coolgardie	25	21	46	— 23	1·74	1·22
15. East Coolgardie	871	1,080	1,951	— 16	49·51	51·81
16. Coolgardie	85	71	156	— 44	5·03	4·15
17. Yilgarn	69	67	136	— 8	3·62	3·61
18. Dundas	35	38	73	— 3	1·92	1·94
19. Phillips River	17	7	24	...	·60	·64
State generally	3	1	4	— 3	·18	·11
Total	1,778	1,988	3,766	— 207	100·00	100·00

TABLE 21.

Alluvial Gold Workers.

Goldfield.	1927.	1928.	Increase or Decrease compared with 1927.
1. Kimberley	4	4	...
2. West Kimberley	...	...	...
3. Pilbara	5	8	+ 3
4. West Pilbara	2	2	...
5. Ashburton	2	2	...
6. Gascoyne	2	2	...
7. Peak Hill	5	5	...
8. East Murchison	7	7	...
9. Murchison	7	11	+ 4
10. Yalgoo	1	...	— 1
11. Mt. Margaret	...	...	...
12. North Coolgardie	2	...	— 2
13. Broad Arrow	5	9	+ 4
14. North-East Coolgardie	4	3	— 1
15. East Coolgardie	23	30	+ 7
16. Coolgardie	14	12	— 2
17. Yilgarn	...	1	+ 1
18. Dundas	...	...	...
19. Phillips River	...	1	+ 1
Total	83	97	+ 14

PART V.—ACCIDENTS.

TABLE No. 22.

MEN EMPLOYED IN MINES KILLED AND INJURED IN MINING ACCIDENTS DURING 1927 AND 1928.

A.—*According to Locality of Accident.*

Goldfield.	Killed.		Injured.		Total Killed and Injured.	
	1927.	1928.	1927.	1928.	1927.	1928.
1. Kimberley	...	...	...	...	...	...
2. West Kimberley	...	...	...	...	...	...
3. Pilbara	...	1	...	1	...	2
4. West Pilbara	...	...	...	...	...	...
5. Ashburton	...	...	...	...	...	...
6. Gascoyne	...	...	...	...	...	...
7. Peak Hill	...	...	...	...	...	...
8. East Murchison	...	...	5	5	5	5
9. Murchison	3	...	17	9	20	9
10. Yalgoo	...	...	...	1	...	1
11. Mt. Margaret	2	...	40	40	42	40
12. North Coolgardie	...	...	3	3	3	3
13. N.E. Coolgardie	...	...	1	...	1	...
14. Broad Arrow	1	...	...	...	1	...
15. East Coolgardie	7	2	199	156	206	158
16. Coolgardie	1	...	1	...	2	...
17. Yilgarn	1	...	4	...	5	...
18. Dundas	...	...	...	...	...	...
19. Phillips River	...	...	...	...	...	...
MINING DISTRICTS—						
Northampton	...	...	1	...	1	...
Greenbushes	...	...	...	1	...	1
Collie	1	1	99	115	100	116
Swan	...	...	1	4	1	4
Kendenup	...	...	...	...	...	...
Roelands	...	...	...	...	...	...
Total	16	4	371	335	387	339

From the above table it will be seen that the total number of fatal accidents for the year 1928 was 4 as against 16 for 1927. The number injured shows a decrease of 36 as compared with the preceding year. In the report of the State Mining Engineer, published as Division II. to this report, these accidents are classified according to the causes.

B.—*According to Causes of Accidents.*

	1927.		1928.		Comparison with 1927.	
	Fatal.	Serious.	Fatal.	Serious.	Fatal.	Serious.
1. Explosives	3	5	...	7	— 3	+ 2
2. Falls of Ground	6	19	1	19	— 5	...
3. In Shafts	5	9	1	6	— 4	— 3
4. Miscellaneous Underground	...	242	2	212	+ 2	— 30
5. Surface	2	96	...	91	— 2	— 5
Total	16	371	4	335	— 12	— 36

Fatal Accidents.—2 occurred in gold mines, 1 in a coal mine, and 1 in an asbestos mine. The death rate per 1,000 men employed in gold mines was .53 as against 3.78 in 1927.

DIAGRAM SHEWING THE NUMBER OF DEATHS FROM ACCIDENTS ARRANGED IN FIVE CLASSES, IN THE MINES OF WESTERN AUSTRALIA DURING THE YEARS 1910 AND ONWARDS.

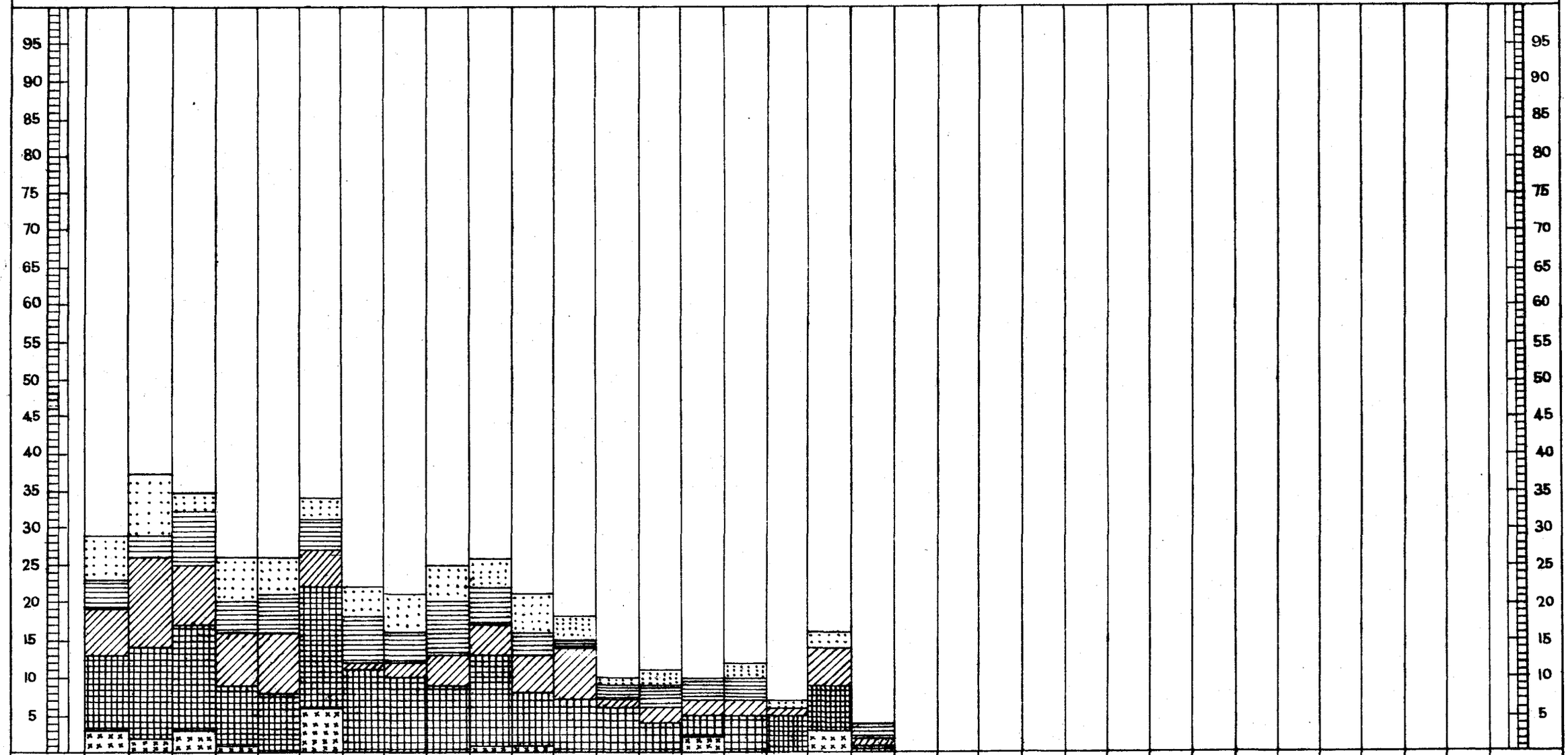


TABLE No. 23.

Deaths from Accidents of Persons employed at Mines during 1927 and 1928.

	1927.						1928.					
	Number of Persons killed.			Death Rate per 1,000 men employed.			Number of Persons killed.			Death Rate per 1,000 men employed.		
	Above Ground.	Under Ground.	Total.	Above Ground.	Under Ground.	Total.	Above Ground.	Under Ground.	Total.	Above Ground.	Under Ground.	Total.
Coal Mines	...	1	1	...	1·75	1·34	...	1	1	...	1·66	1·25
Men employed	(177)	(571)	(748)	...	...	...	(198)	(600)	(798)	...	...	...
Gold Mines	2	13	15	1·01	6·27	3·70	...	2	2	...	1·01	·52
Men employed	(1,984)	(2,072)	(4,056)	...	...	...	(1,875)	(1,988)	(3,863)	...	...	...
Other Mines	...	...	...	...	...	...	...	1	1	...	35·71	5·21
Men employed	(178)	(54)	(232)	...	...	...	(164)	(28)	(192)	...	...	...
Total for all mines ...	2	14	16	·86	5·19	3·18	...	4	4	...	1·53	·82
Total number of men employed	(2,339)	(2,697)	(5,036)	...	...	...	(2,237)	(2,616)	(4,853)	...	...	...

TABLE No. 24.

Deaths from Accidents of Persons employed at Quarries during 1927 and 1928.

	Number of persons employed above ground.		Number of persons killed above ground.		Death rate per 1,000 men employed above ground.	
	1927.	1928.	1927.	1928.	1927.	1928.
Swan	598	695	...	...	...	...
Roelands	...	...	...	...	...	...
Total	598	695	...	...	...	...

TABLE No. 25.

Deaths from Accidents of Persons Employed in Gold Mines during 1928, and the Death Rate per 1,000 Men Employed and per 1,000 tons of Gold Ore raised, during 1927 and 1928. (Number of men taken as in Table No. 20, not including Alluvial Gold Workers.)

Goldfield.	Number of Deaths.			Death Rate per 1,000 men employed.				Number of Deaths per 1,000 tons of Gold Ore raised.	
	1928.			1928.			1927.		
	Above Ground.	Under Ground.	Total.	Above Ground.	Under Ground.	Total.	Total.	1928.	1927.
1. Kimberley	...	...	...	...	...	...	...	...	...
2. West Kimberley	...	...	...	...	...	...	...	...	...
3. Pilbara	...	...	...	...	...	...	...	...	...
4. West Pilbara	...	...	...	...	...	...	...	...	...
5. Ashburton	...	...	...	...	...	...	...	...	...
6. Gascoyne	...	...	...	...	...	...	...	...	...
7. Peak Hill	...	...	...	...	...	...	...	...	...
8. East Murchison	...	...	...	...	...	...	...	...	...
9. Yalgoo	...	...	...	...	...	...	...	...	...
10. Mt. Margaret	...	...	...	...	...	...	4·45	...	·019
11. North Coolgardie	...	...	...	...	...	...	...	...	...
12. North-East Coolgardie ...	...	...	...	...	...	...	...	...	...
13. East Coolgardie	...	2	2	...	1·85	1·03	3·56	·005	·015
14. Broad Arrow	...	...	...	...	...	...	8·33	...	·070
15. Coolgardie	...	...	...	...	...	...	5·00	...	·205
16. Murchison	...	...	...	...	...	...	8·15	...	·062
17. Yilgarn	...	...	...	...	...	...	6·94	...	·037
18. Dundas	...	...	...	...	...	...	...	...	...
19. Phillips River	...	...	...	...	...	...	...	...	...
Total	...	2	2	...	1·01	·53	3·78	·003	·022

The number of deaths per 1,000 men employed shows a decrease from 3.78 in 1927 to .53 in 1928, and that per 1,000 tons of gold ore raised shows a decrease, being .003 as against .022 for the preceding year.

PART VI.—STATE AID TO MINING.

The number of State Batteries existing at the end of the year was 22.

From inception to the end of 1928, gold and tin to the value of £6,194,451 have been recovered from the State Plants; 1,474,367 tons of auriferous ore have been treated and have produced £5,021,745 by amalgamation, £804,514 by cyanidation, £265,266 by slimes treatment, £9,353 worth from residues and 80,935 tons of tin ore produced tin to the value of £93,000, and in addition a sum of £572 was recovered from residues.

During the year the gold ore treated was 16,274¾ tons for 15,001.37 ozs. of bullion.

The working expenditure for all plants for the year totalled £24,922 2s. 3d. and the revenue £16,558 16s. 6d., which shows a loss of £8,363 5s. 9d. on the year's operations.

The capital expenditure since the inception of the scheme has been £412,565 5s. 7d., £320,584 3s. 11d. from General Loan Fund and £91,981 1s. 8d. from Consolidated Revenue.

The cost of administration for the year was £2,434 2s. 5d., as against £3,115 17s. 3d. for 1927.

The working expenditure from inception to the end of the year exceeds the revenue by £169,070 5s. 5d.

GEOLOGICAL SURVEY.

The work carried out by the Geological Survey for the year 1928 is as follows:—

The two assistant Geologists were occupied for the greater part of the year in assisting Dr. Stillwell complete his report on the Boulder Belt. Several inspections on mines and mineral deposits, with the location of boring sites, were effected by the Government Geologist, the more important of which were as follows:—

1. Report and fixing of bore sites on the coal deposits at Eradu.
2. Fixing boring sites on the Braeside Mineral Belt.
3. Sampling and reporting on the Brown Coal deposits of the Fitzgerald River.
4. A second visit to Braeside in connection with the boring.
5. Report on the occurrence of oil at Poole Range, East Kimberley.
6. Sampling the Alunite deposits at Lake Campion. (Report waiting on the analyses.)
7. Inspection of the Lead Deposits at Galena. (Northampton District) with Mr. Broughton Edge, Director of the Imperial Geophysical Experimental Survey.
8. Inspection of the Proprietary Coal Mine at Collie, in connection with subsidence of roof.
9. In company with R. Lockhart Jack an inspection regarding underground water supplies was made of the area set aside for 3,500 farms.
10. In company of the Engineer-in-Chief inspections were made and reports furnished on—
    a. Boya Quarry.
    b. Byford Brick Works.
    c. Canning No. 1 and No. 2 Reservoir sites.

The Government Geologist also attended a conference in Hobart on Geophysical methods of prospecting, in the month of January, and a second meeting on the same subject in Melbourne during the month of May, followed a few days afterwards by a Geological Conference held in Adelaide.

PETROLOGICAL WORK.

Most of petrological work was confined to the examination of cores from the boring at Tindall's Mine, Coolgardie; Reedy's near Cue; Surprise Mine, Ajana; Big Bell G. M., Cue; Harbour Lights G. M. Leonora; Oroya Black Range, Black Range, and Black Range West, Sandstone; and the tin lodes at Greenbushes; and of various rocks collected by the Government Geologist in Kimberley and specimens submitted by the public generally.

One alteration was made in the staff, due to the transfer of Mr. Glover, the Clerk-in-Charge, to the Crown Law Department. His place was filled by Miss F. Armstrong, B.Sc.

ASSISTANCE UNDER MINING DEVELOPMENT ACT, 1902.

The following statement shows the sums advanced during the year 1928, under the Mining Development Act:—

	£	s.	d.
Advanced in aid of mining work and equipment of mines with machinery	13,591	4	5
Subsidies on stone crushed for the public	23	7	6
Providing means of transport and equipment to prospectors	6,221	19	11
	£19,836	11	10

In addition to the above, the Vote was charged with rebates on water as follows:—

	£	s.	d.
Southern Cross eastwards	47,833	10	3
Ingliston Consols	1,397	12	6
	£49,231	2	9

This arrangement dated from 1st July, 1923. Other assistance granted from the Vote during the year on various matters totalled £11,598 9s. 8d.

The subsidies paid on stone crushed for the public amounted to £23 7s. 6d., and are subsidies paid to owners of plants crushing for the public, the conditions being that they crush at fixed rates. The ore crushed during the year at these plants totalled 176½ tons.

The receipts under the Mining Development Act, exclusive of interest payments, amounted to £6,931 2s. 4d., and included:—

	£	s.	d.
Refund of advances	1,711	0	4
Sale of securities	5,060	15	11
Miscellaneous refunds	159	6	1
	£6,931	2	4

Liability on guarantees at end of 1928—£51,500.

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

ASHBURTON GOLDFIELD.

The recovery of thiry six (36) fine ounces of gold was reported, and in the preceding year fifteen (15) fine ounces.

There is practically no mining going on in this field, only a few fossickers being at work.

BROAD ARROW GOLDFIELD.

The output of gold was 1,190 fine ounces, and in the preceding year 7,570 fine ounces; a decrease of 6,380 fine ounces.

This is largely attributable to the suspension, during the year, of operations on the Associated Northern Company's Mine at Ora Banda. Operations generally were much retarded on account of the small amount of rain. Although a lot of systematic prospecting was done, no promising discoveries were reported.

COLLIE COALFIELD.

The output of coal was 528,420 tons, and in the preceding year 501,505 tons; an increase of 26,915 tons.

Five (5) mines were producing during the year, viz., Proprietary, Co-operative, Westralia, Cardiff and Stockton. The Griffin was also working, but only produced sufficient for boiler purposes. A serious fire occurred in the Co-operative in January, causing a sealing off of a large portion of the mine and the stopping of more than half of their working places.

The mines generally are in good order and the district is prosperous.

COOLGARDIE GOLDFIELD.

The output of gold was 6,104 fine ounces, and in the preceding year 5,786 fine ounces; an increase of 318 fine ounces.

In the Kunanalling district there were some good crushings, and a couple of mines were regular producers.

At Gibraltar a little work was in progress, principally on the old "Lloyd George" Mine, and the prospects are stated to be encouraging.

At Burbanks the diamond drilling carried out by the Government was completed and the results obtained were somewhat encouraging.

At Widgiemooltha a few prospectors were working, but nothing of note was reported.

At St. Ives some good returns were reported from a new discovery, but otherwise the district was very quiet.

In the immediate vicinity of Coolgardie only a few prospectors were at work.

DUNDAS GOLDFIELD.

The output of gold was 4,341 fine ounces, and in the preceding year 2,739 fine ounces; an increase of 1,602 fine ounces.

There has been an improvement in the outlook for this field. One mine had regular and satisfactory crushings and two others were also producing. Several prospecting areas are also in existence.

EAST COOLGARDIE GOLDFIELD.

The output of gold was 294,955 fine ounces, and in the preceding year 299,256 fine ounces, a decrease of 4,301 fine ounces.

Most of the large mines maintained a regular output, the principal contributors being the Lake View and Star and the Great Boulder.

The leases of the Oroya Links Limited (in Liquidation) were transferred to the North Kalgurli (1912) Ltd., and this company has done considerable exploratory work prior to commencing operations on a larger scale.

The Golden Horseshoe Company succeeded in raising further capital, but nothing definite in regard to its future policy had transpired at the end of the year.

A large number of tributers have been working on some of the mines, many with very satisfactory results. A good deal of attention is being devoted to searching for deep alluvial and a local syndicate has been formed to control operations.

In the Bulong district the principal activity has been at Mount Monger and good returns have been reported. A geological examination of the "Golden Mile" by Dr. Stillwell whose services were made available by the Development and Migration Commission was completed in December and his report will be published shortly.

EAST MURCHISON GOLDFIELD.

The output of gold was 4,758 fine ounces, and in the preceding year 6,025 fine ounces; a decrease of 1,267 fine ounces.

In the Black Range District there was an increase. At Birrigrin some rich dollying stone was recovered, but nothing of a permanent nature discovered. At Montague several parties were working, with varying results. A small production was reported. At Sandstone prospects have not improved and the most of the gold yield was from the treatment of sands at the State Battery. There were outputs also reported from Maninga Marley, Hancocks and Youanmi.

In the Lawlers district the production showed an increase, but very little mining was going on. At Lawlers the yield was from the treatment of sands and slimes on the Waroonga Mine.

At Kathleen Valley there was a small return from the treatment of a parcel of concentrates.

At Mount Sir Samuel a good return was obtained by dollying stone from the appropriately named "Dolly Pot" Lease.

In the Wiluna district there was a decrease.

At Cole's Find a rich crushing was got from a prospecting area.

At Mount Hilda there were a few crushings but the centre was rather quiet.

At Diorite there was a lessened output and the principal producers were the "Brilliant North" and the "Gloaming."

At Wiluna development work was steadily pursued on the Wiluna Gold Mines, and in the New Year the erection of a treatment plant will be in hand. On its completion the output of this field should be something substantial.

GASCOYNE GOLDFIELD.

The production of sixty (60) fine ounces of gold was reported, and in the preceding year seventy-nine (79) fine ounces.

No mining is in evidence on this field.

GREENBUSHES MINERAL FIELD.

The output of Black Tin was 54.54 tons, valued at £6,355, and in the preceding year 58.34 tons, valued at £9,544; a decrease in tonnage of 3.80 tons, and in value of £3,189.

The fall in the price of tin, in conjunction with a shortage of water, reduced the output to a normal one, as, with favourable conditions, it was hoped to have had the highest for some years.

Several dredges were operating and a small amount of lode mining was also being done. The Department is carrying out some diamond drilling to endeavour to locate payable lodes, and this work was in hand at the close of the year.

KIMBERLEY GOLDFIELD.

The production of forty (40) fine ounces of gold was reported, and in the preceding year one hundred and ninety-four (194) fine ounces.

The only mining is fossicking on old alluvial workings by a handful of prospectors.

MOUNT MARGARET GOLDFIELD.

The output of gold was 35,224 fine ounces, and in the preceding year 36,698 fine ounces; a decrease of 1,474 fine ounces.

In the Mount Margaret district there was a decrease, but the position was little changed. The principal productions were from treatment of sands on the Lancefield, and the King of Creation.

In the Mount Morgans district there was also a decrease, due to a general falling off. The chief production was from the Westralia Mount Morgans.

A small amount of prospecting was going on.

In the Mount Malcolm district there was only a slight decrease. Almost the whole production for the district comes from the Sons of Gwalia Mine which has been working steadily throughout the year. It is receiving considerable financial help from the Government and although the margin of profit is small the outlook is regarded hopefully and a considerable improvement is anticipated.

The old "Harbour Lights" Mine was again taken up and diamond drilling subsidised by the Government is now going on in an endeavour to locate payable ore at depth.

At outside centres only a small amount of prospecting was being carried out.

MURCHISON GOLDFIELD.

The output of gold was 23,636 fine ounces, and in the preceding year 27,886 fine ounces; a decrease of 4,250 fine ounces.

In the Meekatharra district the principal production was from the mines in the immediate vicinity of Meekatharra where, although there was a falling off, the position was maintained.

In the outlying centres matters were very quiet.

In the Cue district there was a decrease, and mining was quiet. Owing to the dry season, less prospecting was being done.

At Cuddingwarra boring on the "Big Bell" which was assisted by the Department was yielding encouraging results.

At Reidy's the diamond drilling on the Mararoa Company's leases indicated the probable continuance of ore bodies carrying payable values, and it is expected that development and production on a large scale will eventuate shortly.

At Poona mining for emeralds is still going on, and, although the stones recovered so far are mostly of low value, the lessees are hopeful that better ones will be found at depth.

In the Day Dawn district there was also a decrease. The bulk of the production was from holdings on the old Fingall Mine. A small amount came from Lake Austin, where a good number of prospectors were working, and from the Pinnacles.

In the Mount Magnet district there was a decrease. The main production was from holdings in the neighbourhood of Mount Magnet.

At Lennonville there was a small production and a few prospectors are still working.

From Moyagee one crushing was reported and this centre is now deserted.

NORTHAMPTON MINERAL FIELD.

The output of lead ore was 112 tons, valued at £315, and in the preceding year 5,809.50 tons, valued at £17,347; a decrease in tonnage of 5,697.50 tons, and in value of £17,032. Practically all the mines on this field closed down, consequent on the low price ruling for lead, and until there has been a marked improvement in this connection it is unlikely that there will be any resumption of activity. A programme of boring was carried out by the Department, but the results were very disappointing.

NORTH COOLGARDIE GOLDFIELD.

The output of gold was 5,774 fine ounces, and in the preceding year 2,055 fine ounces; an increase of 3,719 fine ounces.

In the Menzies district there was a marked improvement. The Golden Age continued to yield excellent results. A very promising discovery was reported from the old "Crusoe" Mine and a trial crushing at the end of the year was most satisfactory.

At Comet Vale the Sand Queen-Gladsome was working and producing regularly.

At Goongarrie and Mount Ida there was not any improvement.

In the Ularring district the Riverina South was re-opened, but developments have not been too encouraging. Towards the end of the year lack of capital caused a suspension of operations and the mine was let on tribute.

In the Yerilla district no mining whatever was in evidence.

In the Niagara district there was a marked revival of prospecting consequent on a discovery at a locality known as Twin Hills, about 22 miles west of Kookynie, and 15 miles north-east of Menzies. Several leases and prospecting areas have been taken up and it is thought there is a good chance of one or two payable mines being developed.

NORTH-EAST COOLGARDIE GOLDFIELD.

The output of gold was 1,298 fine ounces, and in the preceding year 2,487 fine ounces; a decrease of 1,189 fine ounces. No companies were operating and only a few prospectors were working.

In the Kurnalpi district mining was at a standstill.

PEAK HILL GOLDFIELD.

The output of gold was 1,034 fine ounces, and in the preceding year 1,689 fine ounces; a decrease of 655 fine ounces. The principal activity was in the Peak Hill district, all the outlying centres, excepting Murphy's Well, where there was a slight improvement, being exceedingly quiet. A good many prospectors were at work throughout the field, but nothing of importance was discovered. A good many men were employed on the Manganese deposits at Horseshoe, but it is not expected that shipment of the ore on a large scale will be possible for some time.

PHILLIPS RIVER GOLDFIELD.

The output of gold was 113 fine ounces, and in the preceding year 284 fine ounces; a decrease of 171 fine ounces.

Very little gold mining was done, and there was no production of copper consequent on the low price ruling for the greater part of the year. The marked improvement in this regard towards the close of the year may cause a revival, but the mining outlook for this field is not promising.

PILBARA GOLDFIELD.

The output of gold was 1,946 fine ounces, and in the preceding year 2,023 fine ounces; a decrease of 77 fine ounces.

Black tin to the amount of 35.48 tons, valued at £5,171, was raised; a decrease on the preceding year in tonnage of 1.96 tons, and in value of £1,058.

Asbestos to the amount of 11.70 tons, valued at £782, was raised; an increase on the preceding year in tonnage of .90 of a ton, and in value of £478; Tantalite amounting to 8.76 tons, valued at £2,213; a decrease on the preceding year in tonnage of 6.52 tons, and in value of £1,595; and silver lead ore amounting to 17.85 tons, valued at £293; a decrease on the preceding year in tonnage of 18.15 tons, and in value of £499.

In gold mining there was not any improvement and matters remained very quiet.

In tin mining the production was well maintained.

At Wodgina the tantalite mines were working and producing.

In the Lionel centre of the Nullagine district the asbestos deposits were producing satisfactorily.

At Braeside a programme of boring to test the silver-lead deposits was put in hand, but the results to the end of the year were not promising.

WEST KIMBERLEY GOLDFIELD.

No gold was reported from this field.

The Freney Kimberley Oil Company drilling at Poole Range entered an oil bearing strata, but, owing to an influx of water, had to suspend operations and take action necessary to obviate any risk in this regard. The services of an expert driller have been secured and early developments are hopefully anticipated.

The iron deposits at Yampi Sound still remain unworked although from time to time it is announced that active development is about to be commenced.

It is hoped that something definite will be done ere long.

During the year a well equipped prospecting party set out to search for minerals in the vicinity of Walcott Inlet. They anticipate being successful in their endeavours.

WEST PILBARA GOLDFIELD.

The output of gold was 15 fine ounces, and in the preceding year 53 fine ounces; a decrease of 38 fine ounces; also copper ore to the extent of 45 tons, valued at £400, but none in the preceding year.

The low price ruling for copper militated against any marked activity and mining was practically at a standstill.

YALGOO GOLDFIELD.

The output of gold was 6,206 fine ounces, and in the preceding year 2,394 fine ounces; an increase of 3,812 fine ounces. This improvement is consequent on the resumption of crushing operations by the Brilliant Company on the Gnow's Nest Mine at Messenger's Patch.

At Payne's Find the Lake View Company maintained a regular production. At the various other centres there was little or no change.

YILGARN GOLDFIELD.

The output of gold was 5,338 fine ounces, and in the preceding year 9,227 fine ounces; a decrease of 3,889 fine ounces. Also 1,214 tons of gypsum, valued at £1,214, and in the preceding year 698.25 tons, valued at £698; an increase in tonnage of 515.75 tons, and in value of £516.

At Westonia mining was active and several options over properties were taken.

At Burbidge, Marvel Loch, and Holleton, matters were exceedingly quiet.

At Bullfinch a lot of prospecting was done and a public crushing plant, subsidised by the Department, has been erected.

At Manxman the Radio maintained its production.

In the immediate vicinity of Southern Cross only a small amount of prospecting was in evidence.

PART VIII.—EXISTING LEGISLATION.

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

1. The Mining Act 1904.
2. Sluicing and Dredging for Gold Act, 1899.
3. Mines Regulation Act, 1906.
4. Coal Mines Regulation Act, 1902-1926.
5. Coal Mines Regulation Act Amendment Act, 1928.
6. Mining and Development Act, 1902-1924.
7. Mines and Machinery Inspection Act, 1911.
8. Gold Buyers Act, 1921.
9. Miners' Phthisis Act, 1922.
10. Miners' Phthisis Act Amendment Act, 1925.

The following alterations, etc., regarding Regulations were gazetted under the Mining Act, 1904:—

Amendment of Regulations 216, 217.

Additional Regulation 146a.

Mines Regulation Act, 1906:—

Amendment of Clause 2 under Division 2 of Regulation 15 under Section VIII.

PART IX.—INSPECTION OF MACHINERY.

The Chief Inspector of Machinery reports that the number of useful boilers registered at the end of the year toalled 3,470 as against 3,422 total for the preceding year, showing an increase, after all adjustments, of 48 boilers.

Of the total 3,470 useful boilers 1,903 were out of use at the end of the year; 1,526 thorough and 67 working inspections were made, and 1,512 certificates were issued.

Permanent condemnations totalled 33, and temporary condemnations 60. There were no conversions, and 6 boilers were transferred beyond the jurisdiction of the Act.

The total number of machinery groups registered was 7,224 against 6,736 for previous year, showing an increase of 488.

Inspections made total 5,557, and 2,971 certificates were granted.

189 applications for engine drivers' and boiler attendants' certificates were received and dealt with, and 158 certificates, all classes, were granted as follows:—

Winding Competency (including certificates issued under Regulation 40 and Section 60)	2
First Class Competency (including certificates issued under Regulation 40 and 45, and Sections 60 and 63)	6
Second Class Competency (including certificates issued under Regulation 40 and Section 60)	29
Third Class Competency (including certificates issued under Regulation 45 and Section 63)	26
Locomotive Competency	7
Traction	1
Internal Combustion Competency ..	13
Crane and Hoist Competency	14
Boiler Attendants' Competency ...	53
Interim	1
Copies	4
Transfers	2
Total	158

The total revenue from all sources during the year was £5,127 7s. 3d. as against £5,451 17s. 1d. for the previous year, showing a decrease of £324 9s. 10d.

The total expenditure for the year was £5,474 18s. 11d. as against £5,829 5s. 8d. for the previous year, showing a decrease of £354 6s. 9d.

PART X.—SCHOOL OF MINES.

During this, the 25th year of the School's existence, the average number of students in attendance was slightly less than during the previous year. However, the fact that the number in the preparatory classes was about the same as in 1927 indicates it is hoped, that next year the enrolment in the senior classes will be maintained, if not increased. The hopeful feeling evident as to the future prosperity of the industry should also have a beneficial effect on the enrolments.

The School has always maintained a good standard of class-work and has acquired a wide reputation as a result of successes achieved by its students in the past.

Students and staff did good work and the results of the annual examinations were satisfactory. Excellent work on Metallurgical problems was done in the experimental plant attached to the School and has been the subject of favourable comment in several technical journals.

Details of the work of the School will be found in the report of the Director, Division V. of this Report.

The system of free assays for prospectors was continued, a total of 259 assays and mineral determinations having been made.

CONCLUSION.

In dealing with the operations of the various Departments, I have only briefly commented on the principal items.

Full and detailed information will be found in the reports of the various responsible officers, published as Divisions II. to VIII. of this Report.

Before concluding, I desire to place on record an appreciation of the valuable services rendered to the State and the Department by Mr. A. Montgomery, M.A., F.G.S., during his occupancy of the position of State Mining Engineer for a period of over 26 years. His term of office was characterised by marked ability and devotion to duty. In addition to performing the wide range of duties attaching to his office, he found time to compile a number of well known bulletins which are of great value and interest as permanent records. His charming personality endeared him to every officer in the Department and when he left at the close of the year, going on long service leave prior to retirement, all with whom he had been associated, down to the humblest, said farewell with the deepest regret and the Hon. the Minister and Department lost an exceedingly capable and well informed adviser. He is succeeded by Mr. A. M. Howe, formerly Superintendent of State Batteries and Chief Inspector of Machinery, a very capable officer of considerable and varied experience, who, it is certain, will be an unqualified success in the position.

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

I have, etc.,

M. J. CALANCHINI,
Under Secretary for Mines.

Department of Mines, Perth,
30th March, 1929.

DIVISION II.

Report of the State Mining Engineer for the Year 1928.

Office of the State Mining Engineer,
Perth, 30th May, 1929.

The Under Secretary for Mines.

Sir,

For the information of the Hon. Minister for Mines, I have the honour to submit the report hereunder on the work of my Branch for the year 1928.

INSPECTION OF MINES UNDER THE "MINES REGULATION ACT, 1906," AND THE "COAL MINES REGULATION ACT, 1902-1926."

There was no alteration in the Inspection staff during the year. In February, Mr. G. A. Leitch was appointed Acting Inspector of Mines, Collie, for six weeks during Mr. J. McVee's absence on annual leave. Mr. A. W. Winzar, Inspector of Mines, Kalgoorlie, was granted three months' long service leave in February, during which time the Inspectors at Kalgoorlie carried on his work in the Leonora District.

Nominations were called for the position of Workmen's Inspector of Mines for the Cue District. Mr R. P. McMennemin, who was the only nominee, was re-appointed for a further term of two years from the 6th June, 1928.

Bulletins.

The Report on "Deep Alluvial Lead at Lake Darlot" by A. Montgomery, Esq., M.A., F.G.S., was printed in bulletin form in September. It is a valuable addition to the technical records of the department which are available to the public in general and to mining interests in particular.

The School of Mines of W. A. Bulletin No. 3 was issued during the year being "Reports on Investigations conducted in the Metallurgical Laboratory" by B. H. Moore, Esq., M.E., Lecturer in Metallurgy. These bulletins are of great intertest and value to mining companies and metallurgists, and have done much to advance metallurgical practice in this State.

Report of Mr. R. C. Wilson, B.Sc., B.E., Assistant State Mining Engineer.

I beg to submit my annual report for the year ending 31st December, 1928:—

My principal duties during the year were as follows:—

1. Acting as State Mining Engineer while Mr Montgomery was on leave.
2. Inspection of mines relative to assistance under the Mining Development Act.
3. Selection of sites for diamond drill boring carried out wholly or partly at departmental expense.
4. Consultations with Dr. Stillwell regarding the preparation of composite geological and assay plans of Kalgoorlie and collection of information relating to the distribution of values in the Kalgoorlie lodes
5. Examination of mineral deposits.
6. Attendance at Conferences between Mine Managers and representatives of the Union relating to underground conditions.

Brief details of the more important inspections are as follows:—

In January I visited the Golden Horseshoe G.M relative to a loan to test out the bromo-cyanide process. (Appendix No. 1—Report No. 1.)

In February, I inspected the Gnows Nest G.M. and reported upon the general position.

In March, I inspected and reported upon Messrs. Millar and Donaldson's new find at Burracoppin. I also reported upon the Carlow Castle Copper Mine at Roebourne.

In April I visited Greenbushes and selected sites for diamond drill boring on the Cornwall, South Cornwall, Dixie, Lost and Found, and Kapanga Tin Mines. (Appendix No. 1.—Report No. 2.)

In May I visited Kalgoorlie in company with Mr. Broughton Edge and Mr. Blatchford, and arranged for samples to be taken as desired by Mr. Edge to assist in ascertaining the possibility of applying geophysical methods at Kalgoorlie.

The Carbine Mine at Kunanalling was inspected and a site for a borehole selected. (Appendix No. 1.—Report No. 3.) During this month, I also reported upon a proposal to deviate or close the railway line between Golden Gate and Kamballie.

In June I visited Galena in company with Mr. D. F. Browne and went into the question of caretaking and disposal of plant at the Three Sisters, Surprise, Springvale and other smaller mines.

In July, the site for the first bore at the Harbour Lights G.M. was selected and approved of by Mr. H. E. Vail. The Riverina Proprietary G.M. was twice visited in this month and the general position at the mine reported upon. (Appendix No. 1.—Report No. 4.) The new find at Twin Hills was also visited and reported upon. (Appendix No. 1.—Report No. 6.)

In August, I visited and reported upon the Rising and Setting Sun G. Mines.

In September I reported upon an application for assistance for the Lloyd George G.M. I also inspected and reported upon the mica and felspar deposits at Londonderry, Grosmont and Ubini, and the tantalite at Londonderry. (Appendix No. 1.—Report No. 7). During this month, the Riverina South Mine was again inspected, sampled and reported upon. (Appendix No. 1.—Report No. 5.)

In October I reported upon a reported find in the Mayman's Consols G.M., Kalgoorlie. (Appendix No. 1.—Report No. 8.) I also collected a quantity of information about the Youanmi G.M. relative to carrying out diamond drilling at the mine. (Appendix No. 1.—Report No. 9.)

In November, I inspected the Sons of Gwalia G.M., and reported upon a proposed alteration in the development programme and upon the ventilation of the mine. (Appendix No. 1.—Report No. 10). the Sand Queen G.M. was also visited and reported upon. (Appendix No. 1—Report No. 11.) Greenbushes was visited during this month, and some further boring sites were selected. A second bore site was also marked out at the Harbour Lights G.M. An application for assistance to sink a main shaft at Thring's Block 7 Lead Mine was reported upon.

SUMMARIES OF REPORTS OF INSPECTORS OF MINES.

Mr. W. Phoenix, Kalgoorlie.

Dust.—During the year dust surveys have been made and dust spots counted with the dark ground illumination. One thousand seven hundred and ninety-five (1,795) dust samples were taken in the following mines:—

Lake View and Star Ltd.	663	samples
Boulder Perseverance Ltd.	288	„
South Kalgurli Consols	377	„
Great Boulder Proprietary	172	„
Sons of Gwalia G.M.	121	„
Associated G.M.	63	„
Mararoa G.M.	42	„
Ingliston Consols Ext. G.M.	33	„
Butterfly G.M.	18	„
Wiluna G.M.	18	„
Total	1,795	„

The average number of particles of dust per cubic centimetre in underground workings was 247, in dry crushing plants 186, and in wet crushing plants, 78. There has been a gradual reduction shown each year which has been more marked in some mines than in others.

The general average for 1926	370	p.p.c.c.
The general average for 1927	306	„
The general average for 1928	247	„

Ventilation.—Close attention has been given to the direction of air currents, air volume and to the separating air doors in the mines. The volume of air in the mines generally was well maintained, whilst the number of men employed underground showed a decrease.

Temperatures.—A great many special visits were made to the mines in connection with the Arbitration Court Award at the request of the A.W.U. Secretary. During the year about 1,600 temperatures were taken in all sections of these mines. The use of ice in development ends had a tendency to reduce temperatures. I must emphasise the necessity for larger blowers to deliver greater volumes of air into dead ends. Blowers reduce the temperatures equally as well as ice and in addition remove dust.

Explosives.—The regulations relative to explosives have been enforced. All fresh consignments of fuse have been tested and the rate found to comply with the Act. Complaints have been received relative to fumes but from the evidence collected there appears to be neglect with regard to properly ventilating the face before returning to re-fire. Drilling and blasting holes are important factors in underground costs. It seems that greater interest should be paid to this branch of mining.

Rock Drills.—The Leyner type of machine is now in favour particularly those of the Jack Hammer type. They are used mostly for stoping purposes where the ground is not extremely hard. There is evidence that they have lowered cost and increased efficiency beyond expectation. This mobile machine is more efficient than the old type. The Axial Water feed machine is now most generally used throughout the district.

Sanitation and Safety Appliances.—Observations have been made by each District and Workmen's Inspector with regard to sanitation and safety appliances. Causes for complaint have arisen and have been rectified. The hygienic conditions are reasonably good.

Miners' Health.—During the year nearly 4,000 miners presented themselves at the Health Laboratory for examination. The Laboratory Staff with the mobile X-ray apparatus have also visited Meekatharra, Cue, Wiluna, Boya Quarry and Norseman. Dr. Tyrer, Officer in Charge, also visited Carbine, Mt. Monger and Comet Vale. There is evidence that conditions relative to dust prevention and dust laying have improved.

General.—During the year, Messrs. Darcey and Jones, Workmen's Inspectors of Mines, have given close attention to the general working conditions and safety of the mines.

Mr. A. W. Winzar, Kalgoorlie.

A party visited the Warburton Ranges, doing some 300 miles by motor truck and the balance of 150 miles by camels. They reported getting 450 miles east of Laverton but though quartz reefs were numerous, and large, they failed to locate any gold.

The usual care and attention has been given to the dust and ventilation and the keeping of the mines in as healthy a condition as possible. Apart from routine inspection work, a fair amount of my time has been taken up with dust sampling, microscopic work and temperature tests.

Towards the end of the year, investigations were made and notes prepared on the use of explosives underground; comparisons are now being made with different grades and of different ages, attention being given to the methods of boring, the amounts used, and the nature and amounts of gases given off. Some very valuable data will doubtless be obtained from these tests and observations.

Mt. Malcolm District.

Sons of Gwalia.—This mine has been worked continuously throughout the year. Lateral developments are opening up good ore between Nos. 20 and 25 levels and it is expected that the mine will have ample ore reserves in the near future. A new compressor unit has been installed and three boilers to utilise the waste heat from the producer gas engine exhaust are in course of erection.

Harbour Lights.—Diamond drilling was commenced and the work was still in progress at the close of the year.

A little prospecting was done at Mt. Clifford on the old Victory, Bannockburn and Waitakauri leases.

Lawlers District.

A fair amount of work was done at Corboy's Find, on the "Waratah" and "Reward North" leases without very much success. Parcels of ore have been raised and are waiting crushing facilities.

Laverton District.

On the King of Creation Mine, operations were carried on continuously on a small scale, and on the Lancefield cyaniding residues was continued. At Duketon, Laverton and Burtville, there are a few men prospecting.

Mt. Morgans District.

The "Westralia" closed down actual mining operations and the residue dump is being re-treated.

In practically all the other centres mining was at a standstill and there are no indications of an immediate revival.

Mr. E. J. Gourley, Kalgoorlie.

Development Work in Kalgoorlie Mines

North Kalgurli Co.—This Company took over the Kalgurli, Oroya North Block, Brown Hill, and Croesus Proprietary Mines. Prospecting was carried on mainly from the Kalgurli Main Shaft by crosscutting from Nos. 2 to 10 levels. The values encountered have been patchy and so far no extent of pay ore has been opened up for stoping. From the Brown Hill Mine about 500 tons were treated for a return of 1,000 ozs. which were obtained from a "dropper" off the famous ore pipe above the 500ft. level. The work of putting the Croesus Proprietary Mine in order has been started, and a few tribute parties have been working at the 200 and 500 feet levels on the Oroya North Blocks.

South Kalgurli Co.—Extensive development work has been carried out and, between the 500 and 800 levels, a considerable amount of broken payable ore has been located and new makes of ore in one or two places have been discovered. On the 1,400ft. level, long lengths of ore have been discovered, but values are not available. On the surface crude oil furnaces for smelting and refining bullion, for heating drills and the latest sharpening machines have been installed, and the Merrill Crowe gold precipitation process is being experimented with. Underground the latest in stream-lined wet drills is being tried out.

Associated Gold Mines.—The development work done has opened up some pay values, but the shoots have been short. The bulk of the ore treated came from the 100ft. down to 1,200ft. levels, and according to returns this mine has been making a small monthly profit.

Boulder Perseverance, Ltd.—A development policy has been carried out by both the Company and parties of tributers, the Company's operations on Lease 66E opening up some very promising ore bodies, especially on the X lode. Tributes are, to some extent, now only let in isolated parts of the mine, and the number of tributers is diminishing. Good work has been done to make conditions underground more efficient. Successful experiments have been made with a view to finding a more economical method of treatment of the ore.

The Great Boulder Proprietary Gold Mines, Ltd.—A fair average grade of ore has been opened out at the 600ft. level. East of the previous workings and at the 2,200ft. and 2,500ft. levels a considerable quantity of pay ore is likely to be won. Large numbers of tributers are engaged in this mine. Near the surface between Edwards Shaft and the railway several parties have been mining out a sort of alluvial wash with satisfactory results. The ore reserves in this mine are practically the same as at the end of the year 1927.

Lake View and Star Group (Ivanhoe, Chaffers, Hannans Star, and Lake View Mines).—These mines are practically in the hands of tributers. On the Chaffers Mine a start has been made to continue sinking the main shaft, and attention has been given to the surface plant. In the Lake View Mine, the Company is working from the 600 feet down to the 2,300 feet and extracting ore of fair value. Ore from all these workings is treated at the Chaffers Central Mill.

Enterprise G.M. (late Boulder No. 1) is under option for purchase to an Adelaide syndicate and is being developed below the 375ft. level.

Golden Horseshoe Mine.—No ore has been broken, but the Chaffers lease is being worked by the Lake View and Star group from the Horseshoe ground.

Associated Northern Blocks are in the hands of tributers who are not developing the Kalgurli Mine or Iron Duke lease to any considerable extent.

Hannans Reward.—Hunt Bros. manage to keep their mill going with ore from four tribute parties working on the lease and occasional parcels of ore supplied by the public.

North End.—There are a few parties of men scattered about from the Croesus Proprietary to the Hannans North. Mayman and party reported a find of telluride below the 150ft. level, but no finds of great importance have been made.

About 20 men have been employed in sinking pot holes West of Boulder No. 1 and Brookman's Boulder lease in search of deep alluvial, but it is doubtful whether there is any deep channel in this vicinity.

Menzies District.

Golden Age Lease.—Rich crushings have been obtained throughout the year from a shoot about 40 feet long and 18 inches wide. An air compressor, oil engine and jack hammers have been installed.

Lady Shenton Mine.—Notwithstanding that in a winze below the 375ft. level at 120 feet, stone carrying values of 3 ounces to the ton was encountered, the Company ceased operations.

Riverina Proprietary G.M.—About 2,000 tons of ore were treated, but were unprofitable, and the funds of the Company became exhausted, although development work disclosed a reef 5 feet wide below the 300ft. level carrying ounce values.

Sand Queen and Gladsome Mines.—About 60 men have been employed, but development work is not sufficiently advanced to keep the 10-stamp mill engaged more than two shifts daily.

In the Mulline, Mt. Ida, Kanowna, St. Ives, Ora Banda, Hampton Plains, Kurnalpi, Mulgabbie, and Balagundi districts parties of prospectors have been spasmodically operating but, beyond obtaining small parcels of ore from time to time which warrant crushing, nothing of importance has been reported.

Careful attention has been given to winding ropes, safety appliances on cages and skips, the elimination of dust above and below ground, and the handling and storage of explosives.

Dr. Stillwell and Mr. Broughton Edge have been assisted at various times in their activities on the Field.

The outlook for an increased number of men being employed is favourable, and there are some indications of a revival in mining operations.

Mr. W. Deeble, Cue.

Jimble Bar.

About 15 men have been engaged prospecting during the year, and two shows are giving very encouraging prospects. On the Jimble Bar lode a drive has been driven for a distance of 160 feet, the lode being the whole width of the drive. Lode outcrops of copper in the form of carbonates can also be traced.

Peak Hill District.

Wembley Mine.—A shaft has been sunk to 120 feet, and a trial crushing of 23 tons yielded 23 dwts. with 8 dwts. 17 grs. in the sands. It is the owner's intention to instal a winding plant.

Holden's.

Waterloo G.M.—This mine has been worked in a small way throughout the year, and it is the Company's intention to carry on operations on a larger scale in the near future.

Meekatharra.

Lady Central.—In this mine two parallel leaders are being worked at a depth of 100 feet and are opening up well.

United.—Operations have been continuous, and a shaft has been sunk with the object of picking up the shoot of ore being worked in the "Lady Central" Mine.

Ingliston South G.M.—A winze is being sunk from the 150ft. level to prove whether the ore shoot continues and values are still good.

Ingliston Consols Extended.—The main shaft is now down 1,347 feet, and the deepest level is at 1,215 feet. A crosscut is being extended from No. 12 level in which it is expected to cut the lode at an early date. This mine treated 32,543 short tons for bullion valued at £65,708.

The New Gwalia, Marmont, Extended, Prohibition, Ingliston, and Haveluck leases have been actively worked with satisfactory results.

Wiluna.

On the Wiluna G.M. 4,000 feet of development work were done. On the "Southern" lease a five-compartment shaft has been sunk to a depth of 200 feet. The shaft is 25ft. by 5ft. in the clear, and has four haulage and one pumping compartments. On the Happy Jack and Happy Jack South leases shaft sinking is in progress. A very extensive development and construction policy is proposed. Ore transport and raising by electric power generated by Diesel oil engines, and an ore reduction plant embracing every modern device will be employed.

Brilliant North Mine.—High-grade stone continues to be produced from this property.

Cue District.

Emu G.M., Reedys.—Good grade ore has been broken throughout the year, and boring by diamond drill has proved that the lodes and values continue at depth. Consideration is now being given to the purchase and erection of a more efficient plant.

In other centres small parties of prospectors have been engaged, but nothing has been reported of outstanding interest.

Big Bell G.M.—Assay results from boring with the diamond drill have revealed payable values, and further drilling has been decided upon.

Mt. Magnet District.

Hill Crest G.M.—This mine has been equipped with Huntington Mills and grinding pans driven off a crude oil engine. The lode is a very large formation and easily worked.

A large lode formation is being worked at Warda Warra, and a small mill is erected upon the property.

There is nothing worthy of note from any of the other centres.

Northampton Mineral Field.

Owing to the low market price of lead all the mines on this field are practically closed down.

Mr. H. P. Rockett, Southern Cross.

Yilgarn Goldfield.

Bullfinch.—A five-head mill, gas engine and hoist have been erected on the old Bullfinch leases, but no returns have been obtained so far.

Southern Cross: "May Queen."—This mine was in operation throughout the year, but is handicapped by insufficient steam power.

Westonia.—There has been a marked revival at this centre and promising developments are reported by McCahon's Syndicate and from the Les Trois and Royal Flush leases. There are several parties of prospectors in this district, but no discoveries of importance were recorded.

Holleton.—Considerable expenditure was incurred in the endeavour to locate an adequate water supply, but the efforts were unsuccessful, and although many of the shows are still manned, there was no further development to record.

Coolgardie Goldfield.

Carbine Mine.—This property continued operations, employing about 20 men.

At Balgarrie, Dunnes, and Kunanalling a fair number of prospectors have been engaged, but without success.

Dundas Goldfield.

Norseman.—The Mararoa Mine maintained satisfactory yields throughout the year, about 30 men being employed. On the Mararoa South an ore body has been proved, 3 feet wide and 600 feet long. The Viking Mine was equipped with a steam boiler, winding engine, air compressor, and two rock drills, but 200 feet of driving have not yet given very encouraging results. On the O.K. Mine a steam boiler, winch, and air-compressor operating two jack hammers have been installed. At and below 400 feet the ore is said to be high grade.

Phillips River Goldfield.

Except for some prospecting at Kundip and at Manganese Knob, no mining operations were carried on in this field.

Greenbushes.

There were seven monitors employed during the year but the comparatively low market price of tin reduced what in all probability would have been the highest output for some years. A Government diamond drilling plant put down several bores, but nothing of a promising nature was disclosed.

At Yellowdine a plant for the production of plaster of paris has been laid down, comprising gas generator, 85 h.p. engine, gas-fired revolving calciner, and a 20 foot tube mill with all accessories.

Mr. J. McVee, Collie.

The following mines were producing coal during the year, viz.: Proprietary, Co-operative, Westralia, Cardiff, and Stockton. The Griffin Mine was also working, but producing only sufficient coal for boiler purposes.

The total output for the year was 528,420 tons, valued at £420,142, as against 501,510 tons, valued at £407,970, in 1927, being an increase of 26,909 tons, valued at £12,171. The railway consumption also showed an increase, the quantities being shown in accompanying tables, and amount to 57·99 per cent. of the total coal sent to the market, the increase over last year's consumption being 4·53 per cent.

Proprietary Colliery.—A small creep occurred at this mine in old workings and caused the main return air shaft to be rendered inoperative. Another shaft which was in use as a downcast was equipped with a fan and utilised as an upcast. A new air shaft is being sunk.

Co-operative Colliery.—A serious fire, due to spontaneous combustion, broke out in January. The whole of the east side and dip workings had to be sealed. As a result of investigations from time to time, the fire appears to be extinguished, and the affected area will be re-opened as soon as possible.

General.—Development work in the collieries has been satisfactorily undertaken. The mines have been kept in fair order, and very few complaints have been made. There were no machinery accidents, but 308 accidents underground and on the surface were recorded, most of them being of a minor nature. One fatal accident occurred.

ACCIDENTS.

The following table gives the number of fatal accidents which occurred to men engaged in mining during the last five years:—

	1924.	1925	1926.	1927.	1928.
Fatal accidents to men engaged in mining	10	12	7	16	4
Total men engaged in mining (average)	6,289	6,011	5,437	5,036	4,853
Accident death rate per 1,000 men	1·59	2·00	1·29	3·18	0·82
Fatal accidents on Quarries reported	...	...	...	...	...
Total men engaged in quarrying	337	307	291	598	695
Accident death rate per 1,000 men	...	...	...	...	...

The mining accidents for the year 1928 are classified in Tables 22, 23, 24 and 25, the previous year's figures being given for comparison, and are forwarded herewith for inclusion in your annual report, together with diagram of the fatal accidents year by year, and their causes. (See Division 1, Report of the Under Secretary for Mines.)

In Table 22, the accidents are classified according to causes. In 1928, 4 persons were killed and 335 seriously injured, as compared with 16 persons killed and 371 seriously injured during the previous year. The diagram shows graphically the totals of fatal accidents since 1910.

The death rate per 1,000 persons employed on surface and underground in gold, coal, and other mines is shown in Table 23, the general average rate for 1928 being 0.82 as against 3.18 for 1927. The rates per 1,000 are based upon the figures in Table 18 of

the report of the Under Secretary for Mines, which shows a grand total for 1928 of 4,853 men employed at mines above and underground, inclusive of alluvial workers.

Table 24 gives the average number of men employed at quarries and the death rate per 1,000 persons employed thereon. The total number of men employed during 1928 was 695, as against 598 for 1927, the death rate for both years being nil.

Table 25 summarises all the fatal accidents for 1928 above and below ground in gold mines only, with rates per 1,000 men and per 1,000 tons of ore raised, similar figures for 1927 being given for comparison. The number of men on which these rates are based is taken from Table 20 of the Under Secretary's Report, and does not include alluvial workers.

The following table comprises all the fatal and serious accidents reported to this office during 1928, the accidents being classified according to the gold or mineral field in which they happened, and also as to causes; the totals from each cause for 1927 are shown for comparison:—

	Explosives.		Falls of Ground.		In Shafts.		Miscellaneous Underground.		Surface.		Machinery.		Total.	
	Fatal.	Serious.	Fatal.	Serious.	Fatal.	Serious.	Fatal.	Serious.	Fatal.	Serious.	Fatal.	Serious.	Fatal.	Serious.
1.—East Coolgardie	...	3	1	1	...	3	1	105	...	39	...	5	2	156
2.—Mt. Margaret	...	...	...	1	...	...	...	25	...	13	...	1	...	40
3.—Murchison	...	1	...	...	...	1	...	5	...	2	...	...	...	9
4.—East Murchison	...	...	...	...	...	1	...	2	...	1	...	1	...	5
5.—Coolgardie	...	...	...	...	...	...	...	...	...	...	...	...	...	...
6.—Yilgarn	...	...	...	...	...	...	...	...	...	...	...	...	...	...
7.—N. Coolgardie	...	1	...	...	...	...	...	2	...	...	...	...	...	3
8.—N.E. Coolgardie	...	...	...	...	...	...	...	...	...	...	...	...	...	...
9.—Broad Arrow	...	...	...	...	...	...	...	...	...	...	...	...	...	...
10.—Dundas	...	...	...	...	...	...	...	...	...	...	...	...	...	...
11.—Pilbara	...	...	...	...	1	1	...	...	...	...	...	...	1	1
12.—Peak Hill	...	...	...	...	...	...	...	...	...	...	...	...	...	...
13.—Yalgoo	...	...	...	...	...	...	...	1	...	...	...	...	...	1
14.—Phillips River	...	...	...	...	...	...	...	...	...	...	...	...	...	...
15.—Collie	...	...	...	15	...	...	1	72	...	26	...	2	1	115
16.—Greenbushes	...	...	...	...	...	...	...	...	...	1	...	...	...	1
17.—Northampton	...	...	...	...	...	...	...	...	...	...	...	...	...	...
18.—West Pilbara	...	...	...	...	...	...	...	...	...	...	...	...	...	...
19.—Swan	...	2	...	2	...	...	...	...	...	...	...	...	...	4
20.—Ashburton	...	...	...	...	...	...	...	...	...	...	...	...	...	...
21.—Roelands	...	...	...	...	...	...	...	...	...	...	...	...	...	...
22.—Kendenup	...	...	...	...	...	...	...	...	...	...	...	...	...	...
23.—State generally	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Totals for 1928	...	7	1	19	1	6	2	212	...	82	...	9	4	335
Totals for 1927	3	5	6	19	5	9	1*	242	1	88	1	8	17	371

* Not a "true" mining accident.

FATAL ACCIDENTS.

A brief description of each fatal accident is given hereunder: —

Falls of Ground.

A miner was fatally injured while working at the 2,650ft. Stope of the Great Boulder Proprietary Mine. He was pulling down some loose ground from the west wall around the bulk heads when the back of the stope broke away between the bulk heads, and about four tons of earth fell. A verdict of accidental death was returned by the Jury. It was found that all reasonable precautions had been taken to ensure the safety of these workings.

In Shafts.

At the Chrysotile Asbestos Mine, Soansville, Pilbara Goldfield, the foreman was found dead on the staging across the shaft at the 95ft. level. When ascending the ladder in the shaft, his foot apparently slipped, and having only one arm, he was unable to save himself from falling. The shaft and ladders were in good order. The jury returned a verdict of accidental death.

Miscellaneous Underground.

Two men were timbering a rearing at the 1,100ft. level of the Boulder Perseverance Mine. The stull was in position, but in order to put in a piece of timber to carry the bottom of the upright lagging, they had to shift the stage pole which slipped out of the hitch, and the stage collapsed. Both men fell about 12 feet on to broken ore. One man was very badly injured and died four days later. The stage was quite safe before the pole was shifted. The Coroner's Jury brought in a verdict of accidental death.

A very unfortunate accident occurred at the Proprietary Colliery, Collie Coalfield. Deceased had assisted the machine miner to erect a coal cutting machine, but as the piping, which was 10 feet long and three inches in diameter, was set too close to the machine, it was necessary to alter its position. When the strain on the piping was eased, it came away from the roof and struck him with such force on the right side of the head that he fell on to broken coal and sustained further injury near the left eye. An operation was performed, but he died the following morning. At the inquest, a verdict of accidental death was given.

Other accidents.

In addition, the following fatal accidents occurred in mines, but to persons not engaged in mining at the time of their death:—

The Caretaker of the Mt. Charlotte Reservoir at Kalgoorlie was returning home at night when he fell into an opencut on Crown Lands, and then down a shaft 200 feet deep. The opencut was fenced with old wire rope and posts, but some of the posts had been taken away. The gradual destruction of fencing round old opencuts appears to have been the cause of this accident. A verdict of accidental death was returned by the Coroner's Jury.

In another case, when a man was on his way home at night he fell down the Lake View South Shaft 100 feet and struck some timber and then fell another 300 feet. He was not found until six days later. At the inquest there was no evidence given to show how the deceased came to be in the shaft, which was well protected.

SERIOUS ACCIDENTS.

The term "serious" is applied to all accidents resulting in such injuries as incapacitate the injured person from carrying out his usual work in or about a mine for 14 days or more.

The accidents recorded during the year totalled 335, the greatest number of which occurred in the East Coolgardie Goldfield, viz.:—156, while in the Collie Coalfield there were 115. Only a very small proportion (about 12 per cent.) could be fairly classed as accidents of a more serious nature, such as breakages of the larger bones, permanent injury to limbs, or injuries which may have lasting disabling effects. A considerable number of the remaining accidents, although of a sufficiently serious nature to cause the injured persons to be absent from work for 14 days, were really of a minor nature, such as bruises, cuts, sprains, burns, jarred fingers, etc. Small cuts and scratches turning septic also increased the number of serious accidents very considerably. Some particulars are given hereunder, and reference should be made to the foregoing table.

Explosives.

The recharging of a hole before it was sufficiently cooled caused an explosion and one man received injuries to his face and arms. Two men received burns on face and body, through an explosion apparently caused by the hole not being properly tamped. The inhalation of fracture fumes was the cause of two men being absent from their work for 14 days. The cause of another accident was the explosion of a buried detonator.

Falls of Ground.

Most of these accidents happened in the Collie Coalfield, being due mainly to the men being struck by small pieces of coal. A workman was rather seriously injured when working in a quarry. He was boring a large rock about ten feet up a rill when the rock rolled on to him. While barring down loose ground, another man sustained a broken leg through the ground around the head board breaking away.

In Shafts.

A man was climbing a shallow shaft, about 18 feet deep, by means of a rope which broke when he was almost to the top, and head injuries were received. A water tank jamming in a shaft caused facial injuries to another miner. The remaining accidents happened while men were engaged timbering shafts.

Miscellaneous Underground.

The largest number of accidents were recorded as Miscellaneous Underground, and occurred while handling and loading trucks and skips, through men slipping while trucking and lifting derailed trucks or material into trucks, handling sharp stones, timber, rock drills and coal cutting machines, stones running down rills and ore chutes. Other falls in the workings from stages, ladders, in rills and passes, flying splinters of stone and steel, caused injury to many persons.

Surface (including machinery).

The majority of the surface accidents were caused through falls in the course of their work, the tools they were using falling or slipping, the handling of timber and firewood, and parts of machinery.

Full enquiries were made by Inspectors of Mines into all accidents of a serious nature, and all reasonable precautions taken for the safety of the men. Some of the accidents may have been avoided had a little more care been exercised by the injured persons, but the majority were purely accidental mishaps, incidental to mining.

Other accidents.

A remarkable accident occurred to a little boy, about five years of age, who fell down an old shaft and workings while playing round a slimes dump. He fell 160 feet (at about 80 feet he probably struck a broken tom), then climbed the rill till he came to the hole at the top through which he fell 40 feet to the footwall stope, rolling down 30 feet and over the rearing, again falling 40 feet and rolling 20 feet: he then fell 12 feet and was found in the end of the drive. It was very fortunate that his footsteps were noticed near the top of the first rill. He had a miraculous escape from death, being unhurt except for cuts and bruises. Great praise is due to the men who helped to rescue the boy at grave personal danger. Although this accident is not classified as a mining accident, it is mentioned in this report on account of its extraordinary nature.

WINDING MACHINERY ACCIDENTS.

(Without serious injury to persons).

Fourteen accidents to winding machinery, which include nine skip derailments, three breakages of ropes and two miscellaneous accidents, were reported during the year. Brief particulars are given hereunder:—

Skip Derailments.

These accidents occurred at the Sons of Gwalia Mine, Mount Margaret Goldfield:—

While hauling ore a loaded skip left the rails, the cause of the derailment evidently being a broken skip wheel flange. A number of end legs were knocked out.

The cause of another derailment was unknown as the track appeared to be in good order. It was thought the old skips were not heavy enough and new ones were installed.

A descending empty skip left the rails which had apparently widened and allowed the skip wheels to go between them. No damage was done.

The back wheels of a loaded skip came off the rails, a few shaft timbers being knocked out, but no damage was done to the track. An examination failed to reveal the cause of the accident.

The derailment of another loaded skip was probably due to rock falling on to the track, and as a result a number of shaft timbers were knocked out.

A north skip descending empty became derailed, knocking out several shaft centres. The south skip, ascending full, struck the dislodged centres and was also derailed. An examination was made and nothing could be found to show the cause of the north skip leaving the rails.

In another case, a descending empty skip left the rails through some unknown cause, as a result of of which very little damage was done.

An examination of the shaft, after a full skip, ascending, had been derailed, showed no sign of the rails being dislodged and no definite cause of the accident could be given. The shaft timbers were damaged.

Miscellaneous.

At the Hannans Star Mine, East Coolgardie Goldfield, when the west skip was being tipped, the butterfly hook fractured allowing the shackle to draw out, and the skip fell to the bottom of the shaft. A lighter skip was being used at the time while the working skip was being repaired. Very little damage was done. The skip was put on only for short periods, and no travelling was allowed; it was practically used as a balance.

During hauling operations at the Ingliston Consols Ext. G.M., Murchison Goldfield, a truck upset in the south cage, and the rock jammed the cage in the wall-plates. No damage was done.

Ropes.

While water was being bailed at the Fenian main shaft, Ingliston Consols Extended G.M. Ltd., the rope broke just as the west tank was being pulled away from the well hole. An examination of the broken ends showed that it was badly corroded internally. The Inspector of Mines reported that the rope had been opened at different places about a month previously, but no corrosion was found.

A rope broke at the North Kalgurli main shaft, East Coolgardie Goldfield, while bailing operations were in progress. The rope had only been in use two years, and exhaustive enquiries were made to discover the cause of such rapid deterioration. It was thought possible that a section of the rope had been damaged in transit by sea water which had set up internal corrosion, but from the evidence it was found that the conditions under which the rope had been used in a very wet shaft, together with ineffective lubrication would probably cause the serious internal corrosion which took place.

After mining operations ceased at the Oroya Links G.M., the rope on the Croesus Proprietary Shaft was used only for bailing water for about eighteen months until the South Kalgurli Company took over the property. They continued the bailing operations during which the north rope broke as the tank was leaving the water at the bottom of the shaft. The South Kalgurli Company had new ropes available and intended putting them in before resuming operations.

AMENDMENTS AND ADDITIONS TO THE REGULATIONS UNDER THE "MINES REGULATION ACT, 1906," THE "COAL MINES REGULATION ACT, 1902-1926," AND THE "MINING DEVELOPMENT ACT, 1902-1924."

Mines Regulation Act, 1906.

Amendment of Clause 5, Division 2, of Regulation 15, under Section VIII., relating to payment of Workmen's Inspectors of Mines. (Gazetted 16th November, 1928.)

Coal Mines Regulation Act, 1902-1926.

Towards the end of the year, the "Coal Mines Regulation Act Amendment Act, 1928," was passed to provide for the appointment of Special and Workmen's Inspectors of Mines.

Mining Development Act, 1902-1924.

Continuance of the regulations in relation to production of merchantable mica and manufactured mica goods for a term of two years from the 1st January, 1928. (Gazetted 6th January, 1928.)

EXEMPTION FROM SECTION 31, SUB-SECTION 4, OF THE "MINES REGULATION ACT, 1906."

Ten permits were issued during the year, nine of which were for mines in the East Coolgardie Goldfield, one permit being granted for a mine in the Greenbushes Mineral Field.

In every case, the Inspector of Mines first satisfied himself that the applicants were capable of handling the particular machinery to which the exemption applied, and that it was not practicable to insist on the employment of a certificated engine-driver.

SECTIONS 43 TO 47 "MINES REGULATION ACT, 1906." SUNDAY LABOUR IN MINES.

Five permits were granted to work on Sundays during the year:—

Two permits were issued to the Stockton Colliery, Collie Coalfield, for the purpose of putting in a new flat; and cleaning up and relaying portion of main haulage road. On one occasion the Co-operative Colliery was granted a permit for renewing timber on winch haulage road, and the Cardiff Colliery was given a permit for relaying No. 6 flat.

In the East Coolgardie Goldfield, a permit was issued to the Great Boulder Proprietary Mine, in order to clear a sand pass between the levels which were damaged by a severe earth tremor. The Lake View and Star Company was granted a permit for three months for the purpose of unwatering, cleaning out and repairing Chaffers Shaft.

A permit was given to the Wiluna Gold Mines Ltd., East Murchison Goldfield, for continuous work in their main shaft on account of the inflow of water.

PROSECUTIONS FOR BREACHES OF THE MINES REGULATION ACTS AND REGULATIONS.

Only two persons were prosecuted during the year, particulars of which are given hereunder:—

A shiftman at the Proprietary Colliery, Collie Coalfield, was asked to retire when a shot was being fired, but instead of doing so, he pulled the lighted fuse with detonator attached out of the hole and threw it some distance away. He was prosecuted under Section 55, Rule 11 (f) of Coal Mines Regulation Act, 1902-1926, and fined £2 and costs.

Action was taken against the manager of Hill 60 G.M., Mt. Magnet. It was contended that an explosion occurred through a hole being insufficiently cooled before re-charging, contrary to Section 32, General Rule 3 (q) of the Mines Regulation Act, 1906. The cause of the explosion was not definitely proved and the case was dismissed.

Careful enquiries were also made into other instances of alleged breaches of the Acts.

LOANS AND SUBSIDIES UNDER THE "MINING DEVELOPMENT ACT, 1902-1924," AND FROM THE MINING DEVELOPMENT VOTE.

Each year a great deal of field work is undertaken by the Assistant State Mining Engineer and District Inspectors of Mines in connection with assistance applied for and given to develop and equip mines. The appendix to this report contains some of the more interesting reports of the Assistant State Mining Engineer.

During 1928 advances in aid of mining work and equipment were made to the amount of £13,591 4s. 5d. Diamond drill boring, the details of which are contained in remarks under the heading "Boring," and in the Government Geologist's report, were subsidised by a total amount of £8,349 12s. 5d. as follows:

	£	s.	d.
Eradu	2,084	1	4
Sandstone	*Nil*		
Coolgardie	*Nil*		
Cue (Reedy's)	2,988	6	7
Cue (Big Bell)	213	11	2
Leonora	409	19	9
Galena	*Nil*		
Braeside	2,500	0	0
Greenbushes	153	13	7
	£8,349	12	5

In addition to the foregoing advances, the cost of boring was subsidised by a Federal grant of £6,679 19s. 3d. as follows:—

	£	s.	d.
Sandstone	1,000	0	4
Coolgardie	1,239	19	3
Galena	1,646	5	8
Greenbushes	2,793	14	0
	£6,679	19	3

A considerable amount of money was also found by the mining interests concerned towards the cost of boring done at Cue, Leonora and Braeside.

Providing transport and equipment to prospectors accounted for £6,221 19s. 11d., water supplies cost £49,231 2s. 9d., and represented subsidies towards the reduction in water supplied to mines east of Southern Cross (£47,833 10s. 5d) and at Meekatharra (£1,397 12s. 6d).

Subsidies to public crushing plants privately owned amounted to £23 7s. 6d., and miscellaneous expenditure including subsidies for long distance ore transport to State batteries, sampling mines and maintenance of securities amounted to £3,248 17s. 3d. The total expenditure was £80,666 4s. 3d.

Refunds of advances during the year amounted to £1,711 0s. 4d., miscellaneous refunds £159 6s. 1d., proceeds from sale of securities represented £5,060 15s. 11d., total refunds £6,931 2s. 4d.

Advances written off during 1928 amounted to £6,626 7s. 10d., which, added to £44,390 9s. 2d. written off in previous years, makes a total of £51,016 17s. 0d.

ADVANCES ON ORES.

During the early part of the year, 5.13 tons of asbestos from the Nullagine District were exported to London, the gross proceeds being £418 19s. 5d., and 5.25 tons were sold locally for £132 18s. 5d. Advances were made on delivery at Marble Bar, and after valuation at Fremantle, further advances were given on the higher grades. A parcel of 1.15 tons of silver lead ore was sold at Fremantle for £5.

BORING.

Petrological reports, charts, plans, assay results and full details of each bore mentioned herein will be found in Division IV. of this Annual Report (Geological Survey).

The total amount of boring done during the year was 12,804 feet, as follows:—

(I.)	For coal—Eradu	1,168 feet.
(II.)	For Gold—Sandstone	555 „
	„ —Coolgardie	991 „
	„ —Cue (Reedys)	2,593 „
	„ —Cue (Big Bell)	746 „
	„ —Leonora	1,300 „
(III.)	For Lead—Galena	450 „
	„ —Braeside	2,568 „
	For Tin—Greenbushes	2,433 „
		12,804 feet.

A Calyx drill was used to bore for coal at Eradu and diamond drills (five plants), were used at other places named.

(I.)—WITH CALYX DRILL FOR COAL AT ERADU.

Continuing the report in the Annual Report for 1927, No. 3 Bore which had reached a depth of 403 feet on 31st December, 1927, was continued to a depth of 1,211 feet and was stopped on 28th April, 1928.

No. 5 Bore was commenced on 7th June at a point about 22 chains south-west from No. 4 bore site, and 43 feet above datum level, and was completed at a depth of 360 feet on 14th July. A seam of coal 22 feet thick was passed through between 135 feet and 157 feet.

The total amount of boring done at Eradu for Coal during 1928 was 1,168 feet. The drill was required in July to bore for water and was therefore withdrawn from this work. It is evident from the details contained in the Government Geologist's reports on the various bores that more drilling should be done both on the east and west sides of the river in order to determine the strike and dip of the coal seam.

(II.)—WITH DIAMOND DRILLS ON GOLDFIELDS.

Sandstone.—Continuing the report on boring operations at Sandstone in the Annual Report for 1927, the third vertical bore to cut the Oroya-Black Range Reef was continued from 273 feet and stopped at 828 feet on the 22nd March. Assays were made of those portions of the core likely to contain gold values, but the results were negative.

The total amount of boring done at Sandstone was 4,681 feet. During 1928, there were 555 feet drilled.

The drilling plant employed on this work was transferred to Reedy's Find.

Coolgardie.—The 1927 Annual Report gave details of boring at Tindalls Mine and at 31st December, 1927, No. 3 Bore had reached a depth of 89 feet. It was continued to 410 feet and was completed on 26th March. No. 4 Bore, depressed at an angle of 60 degrees west was commenced at a point 50 feet north of No. 3 Bore on 6th April, and was stopped at a depth of 670 feet on 8th August.

The total amount of boring done on this mine was 2,760 feet, of which 999 feet were drilled during 1928.

The petrological reports of these bores are particularly interesting and should be carefully perused. The lodes cut contained highly satisfactory values and it seems certain that as they have been proved at depth, they will be worked again in the future.

The plant engaged for boring on this mine was transferred to Leonora during the month of August.

Cue (Reedy's).—On the 18th April, boring to cut the lode at vertical depths varying between 300 feet to 500 feet was commenced at the Emu North Lease, Reedy's Find, situated about 35 miles N.E. from Cue. Altogether five bores were drilled from the western side of the lode, and the work was completed on the 22nd September:—

No. 1 Bore depressed at an angle of 45 degrees, depth 418 feet.

No. 2 Bore depressed at an angle of 60 degrees, depth 464 feet.

No. 3 Bore depressed at an angle of 60 degrees, depth 603 feet.

No. 4 Bore depressed at an angle of 60 degrees, depth 642 feet.

No. 5 Bore depressed at an angle of 60 degrees depth 466 feet.

The total amount of boring done was 2,593 feet. The lode was cut in each bore and assay results of cores from Nos. 1 to 4 Bores were highly satisfactory. The core of the lode in No. 5 Bore showed that it was strongly defined, but probably too far north to be in the gold shoot. This work has been of material assistance to the Company holding the leases and will probably lead to the mine being thoroughly developed and equipped.

Treatment tests were made at the School of Mines, Kalgoorlie, on the ore taken from the cores, and the report issued by the officers of that branch was forwarded to the Manager, who expressed his pleasure with the valuable information contained therein.

Cue (Coodardie).—The first of a number of bores arranged to be drilled to intersect the lode at the "Big Bell" Mine, situated about 18 miles N.W. from Cue was commenced on 15th October. The drilling programme included four bores depressed at an angle of 45 degrees to cut the lode in various places at a vertical depth of about 180 feet to 200 feet, and at least one bore depressed at an angle of 60 degrees to cut the lode at 500 feet. All borehole sites were marked out to be drilled from the eastern side of the lode.

No. 1 Bore was started at a point 75 feet north of the main shaft and 100 feet from the hanging wall of the lode, and was completed at 300 feet on 31st October. No. 2 Bore was commenced on 7th November, 205 feet south of No. 1 Bore, and was abandoned by the Drilling Company at 165 feet on 15th November, on account of troubles experienced. On 22nd November, a new bore at No. 2 Site was commenced and was completed on 5th December at an inclined depth of 281 feet. The plant was then moved to No. 3 Bore site, 140 feet south of No. 2 Bore, and operations were suspended until the new year to enable the team of men to take holidays. The results from these bores have demonstrated that the lode maintains its width and value and it is not unlikely that after the programme has been completed the mine may be re-opened and once again become a gold producer. The footage bored at this mine during the year was 746.

Leonora.—The "Harbour Lights" Mine situated about one mile N.W. of the Leonora townsite was rather extensively worked in the more shallow levels and produced a good deal of gold from fair grade ore. It has been closed down for some time, and in order to test the lode at depth the first of two bores was commenced on 30th August to intersect the lode under the old southern workings. At 323 feet drilling difficulties arose and the hole was abandoned on the 19th September before any results of value were obtained. The plant was moved three feet south and boring commenced again on 3rd October, and the hole was completed on 23rd November at an inclined depth of 797 feet. On the 8th December, No. 2 Bore Hole to cut the lode under the old northern workings was commenced and at 19th December had reached a depth of 180 feet when the plant was closed for the holiday season. The total amount of boring done for the year was 1,300 feet. A large ore deposit undoubtedly exists at depth in this mine, but unfortunately the gold values are far too low to permit of it being worked.

(III.)—WITH DIAMOND DRILLS ON THE MINERAL FIELDS.

For Lead at Galena.—Continuing the report in the 1927 Annual Report, No. 2. Bore at Surprise Mine, Galena, was drilled to a depth of 450 feet and was completed on the 17th April. As indicated in that report, these bores were unsuccessful in finding the lode, and the drill was sent to Greenbushes, to undertake a programme of boring at that centre. Further boring in this district was postponed until a proposed geophysical survey by Mr. Broughton Edge has been completed.

For Lead at Braeside.—For some years the attention of this Department has been given to lodes at Braeside. A certain amount of prospecting work has been done and galena of a promising nature located. The locality is not provided with ordinary facilities and prospectors have been greatly handicapped in their endeavours to develop the district, which has been fully described in previous reports. It was decided to test lodes known to exist on the surface, by diamond drilling to intersect them at vertical depths to 400 feet. The Government Geologist surveyed ten bore sites in three groups, at the southern and northern ends and middle of the lines of lode extending over a distance of over 20 miles. A plan of the district, attached to his report shows the positions of the bore sites.

Southern Group:—Nos. 1 and 2 bore sites were marked out on Mineral Lease 288 and Nos. 3 and 4 on Mineral Lease 307, adjoining Mineral Lease 288 on its northern boundary. These leases are situated at "Ragged Hill" and the lodes have a north westerly strike. The bore sites were fixed on the south-westerly side of the lodes and the boreholes depressed in a north-easterly direction.

Central Group.—No. 5 Bore site was marked out on western side of Mineral Lease 325, No. 6 at a point a little south of Mineral Lease 77, No. 7 on the south end of Mineral Lease 77 and No. 8 on Mineral Lease 326.

Northern Group:—No. 9 Bore site was selected on the eastern side of Mineral Lease 291 and No. 10 site at the northern end of the same lease.

Two diamond drilling plants were engaged for this programme of work. No. 1 Plant commenced drilling on 1st May and No. 2 Plant on 1st June. At the close of the year Bores Nos. 1 to 5, inclusive, and No. 9 had been completed; the aggregate depth of the bores was 2,568 feet, as follows:—

No. of Bore.	Date Commenced.	Date Completed.	Angle of Depression.	Depth in Feet.
1	1st May	13th August	43° N.E.	500
2	20th August	12th October	43° N.E.	400
3	1st June	17th August	49° N.E.	443
4	23rd August	13th October	45° N.E.	400
5	30th October	22nd December	47° N.E.	425
9	8th November	31st December	58° W.S.W.	400

Quartz was cut in No. 1 Bore between 386 feet and 394 feet and carried a little galena, one assay showed 2 per cent. lead and 10 grains of silver.

In No. 2 Bore between 323 feet and 332 feet mineral was obtained in the core, carrying values up to 5.51 per cent. zinc, 6.54 per cent. lead with small quantities of gold and silver.

No. 3 Bore passed through veins of quartz with traces of galena, but no section of the core showed payable values.

No. 4 Bore produced core showing typical quartz veins and schisted basalt of the ore channel, but no mineral was visible in it and it was not assayed.

No. 5 Core showed no traces of galena or other metallic mineral.

No. 9 Core consisted of greenstones with a good deal of quartz in small veins and a few specks of pyrite but no galena or blende, except at 366 feet where about four inches of core (greenstone) showed small specks of galena which assayed 2.16 per cent. lead and a trace of silver.

For tin at Greenbushes.—Altogether twelve sites for boreholes were marked out at various leases with the object of proving, if possible, the lodes at vertical depths varying between 160 feet and 320 feet.

During the year, eight of the boreholes were completed. The first four bores were drilled on the "Cornwall" Mine. No. 1 Bore was started on 12th May at a site 380 feet west of the vertical main shaft at No. 1 East Lode, and was depressed at an angle of 45 degrees east to cut the lode, having a strike a few points west of north, at about 200 feet vertical depth. It was completed on 5th June at an inclined depth of 343 feet.

No. 2 Bore was commenced on the 11th June at a point 90 feet north of No. 1 Bore, the angle of depression being 45 degrees, and the direction westerly. It was completed on 26th June at a depth of 291 feet.

No. 3 Bore was commenced on 2nd July at a point 110 feet north of No. 2 Site and was depressed at an angle of 45 degrees west. It was completed at a depth of 322 feet on 23rd July.

No. 4 Bore was started on 28th July at a point 230 feet south of No. 1 and was finished on the 16th August at 288 feet. This bore was also depressed at an angle of 45 degrees north-east.

All four bores drilled on the mine cut lodes as indicated in the petrological reports, but the cores did not reveal any payable values.

No. 5 Bore was drilled on the "Dixie" mine and was commenced on the 27th August at a point 200 feet south-west of the main shaft, depressed at 45 degrees north-east. When a depth of 453 feet had been reached, the bore was stopped on the 2nd October. Lode material was cut between 220 feet and 225 feet, 242 feet and 265 feet, 273 feet and 291 feet and 377 feet to 403 feet, but the core assayed only traces of tin.

No. 6 Bore was put down on the "Cornwall South" Mine, at a point 200 feet south-west of the main shaft and was depressed at an angle of

45 degrees north-east. It was commenced on 10th October, and was completed on 29th October at 295 feet. Tourmalinised greisen was cut at 125 feet to 147 feet and lode formation at 229 ft. 9 ins. to 235 ft. 6 ins., but assay results gave only traces of tin.

No. 7 Bore was drilled on the "Lost and Found" mine and was commenced on the 6th November at a point 250 feet north-west of what is known as the new shaft. It was depressed at an angle of 50 degrees east to cut the lode from the western side. It was completed at 250 feet on the 21st November. One acid dyke strongly tourmalinised was cut and the core from 124 feet to 125 ft. 6 ins. assayed 0.9 per cent. tin.

No. 8 Bore was put down on the same lease as No. 7 and at a point 150 feet south of it, depressed at an angle of 70 degrees. It was started on the 27th November and completed at 191 feet on the 11th December. At 122 feet about 6 inches of quartz felspar rock was cut which assayed 0.39 per cent. tin.

The drill was moved to the "Kapanga" Mine, but boring operations were then suspended during the holiday season. Altogether 2,433 feet were bored at Greenbushes during the year. In each of the eight bores, lodes were cut as indicated in the petrological reports, but most of cores showed little or no cassiterite.

MINING.

Sons of Gwalia Mine, Gwalia.

Under the Agreement between the Sons of Gwalia Ltd. and the Government, which was the outcome of negotiations with the Development and Migration Commission, and a report by its Technical Committee, an active programme of development work was undertaken during the year. The full programme covers a period of three years and a total advance of £78,000 will be made during that period, £38,000 for machinery equipment and £40,000 for development.

Development Work Approved.

Sink main shaft 209 feet to a depth of 4,200 feet on the underlay.

No. 20 *Level.*—Sink two winzes to No. 21 level.

No. 21 *Level.*—Extend the main south drive; drive north and south on the ore body in the west crosscut 1,710 feet south; continue south drive off west crosscut 1,470 feet south on footwall make of ore; sink winze on eastern lode in east crosscut 305 feet south; sink two winzes on South Gwalia shoot 1,720 feet and 1,820 feet south; sink winze on Pozzi's Lode to No. 22 level.

No. 22 *Level.*—Crosscut for east lode met with in east crosscut 305 feet south; crosscut south-west from 1,670 feet south about 120 feet to cut South Gwalia shoot; drive north and south on this ore body; drive south off the west crosscut 1,515 feet south.

No. 23 *Level.*—Extend main south drive to look for southern shoots of ore.

No. 24 *Level.*—Extend main south drive; crosscut east at 1,600 feet south about 40 feet, to cut values found in east crosscut 1,500 feet south and east crosscut 1,675 feet south; sink three winzes at 1,440 feet south, 1,500 feet south, and 1,600 feet south; sink winze at 1,270 feet south to hole into winzes 1,205 feet south about half way down.

No. 25 *Level.*—Extend main south drive; sink five winzes at 900 feet south, 1,000 feet south, 1,100 feet south, 1,280 feet south, and 1,620 feet south.

No. 26 *Level.*—Cut plat; drive north 50 feet to make siding for trucks; drive south for main shoot of ore; crosscut west at 1,400 feet south for western ore body; drive south on western ore body.

From the beginning of March to the end of the year portions of this work have been actively undertaken and approximately 722 feet of driving, 477 feet of crosscutting, 1,033 feet of winzing and 186 feet of rising were completed. Preparations were also made to sink the main shaft, but the actual sinking was not commenced until after the close of the year. The total amount of advances made during the year for this work was £14,980 4s. 9d.

Machinery Equipment.—During the year £16,166 2s. 3d. was advanced to enable the installation of a gas driven air compressor with producer plant, air receiver and main and rock drilling outfit complete. This installation has already proved to be very efficient and of great economic value. Three waste heat boilers were also purchased and delivered on the mine, which when installed will utilise the heat from the exhaust of gas engines driving various machines, and now going to waste, to generate steam to be used for winding purposes. Considerable economy in fuel will result, thus further decreasing power costs.

During the year 108,086 tons of ore were milled and treated for a return of 30,916 ounces fine gold. A report by the Assistant State Mining Engineer on this mine appears in the Appendix (Report No. 10).

Golden Horseshoe Mine, Boulder.

Continuing the notes on this mine which appeared in the 1927 Annual Report, 2,123 tons of ore were raised from the mine and produced 2,842.27 fine ounces of gold. Some of it was sold to other companies and some was tributers' ore. Revenue was also derived from a general clean-up round the plant, from rent paid by other mines for use of machinery and equipment. The total revenue from all sources was £19,148. The expenditure incurred in bailing water, maintenance, protection of assets, experimental work, report on the mine and dumps and all other expenses was £28,511, the loss for the year being £9,363.

Negotiations relative to placing the mine into active operation in the future were carried on, and although no definite arrangement had been made at the close of the year, it has since transpired that an amalgamation of interests has been made with the Lake View and Star Company.

Sand Queen-Gladsome Mines, Comet Vale.

Early in the year a loan of £2,500 was advanced by the Government for the purpose of defraying part of the cost of unwatering the mine and re-conditioning the workings. The Appendix contains the Assistant State Mining Engineer's report (No. 11) on this mine.

During the year 6,549 tons of ore were milled for a return of 3,051 fine ounces gold.

The company decided towards the end of the year to raise additional capital to enable the ore in the lower levels to be developed thoroughly in order that it may be extracted in quantities sufficient to keep

the mill supplied to its full capacity. Altogether over £45,000 have been expended by the company in bringing the mine to its present stage of development. The ore opened up in the lower levels is good grade and the prospects for successful results in the future are bright. The mine must be further developed and thereby made capable of producing ore sufficient to keep the mill employed to its full capacity to ensure profitable results.

Gnows Nest Mine, Yalgoo Goldfield.

The ore above No. 5 level which was being developed in this mine at the close of 1927 was opened up and stoping was commenced early in the year. The mill crushed all ore that could be raised, the tonnage for the year being 9,116 tons which yielded 4,213 ounces of fine gold.

The width and value of the ore between Nos. 4 and 5 levels are quite satisfactory but the shoot is rather too short. The tonnage available appears to be too small to defray the cost of development, extraction and treatment.

During the year loan assistance to the amount of £1,301 10s. 0d. was given to this mine, making the total assistance £8,801 10s. 0d., of which £1,637 14s. 2d. has been repaid, £479 2s. 10d. of it during the year.

Riverina Proprietary G.M., Riverina.

The installation of plant mentioned in the notes on this mine in the 1927 Annual Report was sufficiently far advanced to start the mill before the end of April. Difficulties presented themselves in regard to producing ore for the mill and it soon became apparent that development had not been far enough advanced to ensure regular ore supplies. It was disappointing that only 1,572 tons were milled during the year for a return of 723 ounces of fine gold. The winze, 50 feet below No. 3 or 280 feet level shows the width of the lode to have increased to 60 inches and the value 110/- per ton, where the lode was cut at the bottom of the winze.

Very considerable assistance has been given to this mine, loans to the extent of £9,314 12s. 4d. having been advanced for development work and machinery, of which £185 6s. 11d. have been repaid.

The reports of the Assistant State Mining Engineer which appear in the Appendix (Report Nos. 4 and 5) are very interesting. There is no doubt this mine is well worthy of development below 280 feet.

Viking Mine, Norseman.

A loan of £1,600 was authorised during 1927 for the purchase and installation of a rock drilling plant. The rock is too hard in this mine for hand drilling to be done economically. The machinery was installed and development work at No. 6 Level was undertaken, but with rather disappointing results. At the close of the year, the members of the syndicate working the mine were still trying to locate pay ore. There are indications that this lode should be developed below the present bottom level (No. 7, 433 feet). The mine has produced 50,834 fine ounces of gold from 51,485 tons crushed. The ore has been extracted from two shoots and it has not yet been determined whether the shoots are in one lode or whether two lodes exist. Diamond drilling can be confidently recommended to test the ore at greater depths in this mine.

Waterloo Gold Mine, Holdens.

Operations at the Waterloo Mine, Holdens, were greatly restricted during the year, and only 690 tons were milled for a return of 242 ozs. of fine gold. The affairs of the mine were placed in the hands of a newly formed company, and it was decided that the mine should be inspected and reported on by a mining engineer before further development work was done. The inspection had not been made at the end of the year.

Wiluna Gold Mines Ltd., Wiluna.

At the Wiluna Gold Mines a comprehensive programme of development work was actively undertaken. A new five-compartment main shaft was started and had reached a depth of 200 feet at the end of the year. On the "Happy Jack" and "Happy Jack South" leases shaft sinking is also being carried out. Altogether several thousand feet of development work were completed on the various leases, and preparation is being made for handling large tonnages of ore in future. It will take considerable time to equip the mine with necessary machinery and plant before it can be brought to the stage of production. It is confidently expected that this mine will become an important producer in due course.

General.

The metal market was not sufficiently good to enable a revival in our lead and copper mines. Business arrangements and developments in connection with the W.A. Manganese Company's leases at Horseshoe Range, Peak Hill Goldfield, were continued, but had not been sufficiently far advanced to enable ore to be marketed.

Although the price of tin was somewhat weak, rather more cassiterite was exported from the State than during any of the preceding three years. The production was almost entirely reported from Pilbara and Greenbushes districts.

Coal mining at Collie maintains its importance, and in addition to the collieries regularly producing coal the Stockton Colliery is being opened up on sound lines for a large output in the future.

There has not been a great deal of activity in mica and felspar mining, but asbestos is claiming a good deal of attention, and there have been a number of inquiries for certain heavy minerals, including tantalite ores.

It is pleasing to note the activity that is again being manifested in the mining industry in this State.

Conclusion.

The retirement of A. Montgomery, Esq., M.A., F.G.S., from the position of State Mining Engineer has been referred to in your report contained in the Annual Report for 1928.

I wish to place on record my appreciation of the efficient and loyal co-operation of all members of the staff in conducting the affairs of this Branch of the Mines Department.

I have, etc.,

A. M. HOWE,
State Mining Engineer.

APPENDIX No. I.

Sundry Reports by R. C. Wilson, Esq., B.Sc., B.E., Assistant State Mining Engineer.

These are excerpts from reports on the various mines to which reference is made, which have been examined in connection with applications for loan assistance under the Mining Development Act. The portions published are such as give information relative to the mines which may be of public interest:—

1.—ASSISTANCE TO THE GOLDEN HORSESHOE ESTATES CO., LTD.

(25th January, 1928.)

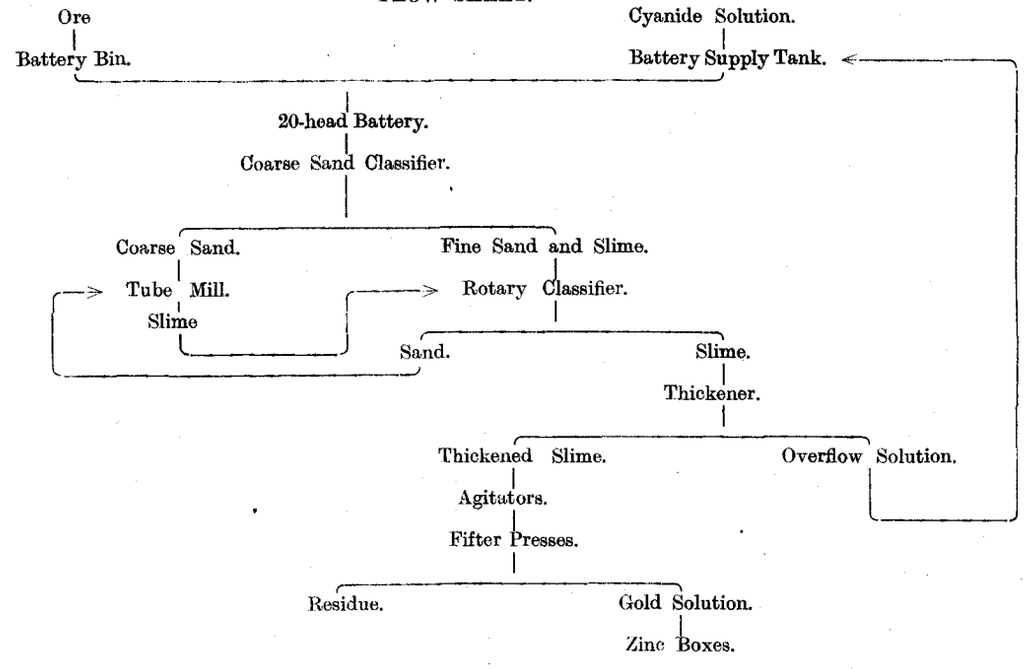
On the 25th November, 1927, Cabinet approved of the further assistance to the above-mentioned company of £5,000 for the specific purpose of testing out on a working scale an improved process of treatment of Kalgoorlie ores.

The treatment consists of the use of bromo-cyanide under careful chemical control, and is based on a number of successful experiments carried out by Mr. C. E. Blackett, formerly metallurgist on the Golden Horseshoe Estates. His experiments were, however, carried out at the Great Boulder Perseverance G.M.

The Bromo Cyanide Process of Gold Extraction is by no means new, but up to the present has not been successfully applied to the raw treatment of Kalgoorlie ores. It was tried at different times, but consistent results could not be relied upon. Mr. Blackett now claims to have found out the chemical conditions necessary to secure consistent results, and if such is the case, Kalgoorlie ores can not only be more cheaply treated, but dry crushing plants, which are undesirable for health reasons, can be dispensed with.

Proposed Plant.—Mr. J. W. Sutherland is at present re-arranging his old plant so as to be able to put 20 head of the 100-head battery into commission for a working test. More of the battery can be utilised later on if desired. The plant will be run by means of electric motors. The general lay-out is indicated by the following flow sheet:—

FLOW SHEET.



Mr. Sutherland's report indicates the nature of the work necessary to get the plant in working order. Most of the items are portions of the old plant, but the rotary classifier will be new and is being made at Silverthorne's. Mr. Sutherland makes rather a feature of this classifier, which enables products of varying sizes to be obtained. The work appears to be fairly well in hand, and it is reasonable to suppose that it will be completed early next month as anticipated.

Underground Position.—The official statement of ore in reserve underground is as follows:—

——	Tons.	Value.	Contents.
		dwts.	fine ozs.
No. 1 Lode ...	7,055	6·61	2,332·70
No. 2 Lode ...	129,960	7·47	48,562·89
No. 3 Lode ...	235,807	7·32	86,381·51
No. 4 Lode ...	109,065	8·82	48,109·21
Total ...	**481,887**	**7·69**	**185,386·31**

I understand, however, that a considerable quantity of this ore is not readily accessible. The management intend to begin by getting ore from the following blocks which are easily accessible and are also above the average grade of the mine:—

——	Tons.	Value.	Contents.
		dwts.	fine ozs.
No. 2 Lode ...	18,914	9·08	8,587·05
No. 3 Lode ...	7,126	10·23	3,644·95
No. 4 Lode ...	44,191	10·46	23,117·33
	70,231	10·06	35,349·33

The present intention is to make a start on the No. 4 Lode and work it at the 2,630ft. level, the 2,780ft. level, the 2,900ft. level, and the 3,020ft. level.

2,630*ft. Level.*—At this level there are blocks of ore to be taken out in Sections 9, 13, 14 and 15, totalling 7,230 tons worth 10·67 dwts. Most of this ore is just below the 2,480ft. level. The Underground Manager advises me that the 2,630ft. level is probably squeezed in places but that the 2,480ft. level is, he thinks, in fair order.

2,780*ft. Level.*—At this level there are blocks of ore left in Sections 2, 3, 4, 13, 14, and 15 making a total of 4,201 tons, averaging 13·37 dwts. per ton in value. It is not thought that this level will need very much repair.

2,900*ft. Level.*—Blocks of ore in Sections 12, 13, 14, and 15 give a total of 10,470 tons, worth 8·67 dwts. per ton. Section 15 is the poorest of these. This level is expected to be in fair order.

3,020*ft. Level.*—At this level there are blocks of ore in Sections 2, 3, 12, 13, and 14 giving 8,308 tons of ore worth 11.52 dwts. per ton in value. This tonnage takes no account of a small rich vein at about 100 feet north. Sections 12, 13, and 14 are said to be in fair breaking order.

3,140*ft. Level.*—Blocks of ore in Sections 10, 11, and 15 are estimated to contain 11,288 tons, worth 9.59 dwts. per ton. These are not included in the list forwarded by the Underground Manager.

3,260*ft. Level.*—At this level, in Section 4, there is an estimated tonnage of 1,615 tons, worth 11.42 dwts. per ton.

The only work which has been done underground has been the repair of the shaft. Arrangements have been made to purchase air from the Lake View and Star G.M. Co. An air main has been connected from the Ivanhoe G.M. to the main air receiver. The air pipes down the mine are to be tested this week.

Summary.

The position may be summarised as follows:—

(1) A loan of £5,000 has been approved to ascertain if the Kalgoorlie ores can be treated by the Bromo-cyanide process without roasting as indicated by Mr. C. E. Blackett's experiments and treatment of small parcels at the Boulder Perseverance G.M.

(2) The process is an old one, but Mr. Blackett claims to have ascertained the chemical conditions which will permit of its being successfully applied to Kalgoorlie ores.

(3) In order to try out the process, 20-head of the Golden Horseshoe battery is being put into commission, together with the necessary slimes treatment plant.

(4) The plant should be ready early in February and will treat accumulated slime and raw ore from the richer portions of the mine.

2.—BORING AT GREENBUSHES.

(18*th May,* 1928.)

Herewith I submit a brief description of the lodes at Greenbushes and a recommendation with regard to the best sites for bores.

General Position.—The lodes which are really more of the nature of pegmatite dykes than true lodes are often small in size and irregular in shape. There are, however, a number of larger lodes or dykes which can be traced for some hundreds of feet at the surface and which have a fairly persistent strike. These give promise of persistence in depth and the values may be expected to be similar to those obtained near the surface.

As far as I can ascertain the only ore won from a greater depth than 100 feet was at the South Cornwall where a big lode was mined for a short length at a depth of 130 feet.

Generally speaking, the lodes were worked to water level which I understand at the Cornwall Lease was about 70 feet and were then abandoned.

Up to the end of 1927, 350.05 tons of tinstone were won from tin lodes and 10,652.35 tons, making a total of 11,002.40 tons valued at £954,196 or an average value of £86 14s. 0d. per ton.

The value of the tinstone, based of course on the price of tin, has been steadily increasing in recent years, and in 1927 averaged £164 per ton, and as the indications are that it is likely to maintain its present high value, attention to the development of the lodes at a depth is fully justified.

A brief description of the principal lodes will now be proceeded with, followed by recommendations regarding the best sites for bores to test their widths and values at depths below their present workings.

The Cornwall Tin Mining Lease No. 627.

More lode mining has been carried out on this lease than on any other in Greenbushes. A great number of small lodes have been worked which are spread all over the lease and which have very varying strikes and dips. There is, however, one main ore body which has been worked out at the surface for a length of over 530 feet. In addition at the south end another lode which may be a faulted portion of the main lode has been worked for a length of 140 feet. The testing of this main lode below water level appears to me to be the most promising boring that can be done at Greenbushes.

I understand that water level is at about 70 feet and that no ore has been mined from the main lode below this depth. Consequently bores to cut the lode at a depth of 200 feet would seem to be as deep as are required at present.

I therefore recommend that the following bores which have already been marked out on the ground be proceeded with:—

No. 1 *Bore* is situated opposite the Main Shaft to be started 200 feet on the West side of the outcrop

and is to be inclined at an angle of 45 degrees from the vertical so as to cut the lode at a vertical depth of 200 feet.

No. 2 *Bore* is situated 110 feet north of No. 1 Bore; it is also 200 feet on the west side of the outcrop and will be inclined at an angle of 45 degrees from the vertical to cut the lode at a depth of 200 feet.

No. 3 *Bore* is situated 100 feet north of No. 2 Bore at an equal distance from the outcrop, and will also be inclined at 45 degrees and will cut the lode at a depth of 200 feet.

No. 4 *Bore,* which is in every way similar to Nos. 1, 2, and 3 Bores, is set out to cut the lode at a point 140 feet south of No. 1 Bore and at a depth of 200 feet.

The South Cornwall Tin Mining Lease, M.L. 300.

The best information which we have regarding this lease is contained in an old report by Inspector Cleland dated 9th June, 1908. At that time 76 feet of driving on the lode had been carried out at the 130ft. level, 31 feet north and 45 feet south of the prospecting shaft.

The lode does not appear to have been cut in the crosscut from the main shaft at the 190ft. level. It is possible that the crosscut was stopped too soon.

Mr. Huitson, who was interested in this property, advised me that the shoots of ore had a tendency to pitch to the north, and expressed the opinion that the shaft should have been situated further north.

The bore is recommended and has been marked out on the ground to cut the lode about 20 feet north of the prospecting shaft at a depth of 200 feet. The bore to start 200 feet from the lode on the west side, to have a bearing of 58 degrees, and to be inclined at an angle of 45 degrees from the horizontal.

The Lost and Found Tin Mining Lease.

A tin lode running through the property can be traced for over 600 feet in length. The shafts along it suggest that it has been somewhat extensively worked to a shallow depth.

In the vicinity of the new shaft, the lode at the outcrop dips to the west at a comparatively flat angle. In an old shaft, some 20 feet from the outcrop, the lode is said to be nearly vertical. I was unable to ascertain the general inclination of this lode but it is reputed to have carried good values.

A bore is recommended and has been marked out on the ground to cut the lode under a point where good values are said to have been obtained. It is to be started at a point 200 feet west of the lode and put down at 45 degrees. The point is rather close to the main road, and if too close for the bore foreman to operate, the bore may be started 25 feet nearer the lode and put down at an angle of 50 degrees from the horizontal as indicated in the accompanying sketch.

The Dixie Tin Mining Lease, M.L. 632.

This lease is situated alongside the Greenbushes Townsite on the eastern side. Its south-eastern boundary is about 17 chains north of north-western boundary of the Cornwall Lease. Like that lease, it contains a number of smaller lodes which strike in various directions in addition apparently to one principal lode having a north-westerly strike.

This lode appears to have been of considerable width and to have been worked by means of an open cut for a length of 50 feet. A vertical shaft, stated to be 110 feet deep, has been sunk 40 feet south-east of the opencut.

I understand from Mr. Angus that some driving was carried out from the bottom of this shaft towards the opencut in hard quartz four feet in width and carrying 6 ounces of tinstone to the dish.

Our returns show that 8.67 tons of tinstone were won from the lodes on this lease valued at £959. This is generally regarded as one of the principal lodes in Greenbushes, and as good a place as any to test it, at a depth of 200 feet, would be between the opencut and the vertical shaft. Such a bore has been set out in the ground and is recommended.

Kapanga Tin Mining Lease, M.L. 515.

This lease is situated approximately a mile south-east of Greenbushes townsite.

As will be noted from the plan (*) accompanying this report, the workings extend along a line of lode formation for a length of 700 feet.

The lode, which as usual is of the pegmatite type, varies considerably in width but is commonly from 8 to 10 feet wide and, according to Feldtmann, was 15 feet wide near No. 3 shaft.

About 22 feet of driving has been done south of No. 2 shaft at a depth of 88 feet. Most of the driving has, however, been done at a depth of 75 feet and at shallower depths. At the 75ft. level a drive connecting the main shaft and No. 2 shaft is 220 feet in length, and I understand that most of the ore above this drive was stoped out. Mr. Fox informs me, however, that the lode pinched out a little below this level.

Mr. Feldtmann, who saw this work, considers that the pinching of the lode may be only local and that it may widen out again below this point. At the north end of the mine two lodes have been worked by Mr. Fox. These dip toward each other, and will probably come together.

About 100 feet of driving has been done on the west lode, which at this depth appears to be a strong body of ore.

The ore won from this lease has produced 36.88 tons of tinstone valued at £4,757.

This lode is so large and persists for so great a length that boring to test it at depth is, I think, justified. The owner, Mr. Fox, considers that a bore at the north end of the mine is most likely to prove successful and in this I am inclined to agree.

I therefore recommend that an inclined bore depressed at an angle of 45 degrees from the horizontal be put down to cut the lode at a vertical depth of 200 feet as per sketch attached. A bore between the main shaft and No. 2 shaft to ascertain whether the lode widens out again at a depth, as Mr. Feldtmann considers possible, could also be recommended and might receive consideration later.

The White Lode (Old M.C. 796).

This claim, which has recently been pegged out by Messrs. Sherwood, McLeod and others, is situated about a mile north of the townsite. Nothing can be seen at present except the remains of an old ver-

* Taken partly from Feldtmann's plan Geol. Bulletin 59, p. 167.

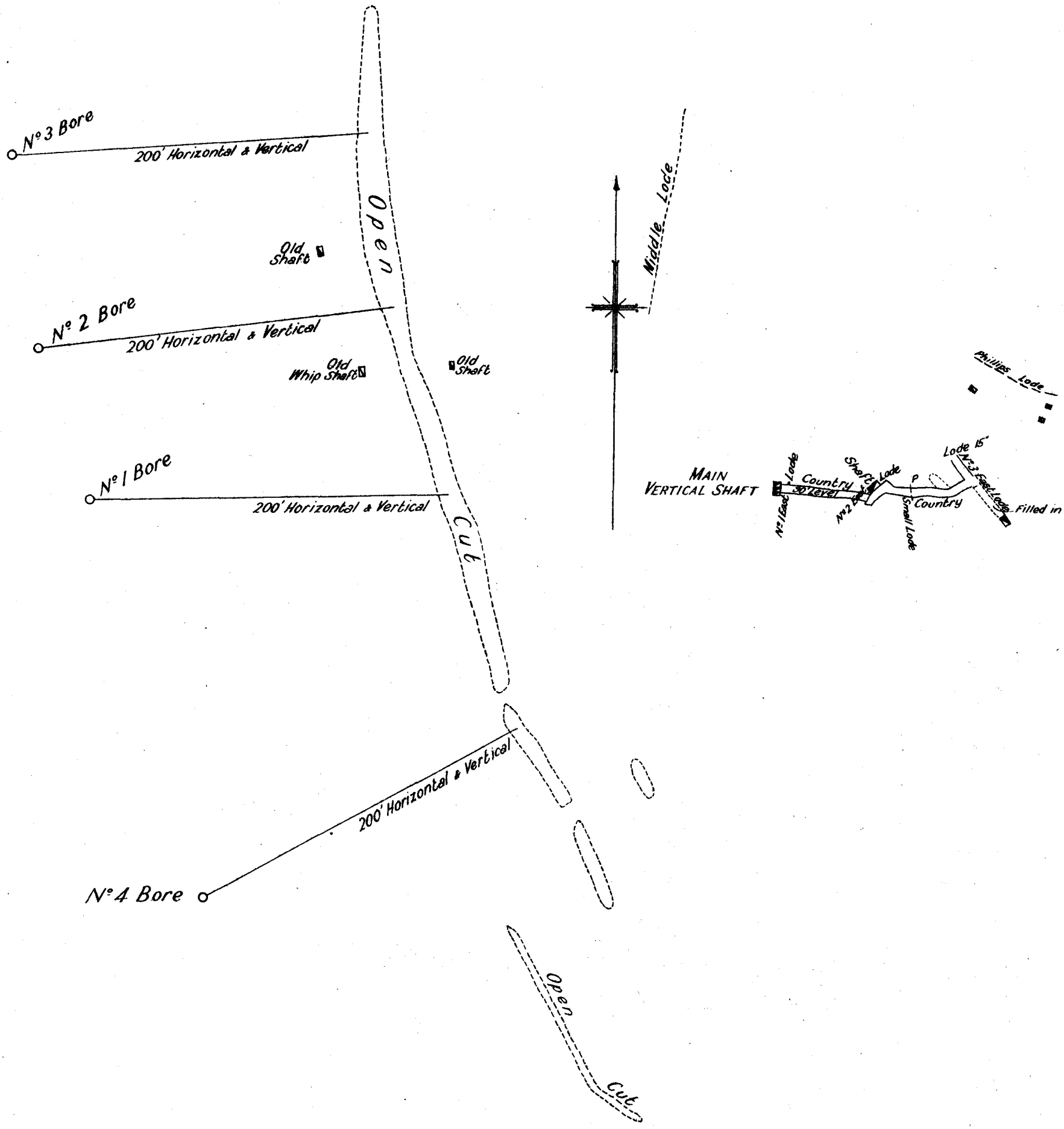
PLAN SHEWING BORES

CORNWALL MINE

GREENBUSHES

40 0 40 80

– Scale of Feet –



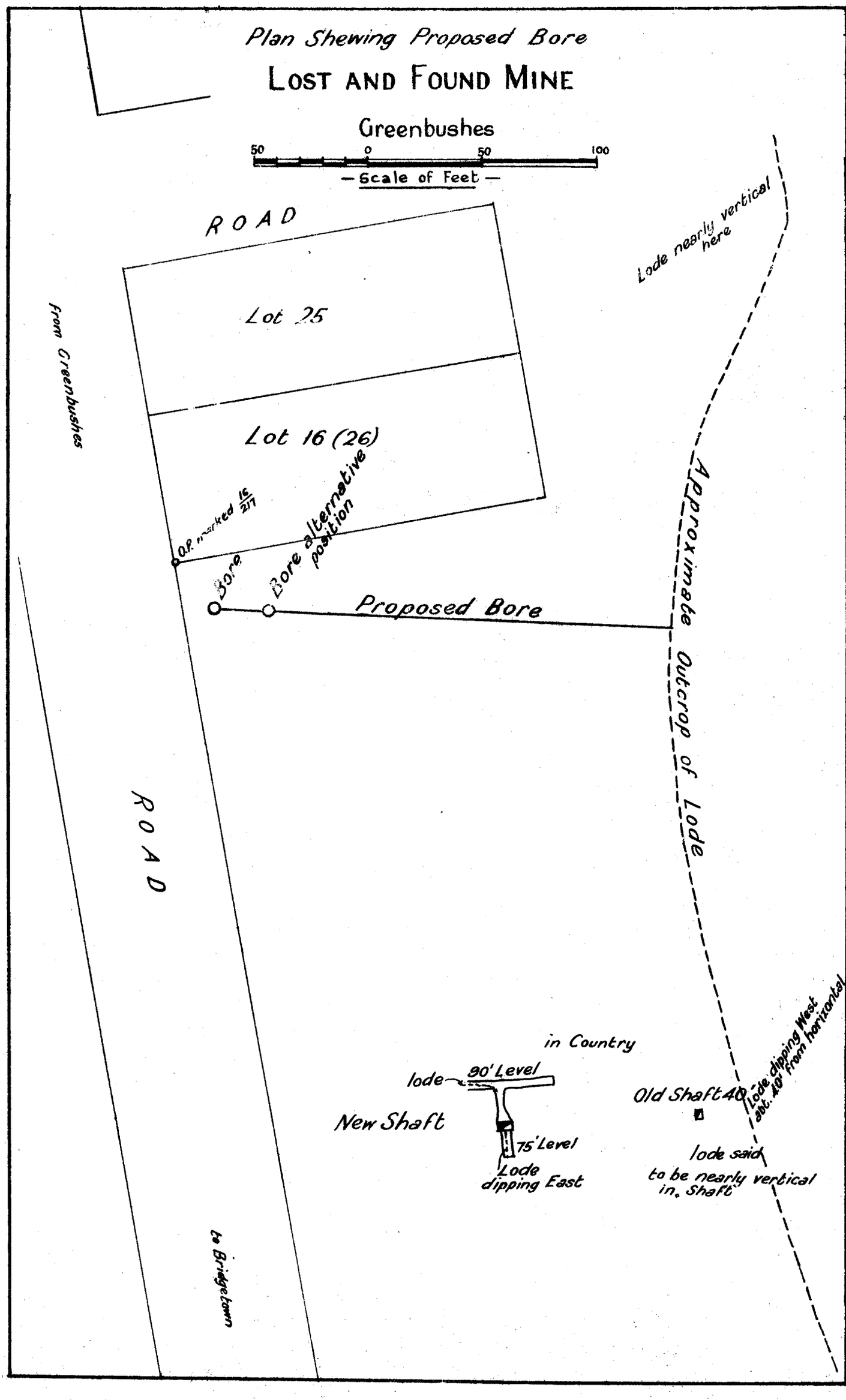
Plan Shewing Proposed Bore

LOST AND FOUND MINE

Greenbushes

50 0 50 100

— Scale of Feet —



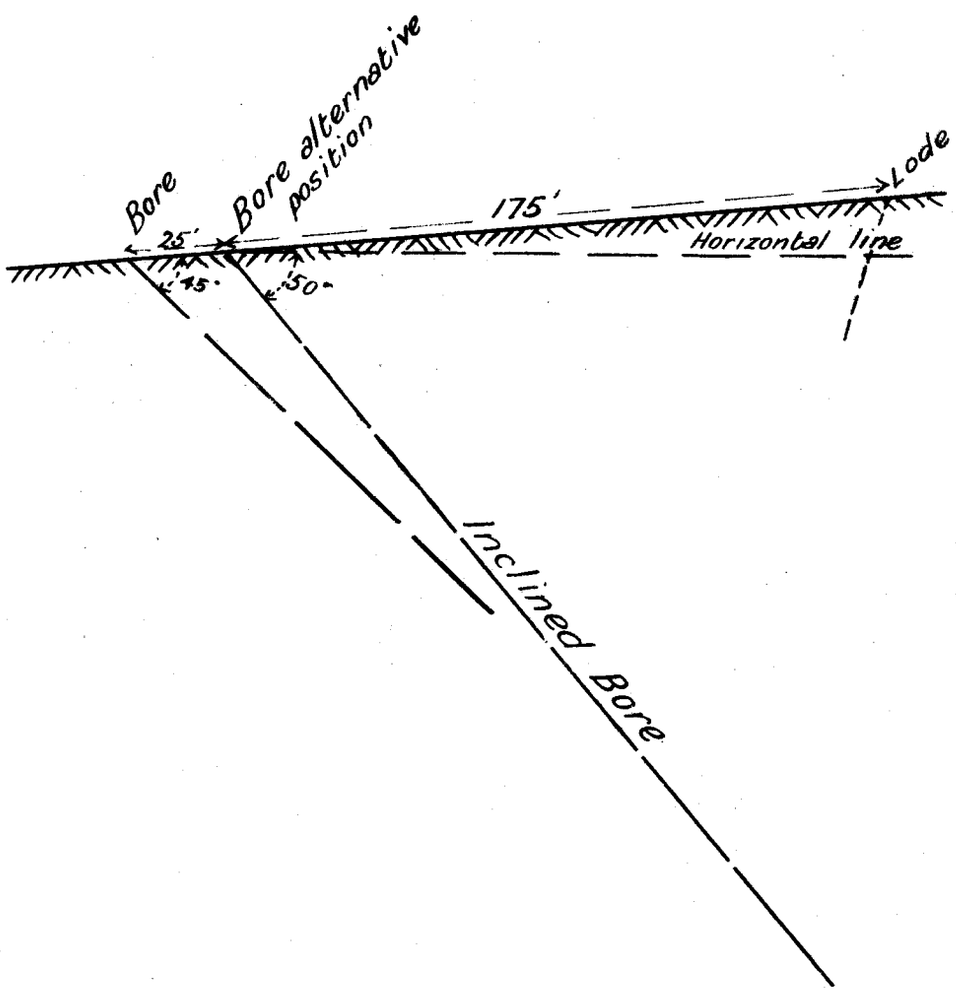
Cross Section at Proposed Bore

LOST AND FOUND MINE

Greenbushes

50 0 50 100

—Scale of Feet—



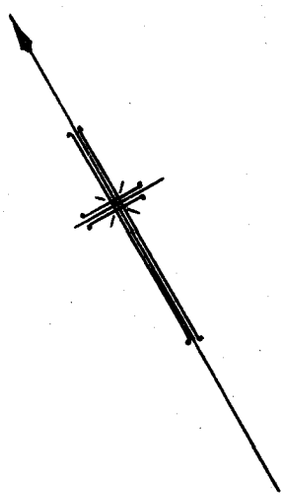
Plan Shewing Position of Proposed Bore

DIXIE TIN MINE

Greenbushes

40 0 40 80

—Scale of Feet—



Open Cut

Shaft (110')

Drive in hard quartz 4' wide

Crushed 6 oz per dish

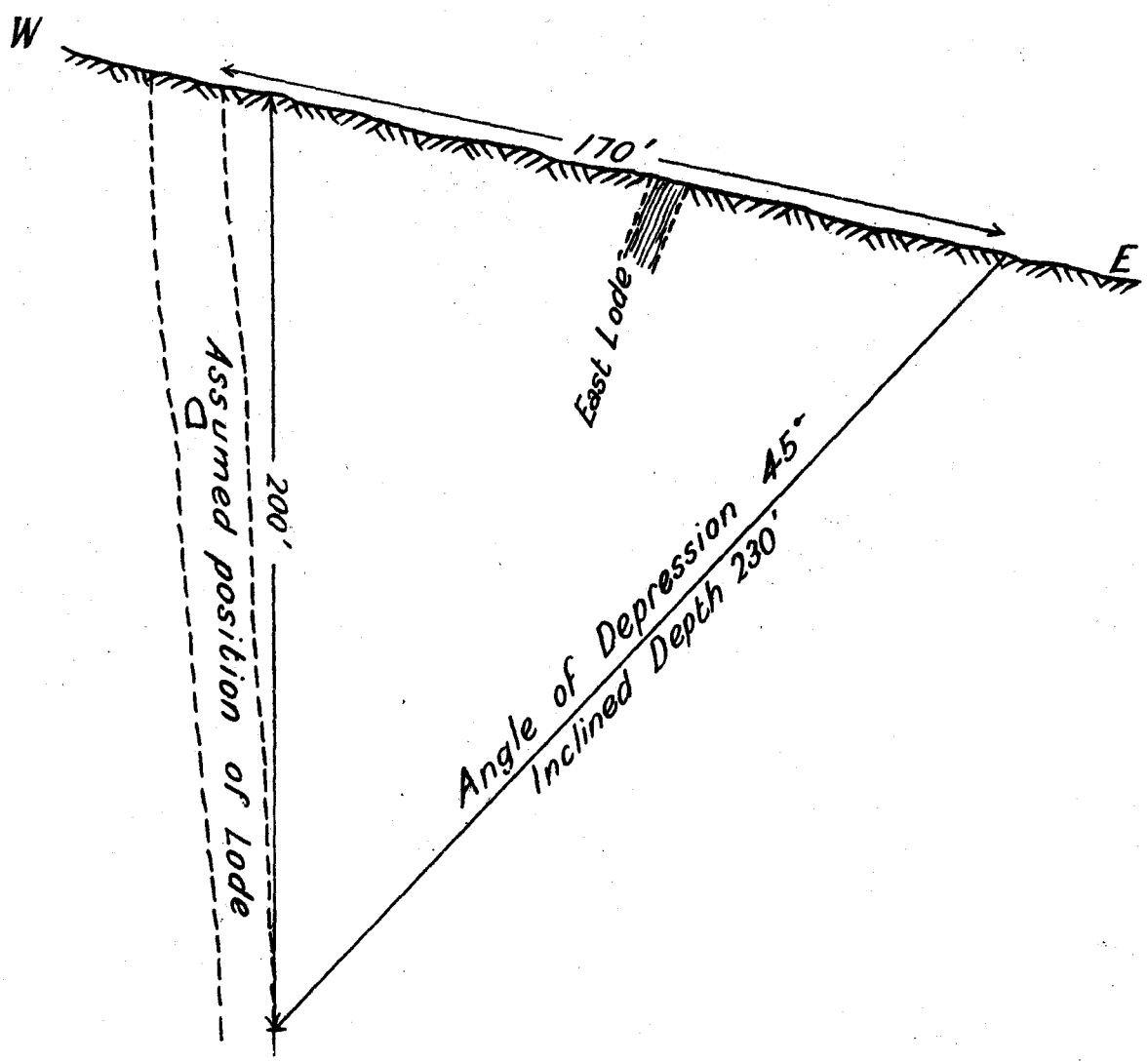
Proposed Bore at 45° 200' Vertical and Horizontal

Cross Section of Proposed Bore

KAPANGA TIN MINE

40 0 40 80

— Scale of Feet —



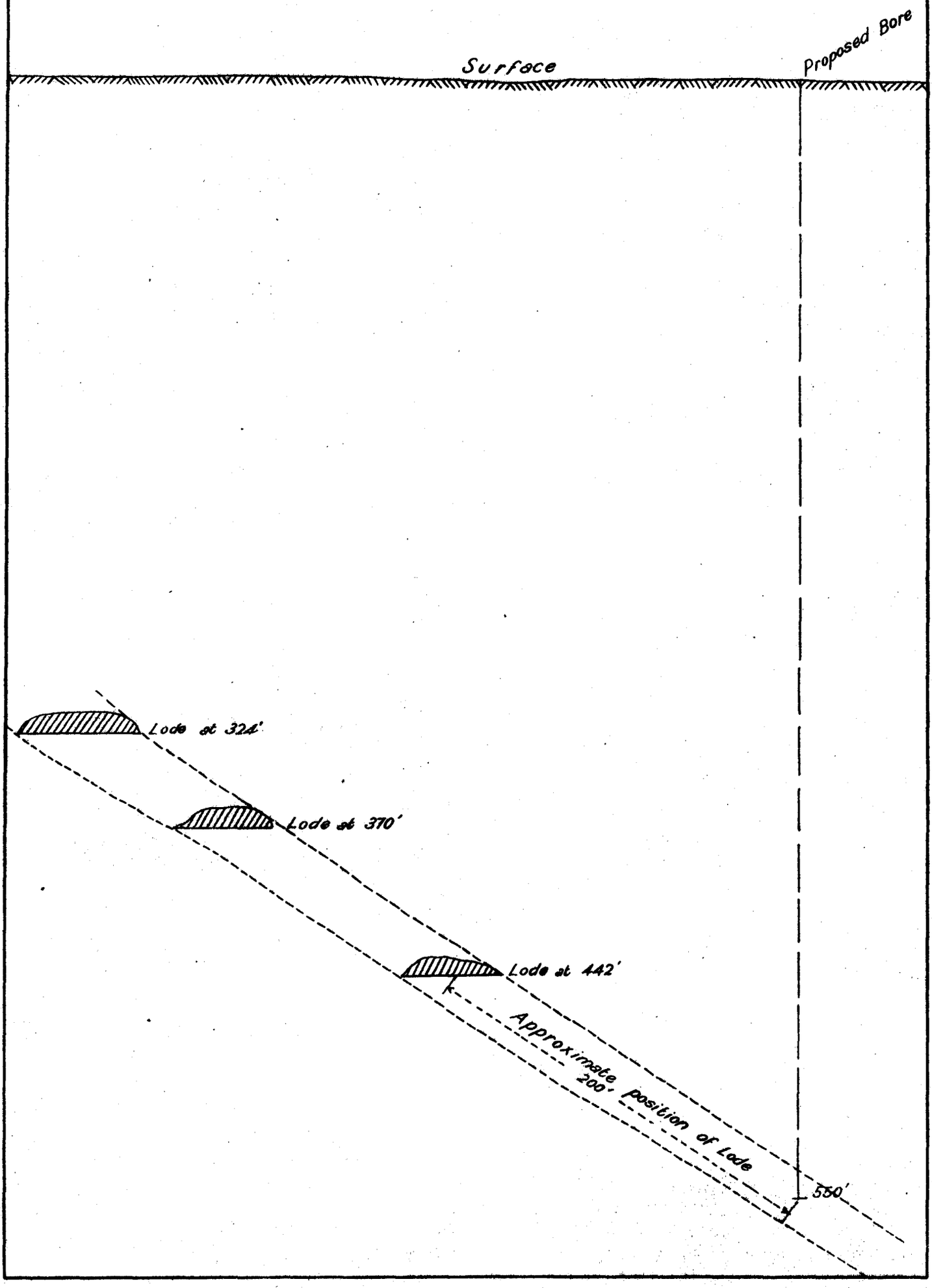
Cross Section at Proposed Bore

CARBINE MINE

KUNANALLING

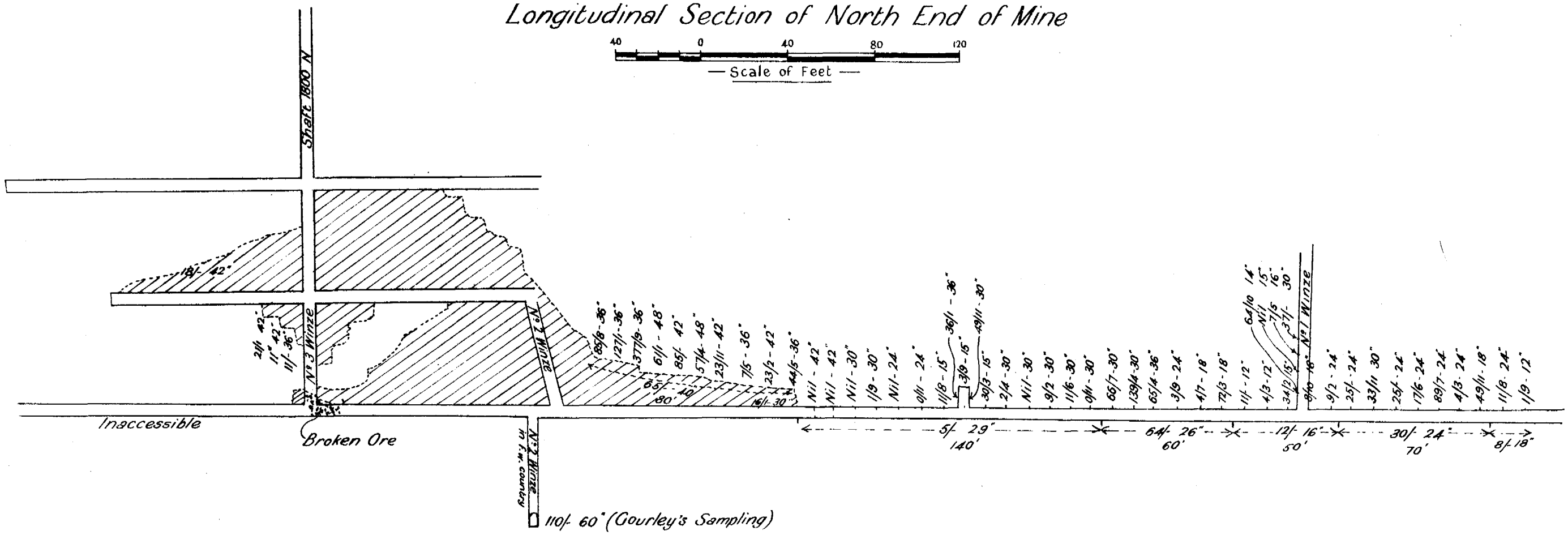
40 0 40 80

— Scale of Feet —

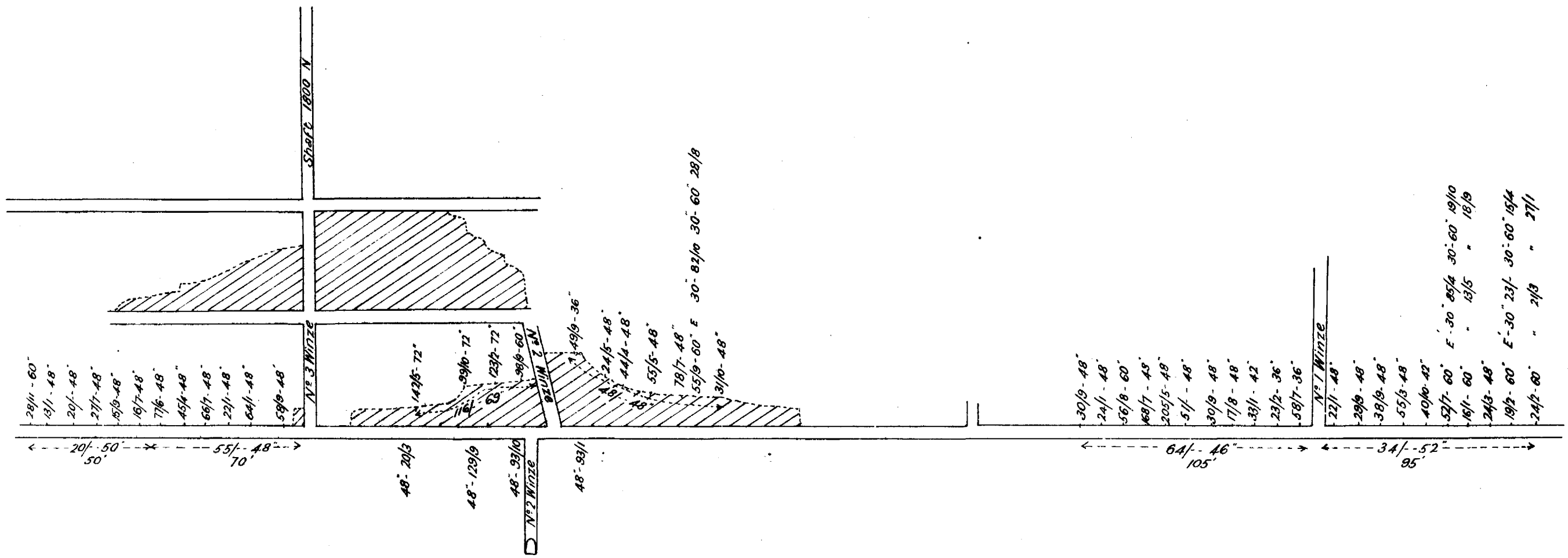


RIVERINA PROPRIETARY G. M.

Longitudinal Section of North End of Mine



— *Sampling by Mr R. C. Wilson* —



— *Sampling by Company* —

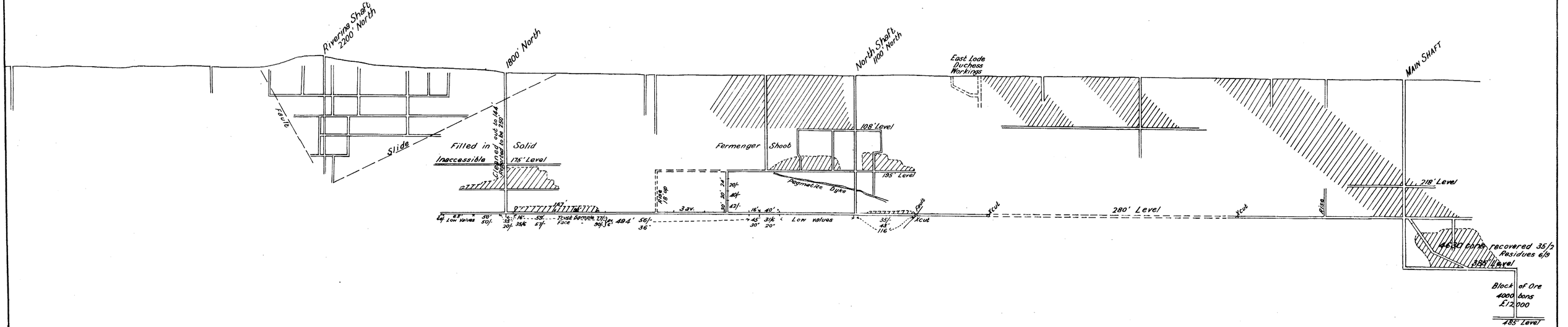
Longitudinal Section

RIVERINA PROPRIETARY G. M.

Shewing average values reported by old Riverina South G.M. Co N.L

100 0 100 200 300

— Scale of Feet. —



tical shaft and a rise to the surface. I am indebted to Mr. Frank Kramer for the following information concerning it:—

The vertical shaft was sunk to a depth of 75 feet. At a depth of 60 feet an east drive was driven about 30 feet on a vein 30 inches wide, carrying tin values of perhaps 6 to 8 ounces to the dish. The ore was stoped out above this level up to the 30ft. level and a rise was put through to the surface.

Several residents mentioned this place as a possible bore site on account of the unusually high values met with in the lode. The shoot, however, would only appear to have been about 30 feet long and the lode small. I do not therefore regard this as a very good site for a bore and consider that boring here is hardly justified.

Recommendation.

I recommend that the following programme of diamond drill boring be carried out at Greenbushes, subject to such modifications or additions as may seem advisable when the results of the boring come to hand.

	Approx. footage.
Cornwall Tin Mining Lease:—Four inclined bores to cut the lode at an approximate vertical depth of 200 feet	1,200
South Cornwall Tin Mining Lease:—One inclined bore to cut the lode at an approximate vertical depth of 200 feet ..	300
Dixie Tin Mining Lease:—One inclined bore to cut the lode at an approximate vertical depth of 200 feet	300
Kapanga Tin Mining Lease:—One inclined bore to cut the lode at an approximate vertical depth of 200 feet	250
Lost and Found Tin Mining Lease:—One inclined bore to cut the lode at an approximate vertical depth of 175 feet ..	250
	2,300

3.—THE CARBINE G.M.

(24th May, 1928.)

I inspected this mine on the 10th May and have to report as follows:—

This mine is situated about 35 miles North by West of Coolgardie and 25 miles west of Broad Arrow.

Ore Body: The ore body consists of an auriferous greenstone schist traversed by quartz veins which are sometimes remarkably rich. Pyrite and galena are also present. The presence of galena is locally regarded as a favourable indication of the presence of gold.

The lode has a north-westerly strike and in the bottom levels dips to the north-east at an angle of approximately 37 degrees from the horizontal. The lode material in places is 60 feet or more in width. There is no assay plan to indicate the distribution of values, but the best values would appear to occur in streaks in the main ore body and in quartz veins.

During my visit some specimen ore was being obtained from a small quartz leader about 2 inches in width.

The ore crushed from 1904 to end of 1927 was 52,571 tons, yielding 40,281.82 fine ounces of gold. It therefore averaged 15.3 dwts. per ton. In addition 687.98 ounces of gold was won by dollying specimen ore.

The principal shoot of ore at the 370ft. level is stated to extend from 300ft. to 500ft. west of the datum point (N.E. corner of G.M.L. 33S), and at the 442ft. level from 250ft. west to 450ft. west, indicating that the shoot is pitching to the east.

General conclusion: There seems to be a reasonable expectation that values will persist below the depth of the present workings, and, while the results obtained in bore holes in an ore body of this class may not represent the average grade of the ore, bore holes will at least show if the ore body persists to a greater depth and will show its value at the particular sections cut through.

Whether any bore holes put down will cut any of the rich quartz leaders which help to bring up the grade of the ore or not cannot be foretold.

The site for a bore most likely to be successful would seem to be somewhere along the line A B on plan, which is approximately in the centre of principal shoot of ore.

Recommendation.—I recommend that a bore be put down at a point marked on the plan to cut the reef at an approximate vertical depth of 550 feet, which will be roughly 200 feet on the underlay below the 442 ft. level, and that when this bore has been completed the question of further boring be considered.

4.—RIVERINA PROPRIETARY G.M. CO., LTD.

(13th July, 1928.)

I inspected the Riverina Proprietary on the 6th July and have to report as follows:—

Treatment Plant: The ore from the mine is trucked from the brace of the main shaft to a rock-breaker on the ground. From here it is elevated in a small skip running on an inclined skipway and discharged into the battery bin, the skip being hoisted by means of a steam-driven winch. The ore is more or less coarsely crushed in a 10-head battery and is then ground almost to a slime in two grinding pans. Amalgamation takes place in the battery boxes and in the pans.

The tailings are being discharged on to the ground to form a slimes dam. When there is a sufficient accumulation, these tailings are to be cyanided in five leaching vats each of 25-ton capacity. The first ore put through the plant was not so finely ground, and the underflow from a cone classifier was sent to one of the leaching vats. This vat had no slats in it, however, and the result was that it was filled with a product containing a good deal of slime which would not leach satisfactorily. The whole of the tailings are now being discharged to form a dam.

I understand from Mr. Forbes that during the first week a quantity of poorer broken ore had to be taken from underground and in consequence the head sample assayed only 30/5d. per ton. The tailings were worth 5/10d. per ton, indicating rather a better percentage of extraction by amalgamation than was anticipated. The plant is now running 12 hours per day and I understand that it is crushing from 20 to 25 tons of ore in that period.

Power Plant: Two Cornish boilers provide steam for the battery engine, a steam driven air compressor of about 5 drill capacity, the winding engine, and a winch which hoists the ore from the rock breaker to the battery ore bin. The air compressor supplies air for two rock drills and one air driven pump, pumping the mine water from the 280ft. level to the surface.

Underground Position: The whole of the underground work is being carried out at the 280ft. level north of the north shaft (1,100ft. north) which may now be regarded as the main shaft. This fact is, in itself a considerable disadvantage as if any ore is broken down on to the level from a leading stope near the shaft no ore can be got anywhere else till it is cleaned up. On day shift one machine is breaking ore in the main shrink stope and another is cutting out a chamber preparatory to the sinking of a winze below the level. On afternoon shift, both machines are breaking ore.

The shrink stope which is now fairly well filled has been worked right up to the intermediate level at the winze at 1.700ft. north. The stoping faces being worked in the shrink stope are south of this winze and in addition a leading stope nearly 100 feet north is just about to hole into the winze at 1,800 feet north. During my visit a heap of ore at this point prevented the level being inspected further north. As soon as this connection is made, it was Mr. Forbes' intention to start an underhand stope at winze. 1.800ft. north just below the intermediate level (220 feet). Inspector Gourley has put forward what I consider a better proposal, to stope back from the bottom of this winze forming a shrink stope.

In addition he suggests that another shrink stope be started on the south of the main shrink stope and that portion at least of the broken ore in this latter stope be now drawn off.

At present the underground manager is sending to the surface about 55 trucks or 18⅓ tons of ore per day, and estimates that he is breaking about twice that amount. He should shortly be able to send up an increased amount from the stopes and the winze should also provide a small tonnage.

Working Costs: I was informed by Mr. Forbes that his last half monthly pay amounted to £340 16s. 7d., and that this would be increased probably to about £425, when the total costs per half month would be approximately as follows:—

	£
Wages	425
Firewood	80
Explosives	30
Candles	7
Oils and Sundries	28
Total	£570

From this it will be seen that to meet expenses it will be necessary to crush 285 tons of ore having a recoverable value of 40/- per ton, i.e., an average of 22 tons per day for the 13 workings days.

General Remarks.—The construction and general lay out of the plant may be regarded as being reasonably satisfactory. I would, of course, have preferred to have seen the steam plant replaced by suction gas or crude oil. The hoisting from the cracker to the battery bin would also have been more cheaply effected by means of a bucket elevator or belt conveyor. The treatment plant has the merit of simplicity. It is, however, rather too soon to say much regarding its efficiency especially as Mr. Forbes has taken very few samples and proposes to take bulk head and tail samples over a week only. We shall know more about it in a few weeks' time.

Underground the satisfactory feature is that at the 280ft. level, there is a shoot of ore 494 feet in length averaging 56/- per ton for a width of 36 inches. The drawbacks are firstly that all the ore has to be won from this level and secondly that no arrangements have been made for filling the stopes. In consequence, the shrink stope method of mining has had to be adopted. This means that while ore is urgently needed for the battery, a quantity of it has for the time being to remain in the stopes. I rather anticipate too that a little of the hanging wall country rock near the intermediate level will fall out as the stope is emptied and unless it is picked out will reduce the grade of the ore. All the same the ore body is in many respects a suitable one for this method of stoping as the lode is nearly vertical, and the walls generally consist of hard, good standing ground.

The timbering at the 280ft. level is rather behindhand. The last 50 feet or more under the leading stope has no timber in it. This should be put in straight away, so that a shrink stope can be started from the winze at 1,800ft. north.

The few face samples which Mr. Forbes showed me would give a satisfactory average. Further sampling of portions of the lode which were inaccessible when the general sampling was made should now be carried out.

It will not be an easy matter to increase the tonnage very materially immediately and be able to maintain it; but provided that the ore keeps up to its average value at the 280 ft. level and the tailings will leach satisfactorily, it should be possible to work the mine profitably with the present equipment.

5.—RIVERINA PROPRIETARY LTD.

(*11th October*, 1928.)

As instructed I visited this mine and decided that my best course would be to sample the back of the No. 3 level, above which all the stoping has been done, and also the back of the stopes where it was possible to reach them. My results are shown on a longitudinal section accompanying the report. I have also prepared another longitudinal section showing the sampling results obtained by the Company. These results may be summarised as follows:—

Beginning at the north end of the mine, it will be noted that north of No. 3 winze the Company's sampling shows that the back of the level from the

winze to a point 70 feet north averaged 55/- per ton over a width of 48 inches and from this point to the face, a distance of 50 feet, the average value was 20/- per ton for a width of 50 inches. Owing to the level being blocked with broken ore under No. 3 Winze this portion of the level was inaccessible on the occasion of my visit and consequently the sampling could not be checked.

A little underhand stoping had been carried out north of this winze below the Intermediate level. Three samples of the faces at present exposed averaged 14/6 per ton only for a width of 40 inches. A single sample taken above the Intermediate level assayed 8/- per ton over a width of 42 inches.

Between Nos. 2 and 3 Winzes.—The Company's sampling of the back of the stope between these winzes averaged 116/- per ton for a width of 69 inches. The bulk of the ore in this block has since been taken out; owing to the comparatively small amount of ore left and the difficulty of getting samples, I did not sample the small block of ore left.

It may be expected to be of about the same grade as the ore which Mr. Forbes has been crushing.

South of No. 2 Winze.—The Company's sampling of the stope on the south side of No. 2 Winze averaged 45/- per ton over a width of 48 inches. Since then a little stoping has been carried out and my sampling of the back of the present stope gave an average value of 65/- per ton for 40 inches in width over a length of 80 feet. The top of the rill was inaccessible.

Back of Level Between Nos. 1 and 2 Winzes.—The Company's sampling of the back of the level from No. 1 Winze to a point 105 feet north averaged 64/- per ton for a width of 46 inches, the back of the level from this point to the stope south of No. 2 Winze was not sampled by them. My sampling gave low results for the first 30 feet north of No. 1 Winze. For the next 60 feet the average value was 64/- for a width of 26 inches and for the remaining 140 feet the average was 5/- per ton only for a width of 29 inches. This is the first I knew of an unpayable length between these winzes. It is portion of the 494 feet of driving reported by the old Company to average 56/- per ton over a width of 36 inches, and which we understood had been confirmed by the sampling carried out under Mr. Forbes' direction.

Back of Level South of No. 1 Winze.—The Company's sampling indicates a length of 95 feet averaging 34/- per ton over a width of 52 inches. My sampling indicates low values for the first 15 feet then a length of 70 feet averaging 30/- per ton for 24 inches in width followed by low values again.

No. 2 Winze Below No. 3 Level.—This winze was sunk 50 feet in footwall country. At this depth, a west crosscut was put through the lode which was 5 feet in width and on Inspector Gourley's sampling averaged 110/- per ton in value. This development is the most encouraging thing about the mine to-day. It shows that the lode is both high grade and above the average width at the deepest point at which it has been exposed.

Mining and Treatment.—I am informed by Mr. Forbes that the ore mined since the plant started up has been as follows:—

———	Tons.	Value.	Average Value.	Tailing.	Total.
		£	s. d.	s. d.	s. d.
Previous to July 22nd	279	323	23 2	9 6	32 8
July 22nd to August 15th	309	609	39 1	15 10	54 11
August 15th to September 15th... ...	411	707	36 4	14 0	50 4
Totals	999	1,639	32 10	13 4	46 2

from which it will be seen that up to September 15th, 999 tons of ore were crushed yielding gold to the value of £1,639 or an average value of 32s. 10d. per ton. The tailings averaged 13/4 per ton, giving a total value of 46/2. It will be noted that the grade of the ore crushed prior to July 22nd averaged 32/8 only. For the next month the grade was 54/11 and for the last month 50/4. No tailings have been treated up to the present. These are being accumulated in slime dams.

Precise information regarding expenditure was not obtainable. I was given to understand by the Manager that mining and treatment costs amounted to approximately 32/- per ton and that the cost of sinking the winze was roughly £300.

General Remarks.—The old Company's figures indicated a shoot of ore at the No. 3 Level 494 feet in length averaging 56/- per ton in value and 36 inches in width.

When the mine was unwatered it was sampled under Mr. Forbes' instructions and he advised us that this sampling confirmed the reported value extremely closely and the assay sheet submitted certainly did give such an average. Now that I have sampled the mine myself however, and have plotted the assay results obtained by Mr. Forbes on a plan, I find that a length of 140 feet was not checked and my own sampling of this portion of the drive shows it to average 5/- per ton only over a width of 29 inches.

It seems that the principal shoot of ore is the one on which the stoping has been carried out and that the best of the ore above the No. 3 Level has now been taken out. There is still some high grade ore on the south side of the No. 2 Winze, but it is impossible to say how much, as there is nothing to indicate how much higher these values will continue.

The Company's sampling indicates also a run of values north of No. 3 Winze. The underhand stope just north of this winze below the Intermediate Level is however poor. I would like to see the floor of the Intermediate Level sampled to see if there are better values further north.

The only other run of values above this level that I was able to find was a little to the north of No. 1 Winze. Here for a length of 60 feet my samples averaged 64/- per ton for 26 inches in width. A little ore might be obtained here but the lode is small and if a wider stope be taken, values will fall correspondingly.

All things considered, it does not look as if there is much chance of keeping the mill going on the ore that can be won above the No. 3 Level.

The one winze sunk below this level shows that good values persist for at least another 50 feet and if they can raise the money to do so, I certainly recommend the Company to continue this winze and perhaps put down two more winzes, one say 100 feet north and another 100 feet south of the present winze.

6.—GOLD OCCURRENCE AT TWIN HILLS.

(24th August, 1928.)

I inspected this new mining centre on the 24th and 25th July and have to report as follows:—

Locality.

The original find made by Messrs. Bright and Fitzpatrick is situated approximately 25 miles north of Menzies and 22 miles west of Kookynie. The ground has since been pegged for a distance of approximately a mile north and two miles south of the ground originally taken up by them.

Geology.

This find occurs near the western margin of a greenstone belt of country which has never been examined geologically. In consequence this greenstone area is not shown on the geological map of the State. It seems to be a strip of country two to three miles in width running north and south, composed mainly of amphibolite which varies in coarseness and grain and which has been rendered schistose in character near its junction with the granite.

A strong jasper bar running nearly north and south forms a conspicuous ridge along its western boundary.

The gold occurrence is about half a mile to the east of this jasper bar. A number of quartz veins, some of which are rich, occur at intervals along an approximately north and south line. These are associated with quartz porphyry dykes which for the most part have a north-westerly strike and can be seen outcropping between this line of reef and the jasper bar.

The following is a brief description of the principal holdings:—

Bright and Fitzpatrick's Northern Prospecting Areas Nos. 481*G and* 482*G.*—These two adjoining Prospecting Areas were the first taken up and are now under option to the Mutooroo Copper Coporation. A number of comparatively small quartz veins occur along a north and south line in echelon formation. Individual veins have a north-westerly strike. These have been opened up by shallow shafts and opencuts. The principal exposures were sampled by Inspector Gourley and myself and gave the results indicated on the accompanying plan..

It will be noted that the best values were obtained in two small opencuts both 50 to 60 feet south of the main shaft. In the more easterly of these opencuts an east vein assayed 1oz. 10dwts. 11grs. over a width of 8 inches and a west vein 1oz. 3dwts. 23grs. over a width of 9 inches. In the more westerly a quartz vein 9 inches in width assayed 3oz. 14dwts. 1gr. In a small opencut 60 feet north of the main shaft a mixture of quartz and formation 48 inches in width assayed 2dwts. 7grs. per ton. In the bottom of the water shaft 80 feet north of the main shaft there are two small veins which assayed 2dwts. 18grs. and 3dwts. 6grs. respectively. In a small opencut 160 feet north of the main shaft a quartz vein 12 inches in width assayed 7dwts. 20grs. per ton. In an opencut 210 feet north of the main shaft, there are two overlapping quartz veins. The eastern vein assayed 10 dwts. per ton over a width of 22 inches while the west vein assayed 8dwts. 17grs. over a width of 24 inches. In a small shaft further north a vein 10 inches in width assayed 3dwts. 22grs. per ton.

Crushings.—Two parcels of ore have been crushed at the State Battery, with the following result.—

——	Tons.	Yield per ton by amalgamation.	Value of Tailing.
		oz. dwt. grs.	oz dwt. grs.
No. 1—March, 21st	20½	0 14 4	0 6 1
No. 2—June 25th ...	38¼	1 7 7	0 19 16

(No. 2 crushing included about 8 or 9 tons of rich ore from these prospectors' southern areas.)

Bright and Fitzpatrick's Southern Prospecting Areas 483*G and* 484*G.*—These prospecting areas which were taken up by the same prospectors are situated 20 chains south of P.A. 482G and are, I understand, under option to the Orinda G.M. Co.

On this property a small rich vein has been exposed in a small prospecting shaft and driven on at a shallow depth for a length of 26 feet. The vein which, for most of this distance is about 2 inches in width, bulges out to a width of 12 inches for a length of perhaps 2 feet. A sample of the quartz at this point assayed 7ozs. 1dwt. 4grs. per ton. This small rich bulge appears to be pitching south. A sample of the quartz in the north end assayed 1oz. 5dwts. 1gr. for a width of 2 inches. The schist alongside this quartz vein was also sampled for a width of 12 inches and assayed 1oz. 9dwts. 22grs. per ton in value. In a small cut 20 feet north of this prospecting shaft, a quartz vein 8 inches in width was exposed assaying 6dwts. per ton. In another small cut 40 feet north of the prospecting shaft a quartz vein 6 inches in width assayed 15dwts. 6grs. per ton in value. At a small shaft 130 feet north of the prospecting shaft, a sample of broken ore assayed 5dwts. 6grs. per ton. At a small shaft 240 feet north of the prospecting shaft a sample of broken ore assayed 10dwts. per ton in value.

Passmore's P.A. 485*G.*—This Prospecting Area adjoins P.A. 482G on the south side. On it a shaft has been sunk 15 feet following a small rich leader 2 to 3 inches in width. A sample assayed 3oz. 7dwts. 7grs. per ton in value. Some soft schist on the footwall side of this vein was also sampled but assayed 14grs. per ton only in value.

Noble's Prospecting Area.—This P.A. adjoins Bright and Fitzpatrick's Southern Prospecting Areas on the south-west side. A small quartz vein a few inches in width widens to a width of 12 inches for a short length. A sample at the bulge, which appears to be dipping south, assayed 2oz. 9dwts. 23grs. per ton.

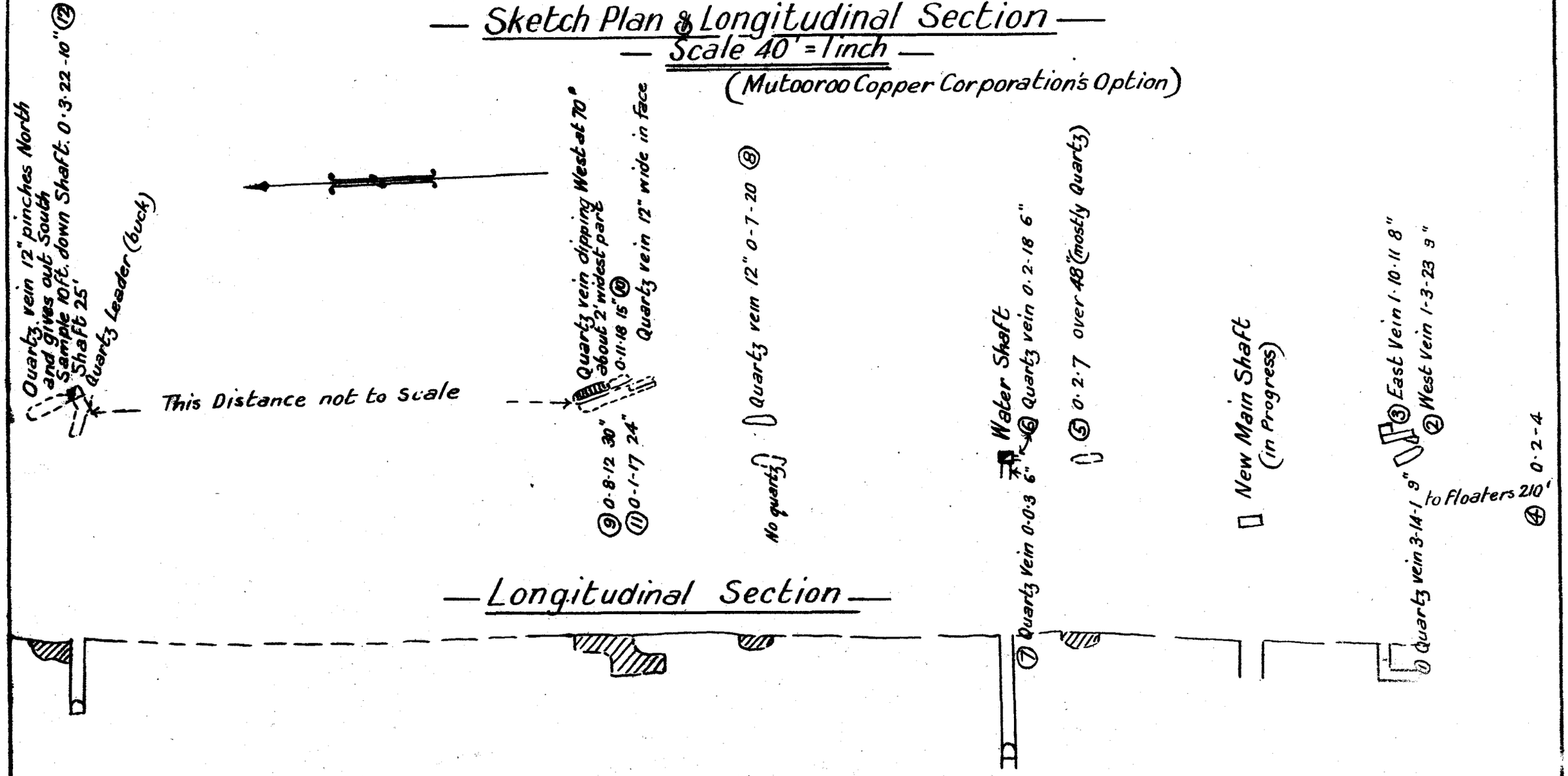
TWIN HILLS

Bright & Fitzpatrick's P.As 481 & 482

Sketch Plan & Longitudinal Section

Scale 40' = 1 inch

(Mutooroo Copper Corporation's Option)

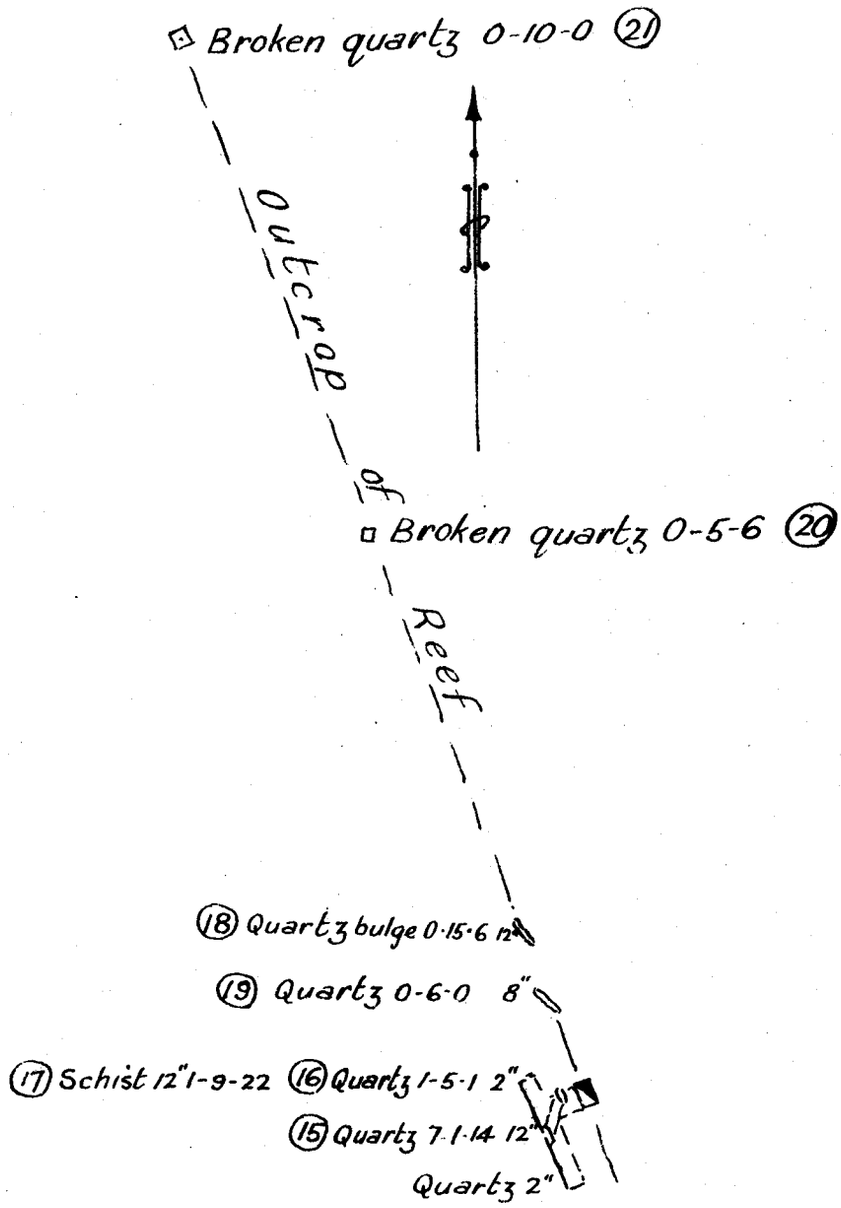


Longitudinal Section

— TWIN HILLS —

Bright & Fitzpatrick's P.A's 483 & 484

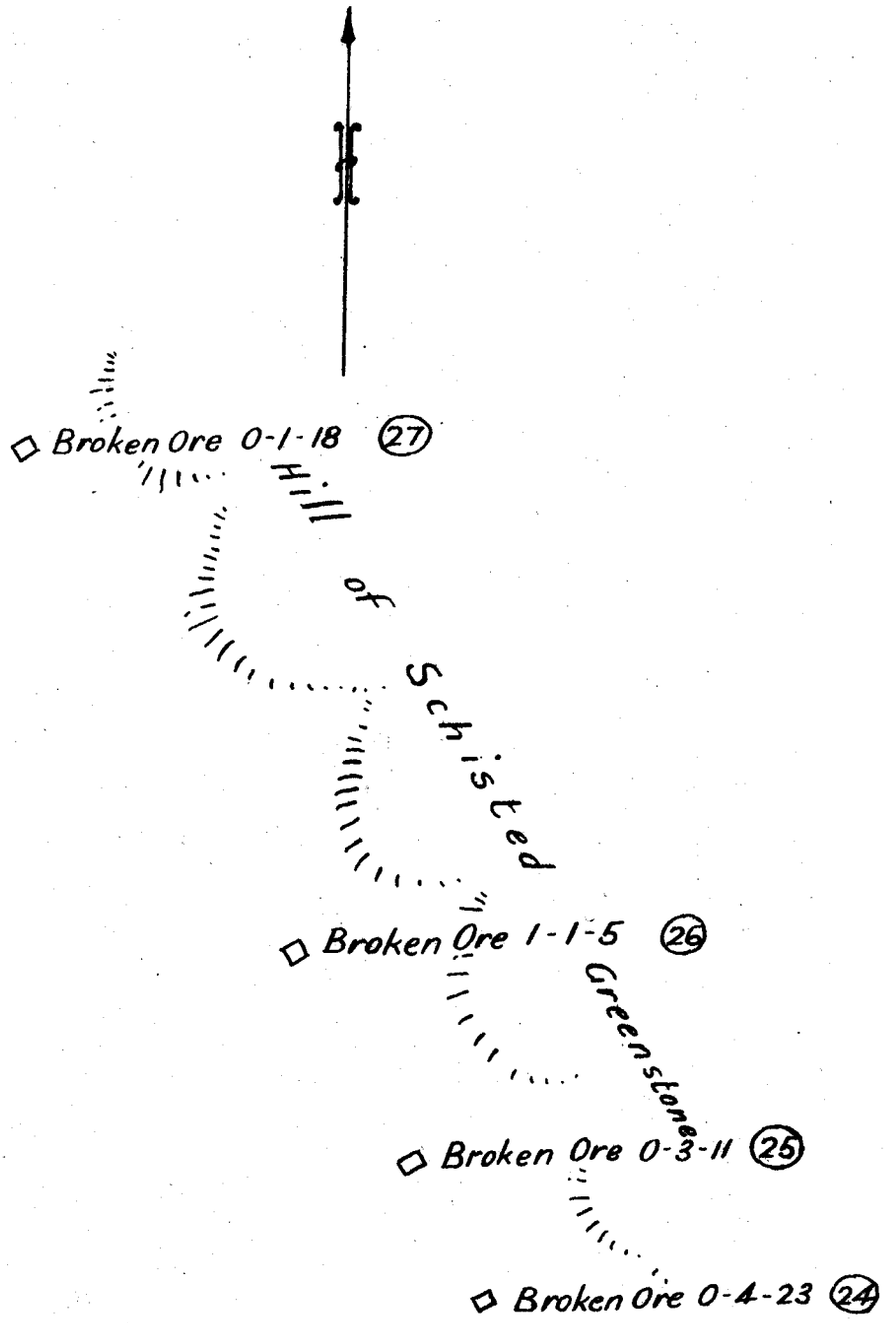
(Orinda G. M. Co's Option)



TWIN HILLS

Sketch Plan Coventry's P.A. 486

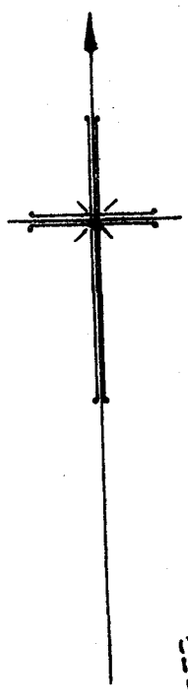
Scale 40' = 1 inch



— MICA AND FELSPAR DEPOSITS —

— at Marshall Haig M. L. 72 (Londonderry) —

— Scale:- 100 Ft. = 1 In. —



Pegmatite Dyke
Containing Microcline felspar
Mica and Quartz

Albite Dyke 3' wide

Pegmatite Dyke

Open Cut
Large body felspar (microcline)
worked here

Lepidolite
here

Pothole
Small Mica

Vertical Mica Vein

Shaft
Heap of large Mica

Shaft 16'

Costean (Small Mica)

Coventry's Find, Prospecting Area 486*G*.—This P.A. is situated about 2 miles south of the original find. What appears to be a fairly persistent quartz reef has been exposed at intervals for a length of about 200 feet. The strike of the reef is north-west and south-east and it dips slightly to the west. Four samples of broken ore from potholes at intervals along the lode beginning at the south end gave the following results:—

ozs.	dwts.	grs.
—	4	23
—	3	11
1	1	5
—	1	18

Wilkinson's P.A. 486*G*.—On this Prospecting Area a shaft is being sunk on a mixture of quartz and schist running north and south and nearly vertical. A fairly good prospect was obtained in the dish from some picked quartz, but a sample taken over a width of 48 inches assayed only 2dwts. 14grs. per ton.

General Remarks.

The geological features are very similar to those met with in many other mining centres in Western Australia.

As is commonly the case, the gold occurrence is along a line of weakness in an area of greenstone country near its junction with the granite which surrounded it. A conspicuous jasper bar is in evidence here as at many other mining centres and, as they so often are, the auriferous quartz veins are associated with dykes of porphyry. On the present showing the best values would seem to be confined mainly to the comparatively small quartz veins which individually have a north-westerly strike but which occur in echelon formation along a nearly north and south line of reef. The high values met with in some of these veins are the attractive feature about this new find and justify the interest taken in this locality.

7.—MICA, FELSPAR, AND TANTALITE IN THE LONDONDERRY DISTRICT.

(3rd November, 1928.)

In company with Dr. Simpson, I visited the above-mentioned deposits on the 18th and 19th September, and have to report as follows:—

Mica and Felspar at M.L. 72, "Marshall Haig."

This mineral lease is situated approximately four miles south-west of Londonderry.

Geology.—This is described in Geological Bulletin No. 53. This deposit occurs near the western margin of the greenstone belt of country which further north contains the Coolgardie mines.

The mica and felspar deposit both appear to occur in the same pegmatite dyke which runs north and south and in places at least attains a width of twenty feet or more. Dr. Simpson will no doubt be reporting fully on the constituent minerals, the principal of which are quartz microcline and albite, felspar, muscovite, mica, and lepidolite.

Felspar.—The northern end of the pegmatite dyke has been worked for felspar which for the most part is of the microcline variety preferred for pottery purposes. It is massive, of good colour, and particularly free from quartz. It has been worked by means of an opencut or quarry 50 feet long by 30 feet wide and 12 feet deep at the deep end. A large quantity of good quality felspar could be easily and cheaply obtained here.

Mica.—The mica occurs in veins or what appears to be the southern continuation of the same pegmatite. The best mica vein observed is about 18 inches wide and dips to the west at an angle of perhaps 40 degrees from the horizontal. This mica has been gouged out for a depth of about 20 feet. A few tons of scrap mica were lying at surface mostly more or less perished, but of fair size, four-inch and five-inch squares being common. As indicated on the plan attached, other small veins occur, but in most instances the mica is small.

I came to the conclusion that while some good mica sheets could no doubt be obtained here, the percentages of valuable mica might not be high. Consideration might be given, however, to the possibility of shipping scrap mica. A parcel of 100 bags of scrap mica from Mullalyup weighing 2 tons 17 cwt. appears to have been sold in Melbourne early this year for £12 per ton.

Tantalite Deposits.

Two Prospecting Areas taken up for tantalite were visited.

Hewitt's P.A. 2423.—This prospecting area is situated about three miles west of Londonderry and two miles north of the "Marshall Haig" Mineral Lease.

The tantalite occurs in a pegmatite dyke, the shedding of which can be picked up along the fall of the hill from the dyke. The only tantalite observed in the dyke appears to occur along a cross fracture.

At the time of my visit Hewitt seemed to have come to the conclusion that the tantalite would be too expensive to obtain and was about to throw up his Prospecting Area.

Tantalite is a valuable mineral, however, and as practically no work has been done a further search seems quite justified. Our advices are that £250 per ton is offered, and possibly a higher price could be obtained.

Dunstan's P.A. No. 2424.—This prospecting area adjoins Hewitt's on the west side. It contains a pegmatite dyke in which one small pothole has been made. Dunstan showed me some pieces of tantalite stated to have come out of it.

Mica Deposit at Grosmont, late M.L. 1.

This deposit is situated about 4 miles from Londonderry in a direction a little north of west.

A nearly vertical pegmatite dyke 6 to 8 feet in width running north and south was worked for mica many years ago. Quite a considerable amount of work has been done. One opencut is 48 yards in length (by pacing), and another 10 yards in length. The depth of these cuts is evidently over 12 feet, as at this depth loose dirt is met with, and a shaft appears to be about 25 feet deep. This deposit is described by Mr. Blatchford in Geological Bulletin 53, page 19. He states that the lepidolite mica occurred

in irregular bunches, never weighing more than a few pounds, intermixed with larger masses of quartz. We have no record of the production. Dr. Simpson collected from the dumps specimens of albite, microcline, topaz, muscovite, and damourite. Mr. Blatchford has reported that beryl has also been found here, but only rarely. We looked for it but did not find any.

8.—MAYMAN'S CENTRAL G.M.L.

(4th December, 1928.)

As instructed, I visited this mine on the 1st November, and have to report as follows:—

The mine is situated on the south side of the Hidden Secret South G.M.L., and in a general way it may be stated that the Hidden Secret, Hidden Secret South, and Mayman's Central are along the same line.

It will be noted from the plan accomanying this report that there are two main lodes passing through these leases marked East Lode and West Lode, and that each of these lodes shows a tendency to fork and divide into east and west branches.

In Mayman's Central the west branch of the west lode is being worked, and it will be noted that there is an east and a west section, separated from one another at the new shaft by about 15 feet of country rock.

The present owners have driven on the west section or most westerly lode at the 150ft. level and at the 170ft. level, and are of opinion that they are working a lode further west than any lode worked in the Hidden Secret or Hidden Secret South Leases.

It will be noted from the plan, however, that at the 150ft. level the north drive has made a decided turn to the east and looks as if it may connect with 153ft. level, main south drive in the Hidden Secret South Lease. Further driving would soon decide the point, as the plan indicates that there is only 100 feet of driving necessary to make this connection.

The north drive at the 170ft. level has been driven 93 feet and is now heading for a point a good deal west of any lodes worked in the Hidden Secret and Hidden Secret South Leases, but if extended this drive may swing round to the east as the 150ft. level above it has done. A sample taken from the face of this drive assayed 10 grains per ton of gold and 3 dwts. 1 gr. of silver.

A winze has been put down about 20 feet at a point 67 feet north of the new shaft. Sulphide ore was met with and tellurides reported. A press report states that telluride is showing in the ore and that one piece, for the purpose of testing the telluride, assayed 52 oz. 6 dwts. per ton of gold and 300 oz. per ton of silver.

On 29th October, Inspector Gourley reported that there was some fine flaky telluride on the hanging wall. This had apparently been taken off with a moil, and I could not definitely say that I saw any telluride, although some small specks on the hanging wall looked like it. Two samples were taken across the face of the winze, giving the following results:—

—	Inches.	Gold.	Silver.
		oz. dwt. gr.	oz. dwt. gr.
Hangingwall Section ...	18	0 1 7	0 11 2
Footwall Section... ...	24	0 0 1	4 7 7

The samples contained no tellurium.

The ore below the 170ft. level between the winze and the shaft has been taken out by means of an underhand stope for a length of about 60 feet and for a depth of 10 feet. The stope is now filled in and cannot be inspected. I understand that fair milling ore was obtained from it.

Mr. Mayman took me down the Hidden Secret South stopes and showed me a west crosscut from the stope at a depth of about 90 feet where, after 18 feet of crosscutting, a lode had been met with which had been driven on for 30 feet. I understand that values were on the low side but, like the Hidden Secret ore and that showing in the present winze, the lode was silver-bearing. This fact, combined with the fact that the Hidden Secret lode had been cut off by a fault, led the present owners to think that the ore met with in the winze was in some way the faulted portion of the Hidden Secret shoot. This shoot is 750 feet away, however, and appears to me to be quite a distinct shoot of ore.

The plans attached show the general relationship of the lodes as closely as they have been worked out. It will be seen that No. 3 Bore was put down 612 feet and cut three lodes, (A), (B) and (C), and that low values only were met with in the most westerly lode, viz.: (A) and (B), and that the hanging wall section of Lode (C) assayed 6 dwts. 11 grs. per ton for a width of 12 inches, the remainder of the lode being low grade. I am not able to say definitely which of these lodes corresponds with the lode which is being driven on in Mayman's Central, but the lode in the winze is dipping quite steeply enough from it to be Lode (C).

9.—THE YOUANMI G.M.

(27th October, 1928.)

I have collected the information that we have relating to this mine, and as the result have come to the conclusion that the prospects of this mine below the present workings, particularly at the P. Shaft end of the mine, are quite sufficiently encouraging to justify some diamond drill boring being carried out to prove the extension of the values below the present workings. The most encouraging feature about the mine is that there are good values going underfoot below the bottom level (No. 7) at the Main Shaft workings as well as below the bottom level (No. 3) at the P. Shaft workings. Details of the results obtained at these levels are set out hereunder.

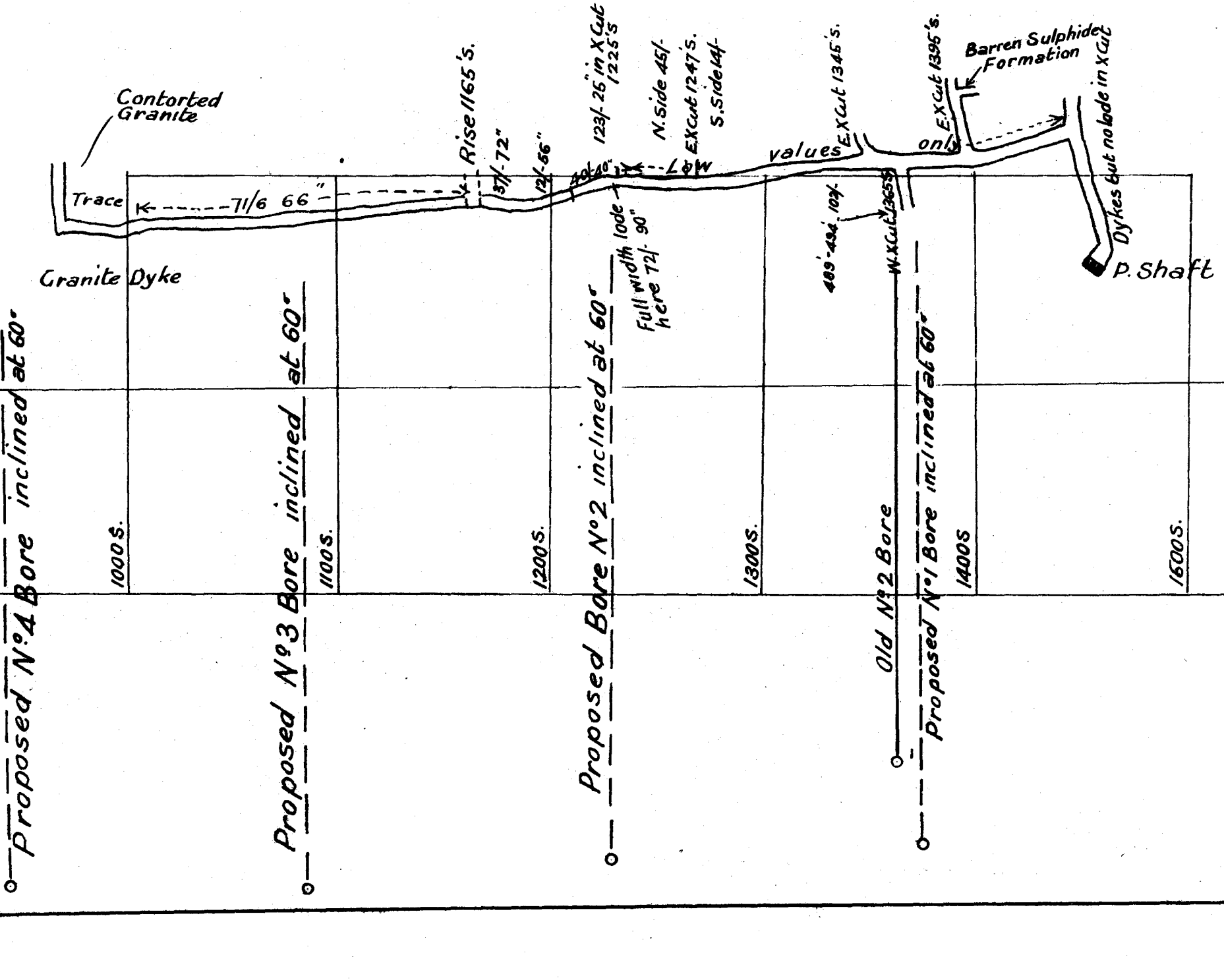
The information is taken from the company's reports and plans, and can, I think, be accepted as being quite reliable and accurate.

YUANMI G.M.

Assay Plan – 302' Level

– Pollard Shaft Workings –

– Scale:- 60 Ft. - 1 In. –

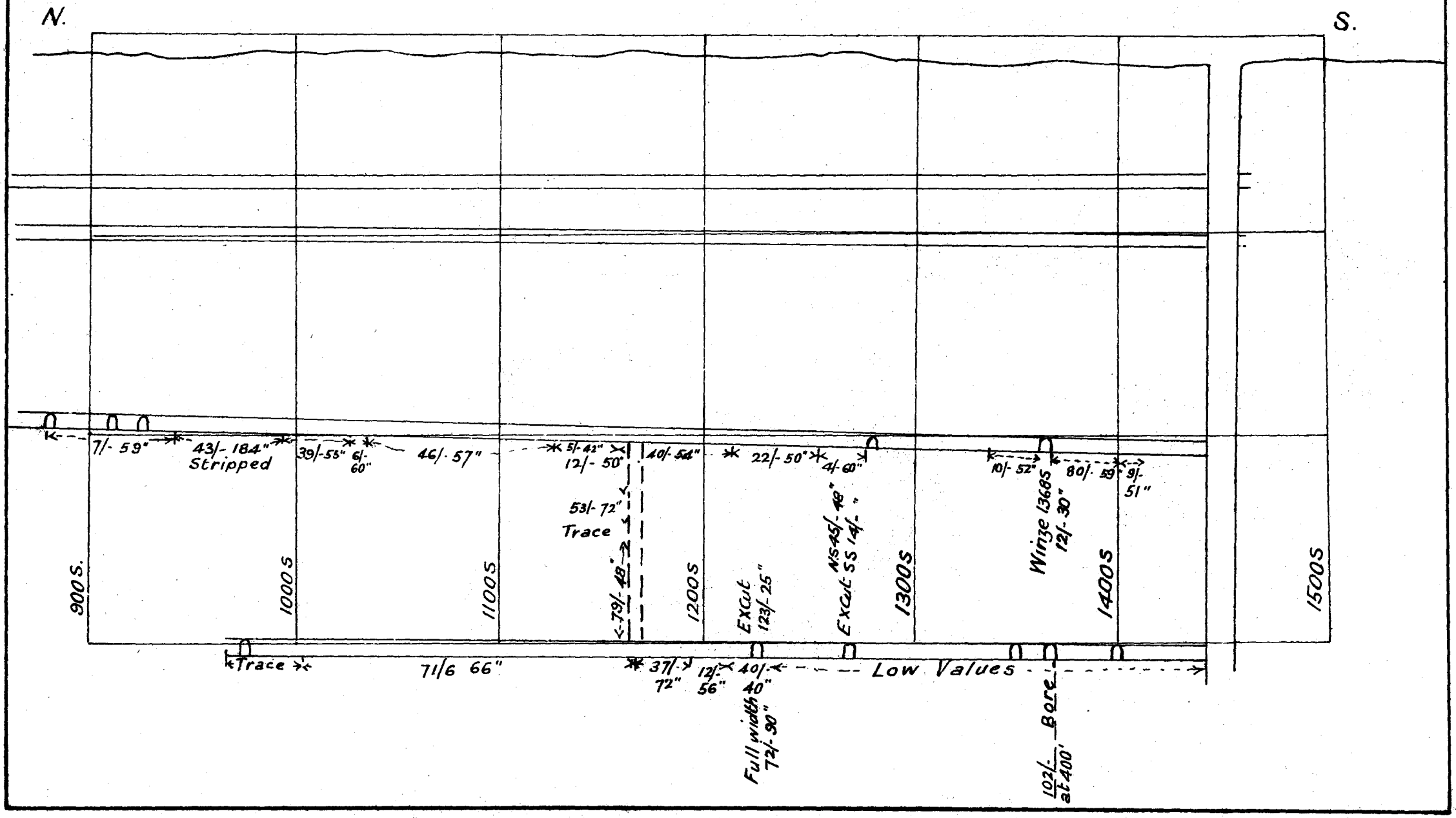


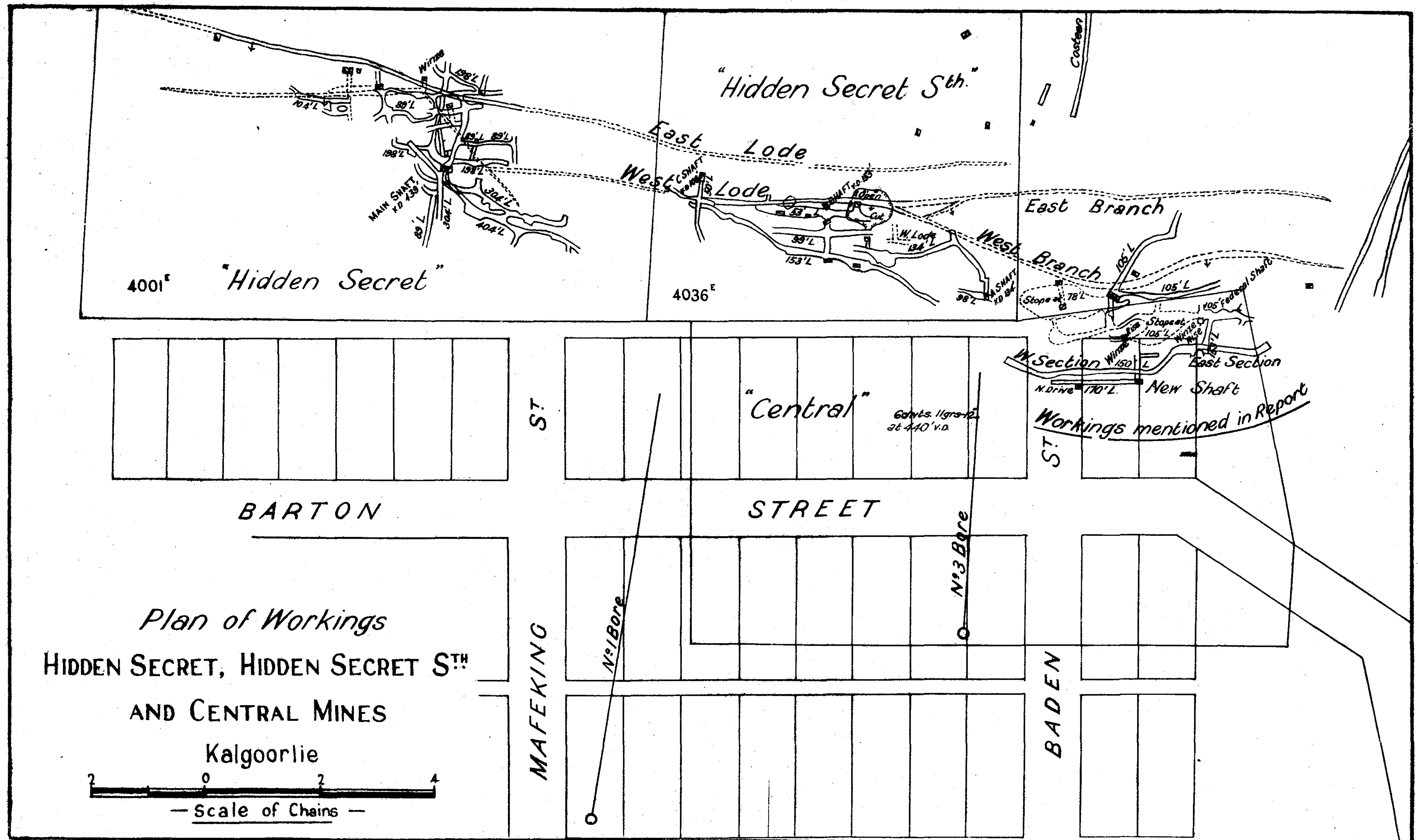
YUANMI G.M.

Pollard Shaft Workings

Longitudinal Section shewing Assay results at 207' & 302' Levels

Scale 60 feet to an Inch

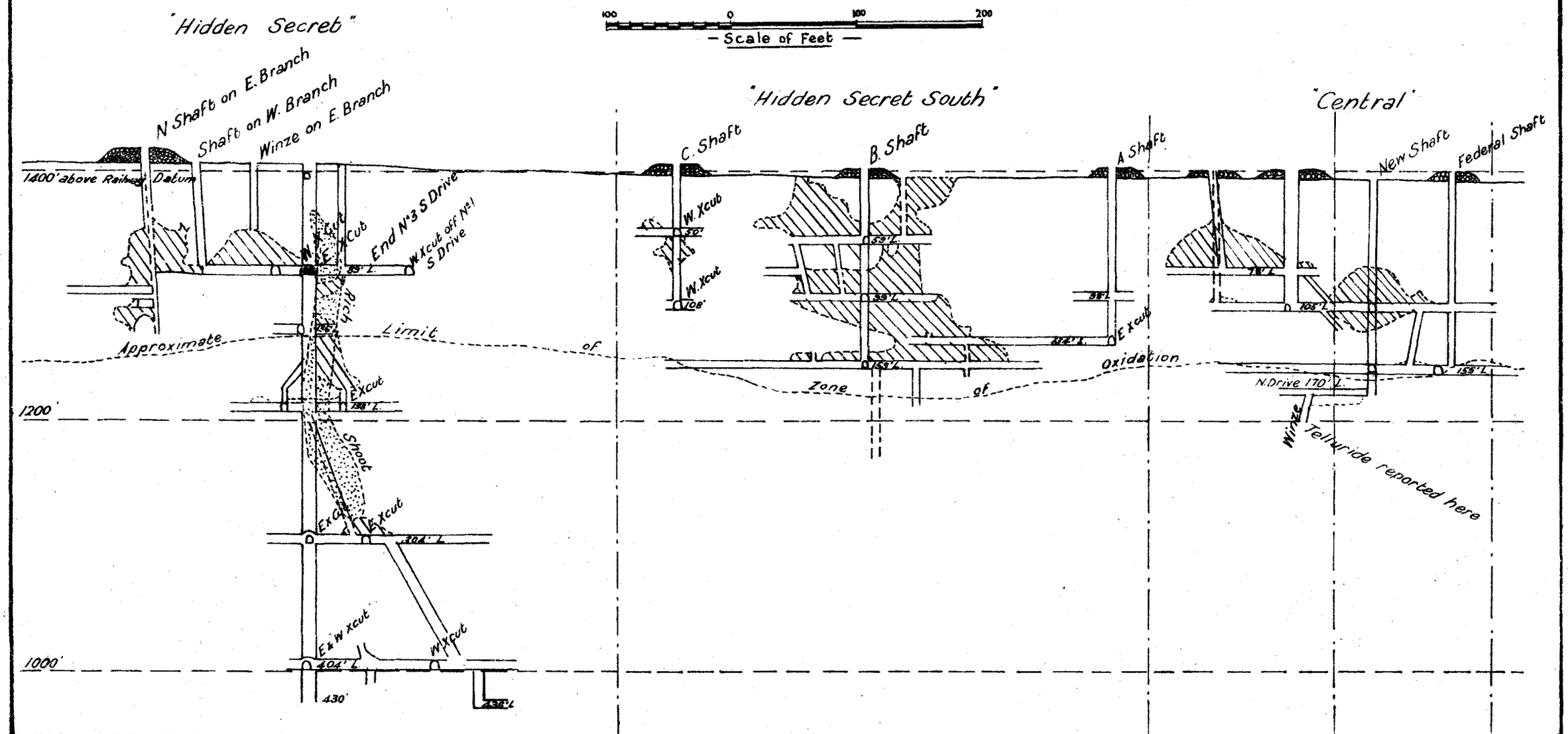



"Hidden Secret Sth."
East Lode
West Lode
East Branch
West Branch
Costean
4001E
"Hidden Secret"
4036E
Main Shaft
W. Section
East Section
New Shaft
Workings mentioned in Report
"Central"
BARTON STREET
MAFEKING ST.
BADEN ST.
No. 1 Bore
No. 3 Bore
Plan of Workings
HIDDEN SECRET, HIDDEN SECRET STH.
AND CENTRAL MINES
Kalgoorlie
2 0 2 4
— Scale of Chains —

Longitudinal Section

HIDDEN SECRET, HIDDEN SECRET SOUTH & CENTRAL MINES

KALGOORLIE

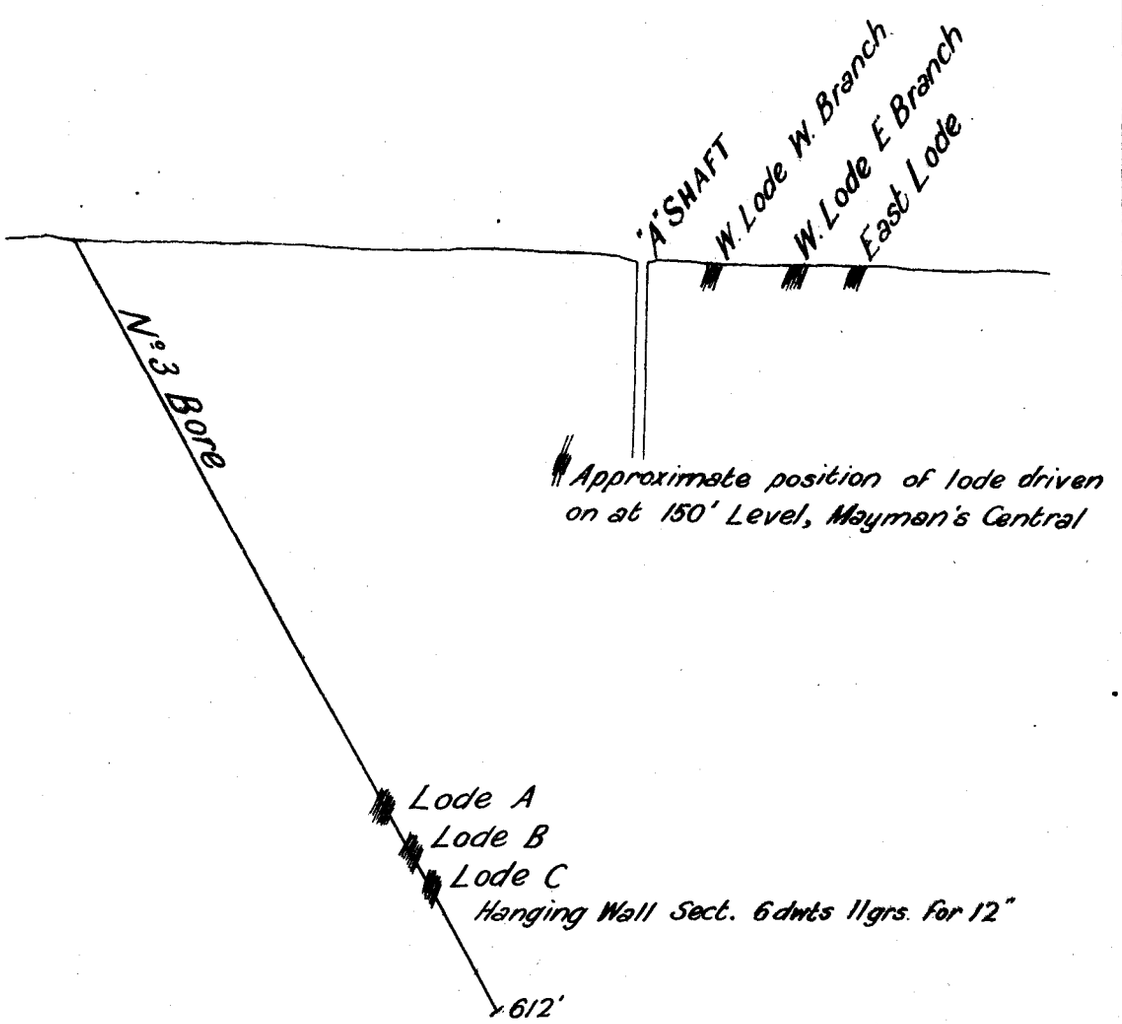


Cross Section on Nº3 Bore

HIDDEN SECRET AREA

Shewing Relative Position of Lodes

100 0 100 200 300 400



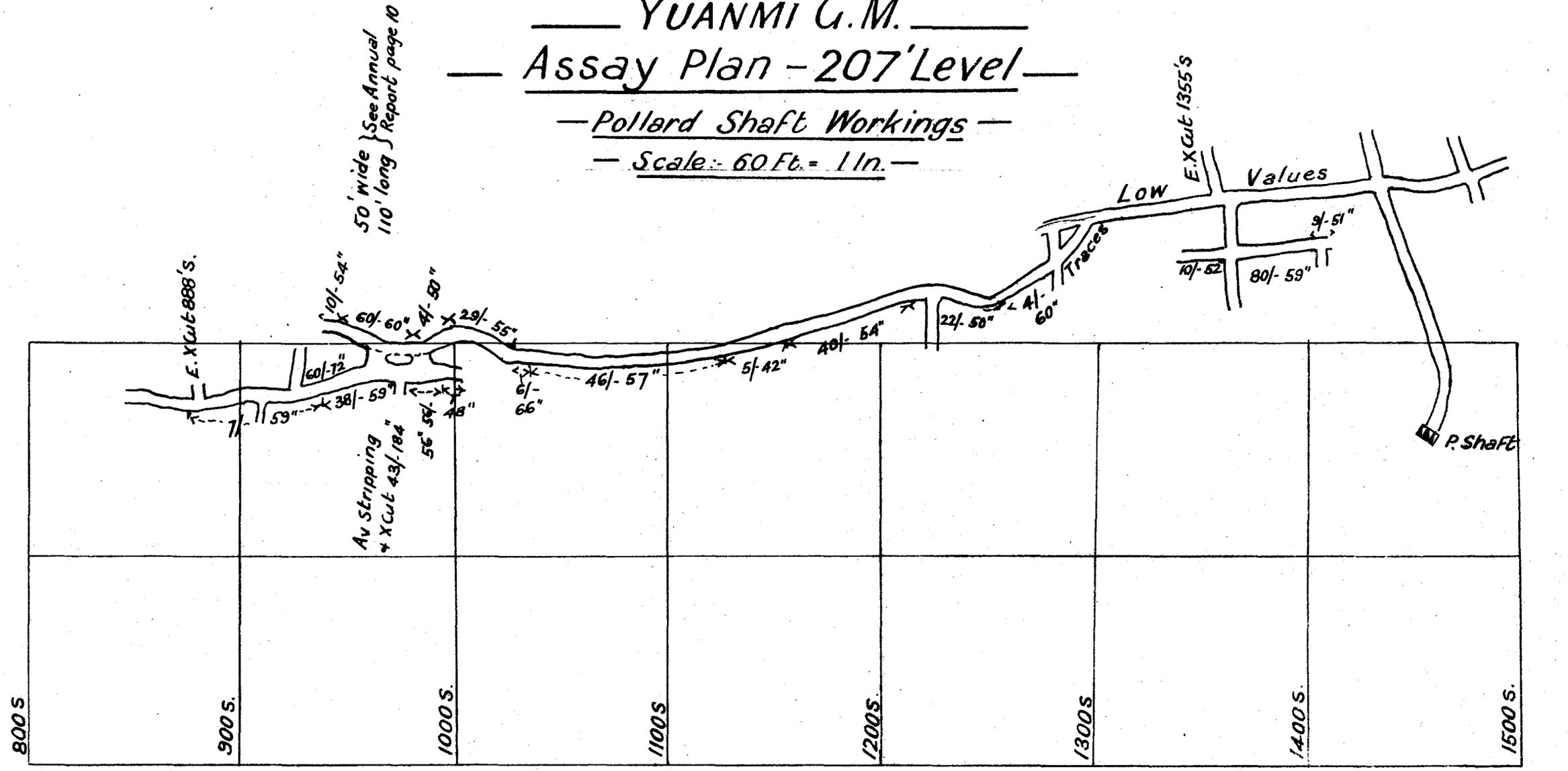
	Inclined Depth	Vertical Depth	Value
Lode A	434'-458'	376'	Nil to 14grs.
Lode B	471'-494'	408'	3grs. to 1dwt. 5grs.
Lode C	508-518'	440'	508'-509' 6 dwts. 11 grs. 509'-512' 1 dwt. 19 grs. 512'-518' Nil to 3grs.

YUANMI G.M.

Assay Plan - 207' Level

— Pollard Shaft Workings —

— Scale :- 60 Ft. = 1 In. —



"P" Shaft Workings, No. 3 Level (Bottom Level).

The Main North Drive has been driven 485 feet with the following results:—

From 0 feet to 208 feet—No values were met with.

From 208 feet to 238 feet—The value was 40/- per ton for a width of 43 inches.

From 238 feet to 256 feet—The value was 12/- per ton for a width of 56 inches.

From 257 feet to 284 feet—The value was 37/- per ton for a width of 72 inches.

Note:—The lode split at this point.

From 284 feet to 443 feet—The value was 71/6 per ton over a width of 66 inches.

From 443 feet to 485 feet—The value was trace only, mostly in granite dyke.

East Crosscut, 1,395 feet South.—This crosscut started and extended 38 feet. No values met with but a barren sulphide vein encountered, presumed to mark the course of a fault.

South Drive off East Crosscut, 1,395 feet South.—This drive was driven 17 feet in barren sulphide formation.

East Crosscut, 1,345 feet South.—This crosscut put out 15 feet. No lode met with.

West Crosscut, 1,365 feet South.—This crosscut put out 26 feet in broken country. No values were encountered. This crosscut is immediately above the point where values of 102/- per ton were disclosed at the random of the No. 4 level by No. 2 diamond drill hole.

East Crosscut, 1,247 feet South.—This crosscut put out 7 feet, exposing lode matter over the first 4 feet which assayed 45/- per ton on the north side and 14/- per ton on the south side.

East Crosscut, 1,225 feet South.—This crosscut was put out 4 feet and exposed 25 inches of ore worth 123/- per ton. The full width of the lode at this point was 90 inches worth 72/- per ton.

East Crosscut, 972 feet South.—This crosscut was put out 29 feet and a borehole a further 6 feet. Granite only was met with.

Rise, 1,165 feet South.—This rise was started from the back of the level and was put up 98 feet. The values exposed were as follows:—

0 feet to 49 feet—79/- for a width of 48 inches.
49 feet to 56 feet—Traces.
56 feet to 71 feet—53/- for a width of 72 inches.
71 feet to 98 feet—12/- for a width of 50 inches.

At 56 feet a hangingwall crosscut was put out 19 feet. The first 3½ feet exposed ore worth 76/- over 40 inches on north side and 28/- over 36 inches on south side, balance in formation worth traces only.

This rise proves an overlap in the No. 2 level ore body as compared with No. 3 level.

Main Shaft Workings.

No. 7 Level Main North Drive.—The main north drive was driven to a point 480 feet north (co-ordinate distance) of the main shaft with the following results:—

0 feet to 215 feet—Low values only.
215 feet to 235 feet—Averaged 53/- per ton for a width of 56 inches.
235 feet to 250 feet—Low values only.
250 feet to 265 feet—Averaged 57/- over 42 inches.
265 feet to 285 feet—Averaged 5/- over 48 inches.
285 feet to 350 feet—Averaged 57/- over 50 inches.
350 feet to 375 feet—Averaged 13/- over 19 inches.
375 feet to 400 feet—Averaged 44/- over 26 inches.
400 feet to 425 feet—Averaged 7/- over 20 inches.
425 feet to 470 feet—Averaged 60/- over 66 inches.

West Crosscut, 474 feet North.—This crosscut was put out 30 feet in ore averaging 49/- per ton.

North Drive off West Crosscut, 474 feet North.—This drive was driven 110 feet, giving the following results:—

0 feet to 100 feet—Averaged 50/- over 56 inches.
100 feet to 110 feet—Averaged 6/- over 66 inches.

South Drive off West Crosscut, 474 feet North.—This drive was driven 90 feet, giving the following results:—

0 feet to 35 feet—Averaged 42/- over 54 inches.
35 feet to 90 feet—Averaged 20/- over 63 inches.

Main South Drive.—This drive was driven to a point 215 feet south of the main shaft. Low values only were met with.

Operations During 1921-1922.—The operations during this period are of particular interest, as in April, 1922, the Youanmi G.M. Company decided to close down the mine. I understand that the plant was stopped in December, 1921, and from December to April development work only was carried out.

The following figures are taken from the last published Annual Report (1st July, 1921, to 30th June, 1922):—

ORE EXTRACTION.

	tons.
Main shaft, No. 7 Level	2,093
Main shaft, No. 3 Level	40
Pollard shaft, No. 2 Level	7,335
Total stopes	9,468
Mine development	145
	9,613
Decrease in bins	246
	9,859

Ore hauled from Development and dumped at surface—480 tons.

ORE REDUCTION.

	Tonnage.	Total Yield.	Total Value.	Value per ton recovered.
		fine ozs.	£ s. d.	s. d.
Slimes by decantation	9,859	5,419·43	22,943 19 6	46/6·53
Slags shipped to Fremantle Trading Co. ...	13·313	183·30	693 1 5	1/4·87
	9,859	5,602·73	23,637 0 11	47/11·40

It is stated that an extraction of 87.9 per cent. was obtained so that by calculation the actual value of the ore treated was 54s. 6.6d., and the residue 6s. 7.2d.

The Krupp ball mill ran 919 hours or 63 per cent. of possible running time and crushed 2,343 tons.

The Edwards roaster ran 996 hours or 68 per cent. of possible running time.

The 5-stamp mill ran 2,646 hours or 72 per cent. of possible running time and crushed 7,516 tons.

Summary of Costs.—The following is a summary of costs for the period 1st July, 1921, to June 30th, 1922:—

MINING.

Tons treated.	Total expenditure.	Per ton milled.
9,859	£ 25,400 s. 12 d. 3	51/6·33

Ore Treatment.	Tons treated.	Total Expenditure.	
		£ s. d.	
Rockbreaking	9,859	667 3 2	1/4 per ton ore treated.
Ore transport	9,859	154 5 2	4d. „ „
Ore drying ...	2,343	162 7 11	1/5 per ton ore dried.
Ball milling ...	2,343	592 17 3	5/3 per ton ore ground.
Roasting ...	2,343	763 9 4	6/6 per ton ore roasted.
Fine grinding sands	5,700	710 6 3	2/6 per ton ore ground.
Decantation	9,859	4,829 0 8	9/10 per ton ore treated.
Milling ...	7,515	964 7 11	2/7 per ton ore milled.
Precipitation and smelting	9,859	933 11 3	1/11 per ton ore treated.
Disposal of residues	9,859	227 19 6	6d. per ton ore treated.
	9,859	10,005 8 5	20/3·56d.

	£	s.	d.
INCOME—			
Gold won realised through Perth Mint	22,943	19	6
Slags realised through Fremantle Trading Company	693	0	6
Sundry revenue	178	0	0
Bullion, premium account	9,316	10	9
	£33,131	10	9

EXPENDITURE—

Working Account:

	tons.	£	s.	d.	s.	d.
Mining costs	9,859 ...	25,400	12	4	... 51	6·33
Ore treatment	„ ...	10,005	8	5	... 20	3·56
Main shaft pumping	„ ...	2,107	4	1	... 4	3·30
Realisation of bullion	„ ...	211	0	0	...	5·13
Slags shipment realisation	„ ...	64	10	9	...	1·58
Grand total working expenditure		37,788	15	7	... 76	7·90
CAPITAL EXPENDITURE—						
Pollard shaft sinking		800	16	11	... 1	7·50
Total expenditure in W.A.		£38,589	12	6	78	3·40

Comments by the General Manager, Mr. L. B. Williams.

The following comments taken from the general remarks made by Mr. Williams are of interest:—

In the early part of the year, the ore in the main sulphide body above the No. 7 level had been broken. Work having been concentrated on the sinking of the Pollard shaft and the opportunities for further development in the main workings being limited, the work in this latter section was confined to No. 4 and No. 3 levels where the blanks in Sections Nos. 3, 4, and 5 North of the Main Shaft offered some scope for prospecting.

Results here (as detailed elsewhere) were not at all encouraging, but they served to show that faulting on the No. 3 series in conjunction with the No. 1 series was probably the cause of the blanks. Upon the completion of this work no further development was done in the main workings. The ore broken in the Nos. 4 and 5 north stopes at No. 7 level was sufficient to keep the mill supplied till August.

At the same time the sinking of Pollard shaft to the No. 3 level was completed and the main east crosscut was extended with all speed possible. Some uncertainty existed as to whether the lode might not be found close to the shaft, one set of calculations making it appear possible that such might be the case. At about 24 feet in, a band of sulphide formation was cut. It proved to be quite devoid of gold and on this account and from the features noted, its occurrence was attributed to a faulting movement in conjunction with a granite dyke.

The crosscut was extended to a distance of 68 feet from the plat where running ground was encountered, but no values of importance were exposed. The progress of the work is detailed elsewhere in this report.

As no ore was found in time to justify the repair of the roaster, the condition of which was very bad, the work of repair was held over.

In the meantime the oxidised lode on No. 2 level which was considered to carry sufficient ore to enable operations to be continued while the repairs to the roaster were being effected, was opened up.

The ore body proved to be much larger than was anticipated, at one point being 50 feet wide and 110 feet long. The causes of this were, however, found to be due to a very considerable flattening and crumpling of the ore body by faulting. The winning of this ore, being confined to one stope only and that requiring (on account of its width and the condition of the old workings above it) a considerable amount of timber, was more costly than it would have been otherwise if it had been possible to work it in conjunction and in rotation with other stopes. Even so its working allowed the development work at No. 3 level to be continued. This latter work was carried on comparatively rapidly despite the very heavy water encountered. The oxidised ore proved to be sufficient to enable ten head of stamps to be run for a period of over four months. By this time the ore body at No. 3 level had been entered.

The first shoot of gold encountered, although heavily laden with sulphides of iron, yielded 90 per cent. of its values to cyanide. It appears probable now that the sulphides (which carried no gold) were associated with a fault plane and did not belong to the lode proper. When the second shoot was entered the sulphide ore proved entirely refractory. Unlike the lode in the main workings it carried no antimony or arsenic and the reasons for its failure to yield its gold to cyanide are still unknown.

Tests made by T. B. Stevens, Consulting Metallurgist of Kalgoorlie, confirmed the tests made by the mine staff to the effect that the gold was not recoverable except by roasting.

The question then arose as to whether there would be sufficient ore to justify the repair of the roasting plant. If the large body of ore worked in Section 9 at No. 2 level were found to continue to No. 3 level it was anticipated that besides adding considerably to the available ore it would be of high grade and the work

of driving was pushed on as rapidly as possible in order to enter this section. The greater part of the drive needed timber, so soft and water-logged was it, albeit showing not much sign of oxidation.

At co-ordinate, 1,006 feet south, an expected granite dyke made its appearance and the drive was pushed on in the confident hope that it would soon pass through this dyke. When, however, a point immediately under the wide ore body at No. 2 level was reached and because of faulting in the granite itself, it was decided to crosscut east. This crosscut together with an advance hole exposed 35 feet of contorted granite. It seems probable from the evidence afforded that the dyke has been crumpled by faulting (as occurred in a smaller degree on the level above) and that duplication of the granite has thus been brought about.

The considerations affected by the failure to open up the lode at this point were further influenced by the fact that the fine ore body exposed by the main north drive at this level, proved from its position not to be the defined continuation of the ore body worked at No. 2 level, but to be situated some distance to the East of it. This feature had been noticed at No. 2 level, but it was hoped that as the zone of oxidation was passed through the lode would take up a continuous line in depth as in the main workings. These features were definitely proved by the rise 1,165 feet south which passed out of values some distance below No. 2 level and considerably to the east of it.

This explains the failure of the winze 1,095 feet south below No. 2 level to go down in ore.

Although it was anticipated that 90 tons of ore could be broken daily and delivered to the mill, the ore available was not sufficient to justify the repair of the plant inasmuch as it would probably have been exhausted before No. 4 level could have been opened up. The work therefore had to be stopped in April, and after keeping the workings open for some time at considerable expense, the water was finally allowed to rise.

The position then is that this lode, the proof of the existence of which entailed so much heavy work and expense, has to be abandoned because the unprecedented conditions as to cost of labour and stores have exhausted the funds before a recovery could be made.

Of the failure to find the important southern shoots in this lode as they were worked at No. 1 level, it may be said with some degree of confidence that so far as the No. 3 level is concerned faulting alone is responsible. Although the early investigations found sufficient cause in the incidence of the dykes to account for the cutting out of the lode below No. 1 level, the causes are not enough to explain the failure at No. 3 level. Incidentally the evidences of faulting which are known as the No. 3 series are much more complete than formerly, and it is certain that this series has affected not only Pollard shaft workings but also the main workings in a very serious way. The difficulties attendant on their recognition have been due to the fact that their strike is almost identical with that of the lodes, their dips vary considerably, and they are accompanied in the sulphide zone by features which belong as well to the main lode.

Errors have been made in assuming some of the features (which belong to another system) to be due to this system and in this way the destruction of the southern shoots at No. 7 level was erroneously thought to be due to reversed movement when as appears probable the features observed were due to an original flat faulting of the No. 1 series followed by a normal fault of the nearly vertical series. (No. 3 series.)

It is now tolerably certain that the main north drive on No. 2 level Pollard shaft was started on the footwall of a fault zone, that the ore body found in the south drive off the west crosscut 1,350 feet south was only a portion of the main ore body held in this zone and that the wide body of granite found in this crosscut owed its width to faulting.

This fault zone has probably cut out the ore body on No. 3 level until the latter emerges from the zone about the vicinity of the east crosscut 1,247 feet south. The splitting of the lode is probably due to this faulting also.

The amount of sulphide ore treated during the year was 2,343 tons. This represented the ore broken in the north end of No. 7 level in the latter half of the previous year. All of this ore was particularly dense and hard and the ordinary capacity of the roaster for ores low in sulphides could not be maintained. The capacity of the ball mill, too, was low, it being impossible at times to maintain a duty of three tons per hour. The cause of the hardness and heavy sulphide contents of the ore was the extraordinary amount of crumpling to which the lode had been subjected.

The lode opened up at No. 3 level, Pollard shaft, returns to the characteristics of the main Youanmi lode above No. 5 level, being soft and friable and containing about the same amount of sulphur. Not only could the ore be roasted more rapidly but the ball mill could handle it to better advantage.

ORE BODY.

General Remarks.—The lode consists of sheared greenstone impregnated with sulphides of iron and containing also arseno-pyrite and stibnite. As is commonly the case in Western Australia it occurs at the edge of a greenstone area just alongside its junction with the granite which surrounds it. The width of the reef ranges from a few feet up over thirty feet. In one place it will be noted Mr. Williams quoted a width of 50 feet. It might average 7 or 8 feet.

Ore has been mined with breaks from a point 600 feet north of the main shaft to 1,500 feet south. The main shaft workings have been carried down to a depth of 775 feet, where the lode has been worked for a length of 300 feet. The Pollard shaft workings extend to a depth of 300 feet where the lode has been mined for a length of approximately 300 feet also.

The total ore mined has been 330,934 tons for a recovery of 167,694.34 fine ounces or an average recovery of 43/1d. per ton. The residues, I understand, average about 8/6d. making the actual value of the ore 51/7d. per ton in value.

Ore underfoot.—It will be noted elsewhere in this report that at the main shaft workings there are four shoots of better grade ore going underfoot at the No. 7 Level having lengths of 15 feet, 65 feet, 25 feet, and 45 feet respectively and at the Pollard shaft workings there are three shoots of better grade ore having lengths of 30 feet, 27 feet, and 159 feet respectively. In addition a cablegram shows that a bore hole nearer the shaft assayed 102/- per ton from 489 feet to 494 feet. It is mentioned in the report that this is in the random of the 400ft. level so that apparently the borehole was inclined at an angle of approximately 60 degrees from the horizontal.

Costs.—If the costs as set out in the final report (viz.: Mining 51/6.33d. per ton and treatment 20/3.56d. per ton) were to be any indication of the costs of production in the future it would be no use considering the question of re-opening the mine again. It must be borne in mind, however, that included in the cost of mining is the cost of all development work, shaft sinking excepted, and that for the second half of the year the only work going on was the development at P. shaft. Apparently the whole of the expenditure during this second half of the year was charged to mining, as being no treatment, there was nowhere else to charge it and no tonnage was produced during the period.

Mr. Fleming, the accountant, who prepared these figures for the general manager, has submitted the following explanation:—

This sheet should not be taken as any kind of criterion. The mode of showing is misleading and requires analysis. The period should have been divided to show the cost of extracting the treated ore and of the development period.

The total cost of ore extraction, including general expenses, amounted to £13,563 3s. 10d. or 27s. 6d. per ton. This work was carrying heavy overhead expenses. During the second half of the year there was no ore extraction as the work was confined to development in P. shaft, which carried a very heavy load. The total shown against mining costs included development and general expense. Originally mining was confined to the extracting of ore, but owing to taxation requirements it was all shown in one account.

The ore at the No. 7 level is said to be hard and dense whereas that at Pollard Shaft up to the present has been soft and friable. Apparently the ore is not more difficult to break than our Kalgoorlie ores and the treatment was practically the same. An indication of costs at Kalgoorlie can be obtained from the following figures taken from the Royal Commission of Mining in 1925:—

Mine.	Monthly tonnage.	Ore Extraction.	Treatment.	Administration Realisation, etc	Total.	Development Expenditure.
		s. d.	s. d.	s. d.	s. d.	s. d.
Lake View and Star ...	7,367	13 1·75	12 9·49	1 5·21	28 4·44	3 9·15
South Kalgurli	6,969	11 7·42	14 6·14	2 5·25	28 6·81	4 2·2
Associated G.M.	5,235	9 9·363	15 8·17	2 5·26	27 10·71	1 0·06

Cost equal to this probably could not be obtained at present owing to insufficient working faces, but if ore below the present workings were located and made available, costs should certainly be low enough to admit of the mine being profitably operated.

Water at Pollard Shaft.—The information on the file goes to show that the water to be pumped at Pollard shaft amounts to about 150,000 gallons per day and that it was pumped by a 12in. x 6in. x 13in. steam pump.

Mr. Fleming estimated in October, 1922, that Pollard shaft could be unwatered at a cost of £325, including a repair to a Cornish boiler of £50. He estimated that three firemen would be required for three weeks, say £200, and 100 tons of firewood costing £75.

Conclusion and Recommendation.

Boring is more likely to be successful on this mine than on any other that I know of on the Murchison Goldfield. The Pollard shaft workings are so much shallower than those at the main shaft that I would suggest boring at this end of the mine first.

Four bores inclined at say 60 degrees from the horizontal might be put down to cut the lode at a vertical depth of 500 feet or an inclined depth of 576 feet at the positions marked on the plan. This would entail approximately 2304 feet of boring at an estimated cost of say £3,556 assuming the total cost of boring to amount to 30/- per foot.

10.—SONS OF GWALIA G.M.

(*7th December,* 1928).

Acting on official instructions I made an inspection of this mine on the 13th, 14th and 15th instant, and now beg to submit two reports viz.:—

(1.) The requested alteration in Development Programme.

(2.) The possibility of reducing temperatures underground.

Report No. 1.

The Requested Alteration in Development Programme.

The original programme of development work was submitted in April, 1925. It may be summarised as follows:—

Original Programme.

Main Shaft.—Sink the main shaft 209 feet to the No. 26 level, making the total depth 4,200 feet on the underlay.

No. 21 *Level.*—(1). Extend the main south drive to look for southern shoots of ore.

(2.) Sink a winze on the eastern lode met with in east crosscut 305 feet south.

No. 22 *Level.*—Crosscut for east lode met with in east crosscut 305 feet south.

No. 23 *Level.*—Extend the main south drive to look for southern shoots of ore.

No. 24 *Level.*—(1). Extend the main south drive to look for southern shoots of ore.

(2). Sink three winzes at 1,400 feet south, 1,500 feet south, and 1,620 feet south respectively.

No. 25 *Level.*—(1). Extend the main south drive to look for southern shoots of ore.

(2). Sink five winzes at 900 feet south, 1,000 feet south, 1,100 feet south, 1,280 feet south, and 1,620 feet south respectively.

No. 26 *Level.*—(1). Cut plat.

(2). Drive north 50 feet to make space for tipping trucks.

(3). Drive south for the main shoot of ore and drive on it to a point about 1,450 feet south.

(4). Crosscut west at 1,400 feet south for the western ore body.

(5). Drive south on the western ore body.

Since the above programme was submitted and approved the southern end of the mine has been further developed at the No. 21, No. 23, No. 24 and No. 25 Levels, and in consequence of the results obtained the management have now made application for permission to carry out the following development work, which is not included in their original programme:—

No. 20 *Level.*—(1). Sink a winze at say 1,770 feet south on the ore body (South Gwalia shoot) met with at the No. 21 level, west crosscut 1,710 feet south.

(2). Sink a winze at say 1,670 feet south on Pozzi's lode.

No. 21 *Level.*—(1). Drive north and south on the ore body (South Gwalia shoot) met with in west crosscut 1,710 feet south.

(2). Sink two winzes on this shoot of ore at say 1,720 south and 1,820 south.

(3). Continue the south drive off west crosscut 1,470 feet south on the footwall make of ore (Pozzi's lode).

(4). Sink a winze on Pozzi's lode to the No. 22 level.

No. 22 *Level.*—(1). Crosscut south-west at a point 1670 feet south about 120 feet to cut South Gwalia shoot (?).

(2). Drive north and south on this ore body.

(3). Drive south off west crosscut 1,515 feet south where a value of 30/- for 6 inches was obtained (Pozzi's lode?)

No. 24 *Level.*—(1). Crosscut east at 1,600 feet south about 40 feet to cut the values met with in east crosscut 1500 feet south and east crosscut 1675 feet south.

(2). Start Winze at 1270 feet south to hole into winze 1205 feet south about half way down.

Estimated cost of proposed additional development work:—

500 feet of driving at £6	..	£3,000
955 feet of winzing at £8	..	7,640
160 feet of crosscutting at £6	..	960
		£11,600

Comments on New Proposals.

The new proposals are more readily understood when it is appreciated that with the exception of the work at the No. 24 level, they are laid out principally to develop the valuable ore body, possibly the South Gwalia shoot, met with in the No. 21 level west crosscut 1710 feet south, and to a lesser extent to develop another footwall make of ore known on the mine as Pozzi's lode which was worked on the No. 21 level from about 1450 feet south to 1600 feet south.

To simplify matters the proposals will now be discussed under these headings.

Development of Supposed South Gwalia Shoot.

The position of the ore body met with in the No. 21 level west crosscut 1710 feet south suggests that it may be the downward continuation of the valuable South Gwalia shoot of ore which was last seen at an intermediate level between the No. 16 and No. 17 levels where it was cut off by an epidiorite intrusion.

At the time of my visit 40 feet of driving had been carried out on this shoot of ore at the No. 21 level which I was informed averaged 40/- per ton over a width of 10 feet. Going north an epidiorite intrusion appeared to be cutting off the lode but the face of the south drive was in good values and was looking well.

Whether this make of ore turns out to be the South Gwalia shoot or not it is, in my opinion, too valuable to be allowed to remain undeveloped. The amount of development work which ought to be carried out on this ore body will naturally depend upon the results obtained. The first thing to be done is to ascertain the length of the shoot by driving on it. One or more winzes should then be sunk on it and the lode looked for at the No. 22 level by means of a crosscut and if found, driven on at this level also.

The management's proposals which deal with the development of this shoot of ore, are the following:

No. 20 *Level.*—Item (1).

No. 21 *Level.*—Items (1) and (2).

No. 22 *Level.*—Items (1) and (2).

This programme can be recommended as being an effective method of developing this new make of ore. A good deal of the programme however would be justified only if sufficiently encouraging results were met with in the driving.

Development of Western Ore Body known as Pozzi's Lode.

This lode which was met with in the west crosscut 1470 feet south was worked at the No. 21 level for a length of about 150 feet and I am informed that it produced 20,000 tons of ore averaging 35/- per ton in value.

At the crosscut the lode is steeper than the main ore body, being inclined at an angle of 60 degrees from the horizontal, but going north it flattens and lies on an epidiorite intrusion.

It is proposed to continue to drive the north drive off west crosscut 1470 feet south as far as the west crosscut 1710 feet south. The present face is in value and the drive is heading for a point about 20 feet east of the new make of ore found in the west crosscut 1710 feet south.

In addition to the chance of opening up additional ore this drive will greatly facilitate the trucking of ore from the South Gwalia (?) shoot of ore. This drive can, therefore, be recommended.

The management's proposals which deal with the development of this lode are the following:—

No. 20 *Level.*—Item (2).

No. 21 *Level.*—Items (3) and (4).

No. 22 *Level.*—Item (3).

This programme can, I think, also be recommended subject to the proviso that the Hon. Minister may discontinue the programme at any stage if in his opinion the results obtained do not justify further expenditure of loan money upon it.

I might mention here that at least one winze from the No. 20 level to the No. 21 level is badly needed at this end of the mine to improve ventilation. The air at present has to pass down through three passes each 3 feet by 3 feet, all between 1,400 and 1,500 feet south.

Other Proposed Development.

The only other development work in the programme is that at the No. 24 level, viz.:—

East Crosscut at 1,600 *feet south.*—This crosscut is proposed to test at this point the value of the lode met with in the east crosscuts north and south of this point at 1,500 feet south and 1,675 feet south respectively. If values are sufficiently encouraging the proposed winze at 1,610 feet south will then, subject to approval, be sunk on this eastern make of ore, instead of on the ore body in the main south drive, as originally intended. The crosscut will only be about 40 feet in length and is, I think, justified.

Winze 1,270 *feet south.*—The principal object of this winze is to facilitate filling operations. It will hole into winze 1,205 feet south about half way down, this latter winze being too flat to admit of filling being run down it. This work appears to me to be well worth doing but as its object is to cheapen mining costs and not to develop fresh ore supplies, it may be argued that the cost of this work should be borne by the Company. It is so much to our interest to see efficient work done, however, that I would prefer to see money advanced for such work rather than see the management forced to do inefficient work on account of shortage of funds.

General Remarks.

The advantage of the new programme of development work and my principal reason for supporting it is that it gives the management a chance of developing quite a considerable tonnage of good grade ore in a very much shorter time than would be the case if the old programme were strictly adhered to.

The disadvantage is that by increasing the programme it is probable that portion at least of the old programme will not have been completed when the loan money has been expended and it is very important that the No. 26 level should be opened up as the indications in the winzes point to this being a better level than the No. 25.

In this connection it is satisfactory to note that the management intend to sink the main shaft concurrently with the work in hand.

The financial position is somewhat as follows:—

	Loan granted.	Expended.	Balance available.
	£	£ s. d.	£ s. d.
Construction	38,000	12,243 11 6	25,756 8 6
Development	40,000	14,980 4 9	25,019 15 3
	£78,000	£27,223 16 3	£50,776 3 9

	£	£
The new programme is estimated to cost		11,600
Add cost of sinking shaft 200ft. at £35 per foot	7,000	
Additional cost for 6-hour shifts	1,400	
		8,400
		£20,000

The estimated cost of shaft sinking was given me by Mr. Edquist, who should be able to estimate the cost fairly closely from previous experience.

From these figures it will be seen that if the whole of the proposed development work be carried out, and should the main shaft cost as much as the management estimate, there will be only £5,000 of loan money left for development at the No. 26 level.

It should be pointed out, however, that the whole of the new programme will be carried out only if the results of driving are sufficiently encouraging, and if so, there is reason to hope that the mine will by that time have reached a profit-earning basis and will be able to bear portion of the cost of the development of this level. If the results are in the least discouraging the new development work should, I think, be discontinued and the loan money ear-marked for development at the No. 26 level.

Summary and Recommendation.

The position may be summarised as follows:—

(1) The principal sources of ore supply are the No. 25 level stopes and the opencuts, and unless the temperature can be reduced in the former, six-hour shifts, which are unprofitable, will have to be worked.

(2) Good values have been met with in the winzes below the No. 25 level and a good No. 26 level seems reasonably to be assured, but the temperature problem will still be present, and in any case the ore cannot be even reached till the shaft has been sunk another lift, and about 800 feet of driving done.

(3) A promising shoot of ore, thought to be the South Gwalia shoot, has been met with in the No. 21 level west crosscut 1,710 feet south, which can be more or less rapidly developed.

(4) Another footwall lode at the south end of the mine, locally known as Pozzi's lode, can also be more or less rapidly developed and made available.

(5) It has to be decided whether it is best to utilise portion of the loan money in developing these two ore bodies, or whether to retain it so that the full programme of development laid out for the No. 26 level can be carried out.

After due consideration I agree with the management that it will be best to begin upon the new development programme and continue it as long as satisfactory results are obtained.

I therefore recommend that permission be granted to the management to proceed with the proposed new development work on the understanding that the Minister may disallow any portion of it if, in his opinion, the results obtained from the development work already carried out are not sufficiently encouraging to justify further expenditure of loan money upon it.

Report No. 2.

The Possibilities of reducing Temperatures Underground.

The temperatures in the bottom level, as will be noted from the plan attached,* are mostly from 1 to 2 degrees above 76 degrees wet bulb, and in consequence, unless they can be reduced, six-hour shifts will have to be worked in compliance with the last Arbitration Award.

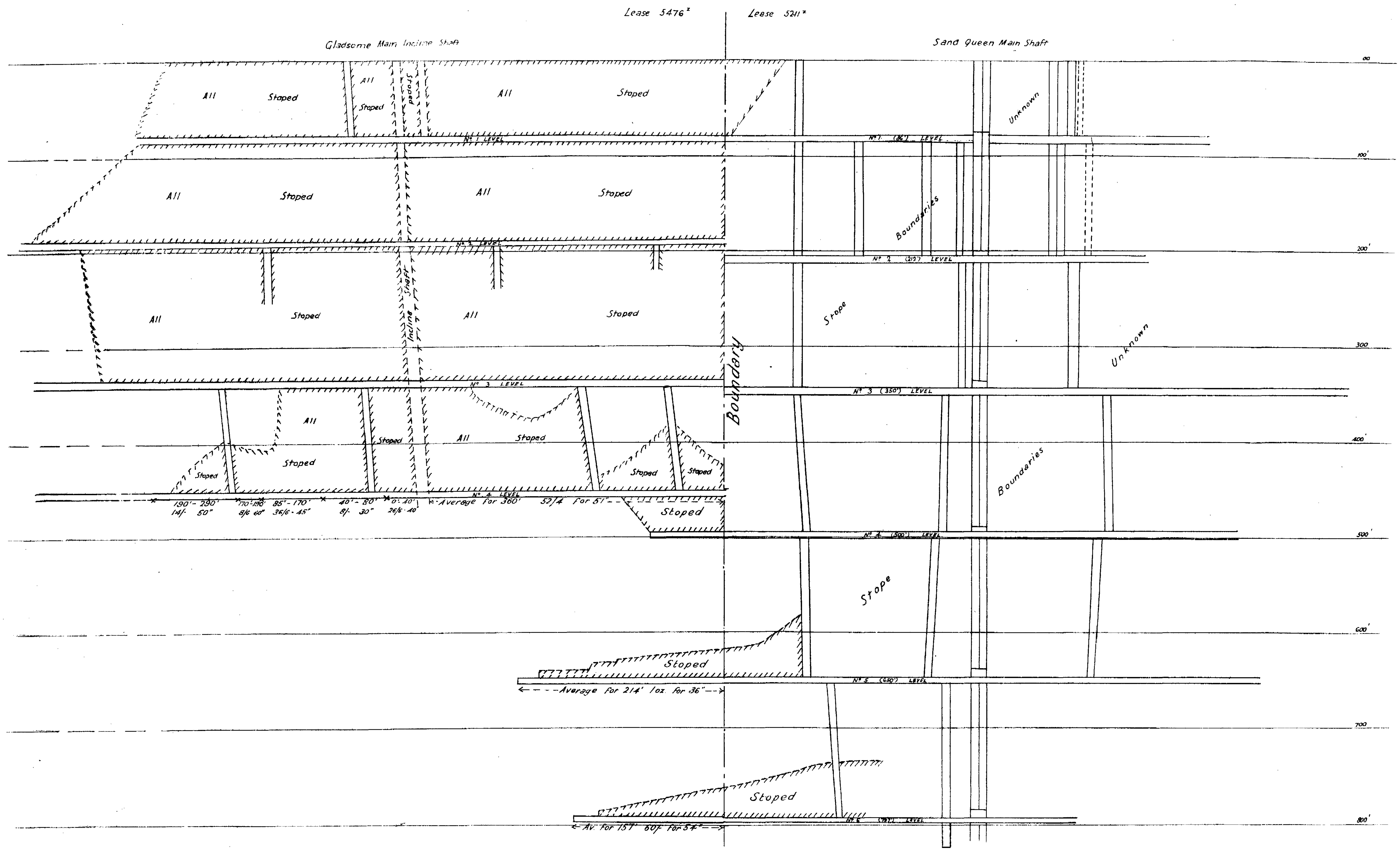
The intake air enters the mine at the South Gwalia shaft and, as is indicated by arrows on the plan attached,* finds its way down to the bottom level at the south end of the mine. The air then passes through the No. 25 level stopes along the No. 25 level to the fan at the plat. After passing through the fan it finds its way up the shaft to the surface. From the intake at the South Gwalia shaft to the fan at the No. 25 level the air has to travel over a mile. It is prevented from short circuiting to the shaft by a system of doors. I found no evidence of any serious leak or short circuit. The air passages were, however, rather too small in places. Between the No. 20 and the No. 21 the air had to pass through three passes, each 3 feet by 3 feet. The No. 25 level is also very small either for a main truck way or a main air passage. In the smallest place it was hardly

* Not reproduced.

SAND QUEEN & GLADSOME MINES

Longitudinal Section

Scale 60' - 1 inch



more than 6 feet high and 4 feet wide. I drew Mr. Edquist's attention to this fact, and I expressed the opinion that when the No. 26 level is being driven the drive should be at least 7 feet by 5 feet, and preferably larger.

The amount of air and its temperature were taken at intervals in the air passages and show a progressive increase from 62 degrees wet bulb at the No. 8 level to 77 degrees wet bulb at the No. 25 level. A few details are as follows:—

	Velocity.	Quantity.	Temperature.	
	Feet per minute.	Cubic feet per minute.	Dry Bulb.	Wet Bulb.
No. 8 Level—				
Air passing along mullock crosscut 1,300ft. south	400	16,000	65	62
Air passing down winze 1,290ft. south	130	3,120	65	62
Total	...	19,120	65	62
Note.—Air along crosscut goes down South Gwalia shoot and the air down the winzes through the western lode stopes. Below the No. 9 level, both currents pass down the western lode stopes.				
No. 12 Level—				
West lode stopes	...	...	70	65
No. 14 Level—				
West lode stopes	...	...	73	67
No. 17 Level—				
Main intake air in main south drive ...	230	13,800	75·5	67·5
Note.—Balance of air passes down west lode stopes				
No. 24 Level—				
Air passing down No. 25 level stope 780ft. south	160	3,750	83	75·5
Crosscut at 1,235ft. south (main air passage) ...	205	7,175	82	73·5
Air from No. 24 level stope, 1,610ft. south ...	...	...	81	73
Note.—A little air was coming up to the No. 24 level winze 920ft. south				
No. 25 Level—				
Main South drive (Inspector Winzar's readings)	...	15,900	84	77

No. 25 Level Stopes.—The main sources of ore supply are from the opencuts and from the No. 25 level stopes and, to use Mr. Edquist's words, he cannot live without the latter. He also stated that it would not pay to work these stopes on six-hour shifts. Both these statements appear to be correct, and in consequence every effort must be exerted to reduce the temperature in them to 76 degrees wet bulb, or lower. A glance at the plan will show that in most places the temperature is from 1 to 2 degrees above this figure.

Possibility of reducing Temperatures.—With regard to the possibility of effecting the desired reduction in temperature, I may say that everything depends on the possibility of drawing a sufficient volume of air through the mine. At present the air passing along the No. 25 level to the fan is roughly 16,000 cubic feet per minute, and the speed of the fan 200 revolutions per minute.

Regarding the amount of air which can be taken along a level I might mention that Inspector Phoenix's figures show that at the Golden Horseshoe Mine 40,000 cubic feet of air per minute pass along the 2,000ft. level crosscut at a speed of 1,100 feet per minute.

As explained in my brief preliminary report, the Sons of Gwalia fan has been driven by an air-driven engine of insufficient power, so that it has been impossible to speed up the fan as desired.

I was informed by the management last week that they had procured cables from England and that probably the motor would be running by the 3rd December. We may receive advice any time now of the effect that the faster running has had upon the temperatures.

11.—SAND QUEEN AND GLADSOME G.M.

(14th December, 1928.)

As instructed I inspected this mine on the morning of 16th November, and have to report as follows:—

Surface Plant:

The principal items of plant are as follows:—

Ten Head Battery,
3 grinding pans,
2 Wilfley tables,
1 tailings pump,
2 collecting sand vats (45 ton capacity),
5 percolating vats, „ „
1 steam compressor, estimated about 10 drill capacity,
1 steam winding engine,
2 Cornish boilers, 24 ft. x 6 ft. dia.,
1 portable boiler, 13 ft. x 5 ft.,
1 Dudbridge 120 H.P. gas engine,
1 producer,
1 fitting shop containing a good lathe and Holman drill sharpener,
1 extractor and smelting room.

The pulp from the battery goes to two grinding pans. The concentrates from the Wilfley tables go to the third pan where they are ground finer and amalgamated.

Although the mine is equipped with a sand treatment plant, this is not being operated at present. This, I am informed, is because the battery tailings are worth only 7/4d. per ton and there is no water suitable for cyaniding available; the mine water is particularly dense, stated to contain 22 per cent. of solids.

Underground Position.

The underground position is briefly as follows:—

The Sand Queen and the Gladsome mines worked the same reef in adjoining Leases. The Sand Queen G. M. Co. worked the reef to a depth of 797 feet and the Gladsome to a depth of 460 feet. When sinking a winze below the 797 feet level in the Sand Queen mine, such a heavy inflow of water was met with that the management decided to abandon the mine and allowed the water to rise. In due course both mines were flooded.

Assisted by this Department, an attempt was made by the Bullfinch G. M., to unwater the mines again with the intention of working them as one mine. The water was taken out sufficiently to admit of the bottom level (460 ft.) in the Gladsome being sampled when funds gave out and this Company abandoned their option over the mine. Subsequently the present company was formed, and at considerable expense succeeded in unwatering the mine and cementing up the winze that was making so much water.

The old Sand Queen G.M. Co. drove their main north drives as far as the Gladsome boundary and then stopped. The new Company is continuing these drives into the Gladsome Lease at the three bottom levels, viz., at the No. 4 level (500 ft.), the No. 5, (650 ft.), and the No. 6 level (797 ft.).

The No. 4 level main north drive is being continued by underhand stoping the reef from the 460 feet level (Gladsome) down to the depth of this level (500 feet). In this way the drive has now been advanced 75 feet, and a quantity of milling ore has been produced at the same time.

The No. 5 level main north drive has been extended 214 feet. The mine assays average approximately an ounce per ton in value for a width of 36 inches.

The No. 6 level has been extended 157 feet into the Gladsome Lease in ore averaging 60/- per ton in value for a width of 34 inches.

Ore is at present being mined by means of the underhand stopes below the 460ft. level (Gladsome) and in stopes over the main north drive at the No. 5 and No. 6 levels. The shrink stope method of mining has been employed in these two stopes and it is estimated that there were 1,300 tons of broken ore in them at the time of my visit.

The Company has found that it has been unable to operate the mine profitably while breaking more ore than goes to the mill and have been looking round for some other method of working. The underground manager informed me that it was proposed to run out the ore and fill the stopes by breaking mullock from the footwall of the stopes. I told him that I could not recommend the proposal as the footwall was so hard that it would be almost as expensive to break mullock as to break ore and that in my opinion it would be better to continue to shrink stope than attempt to fill by this method. I recommended him strongly, however, to make an effort to recover the sand pass which had collapsed in places as the result of the flooding and unwatering of the mine.

Ore Extraction.

Since the mill started in March, 1928, the ore treated was as follows:—

Month.	Tons.	Gold Recovered.	Average Value Recovered.	Battery Tailing.	Total Value.
		fine ozs.	s. d.	s. d.	s. d.
March	640	237·51	31 5	9 0*	40 5
April	380	243·96	54 9	9 0*	63 9
May	674	401·23	44 1	9 0*	53 1
June	752	262·26	29 7	9 0*	38 7
July	560	237·30	35 11	9 0*	44 11
August	768	347·59	34 0	9 0	43 0
September	728	394·25	46 0	7 4*	53 4
October	780	350·05	38 1	7 4*	45 5
November	807	410·58†	43 4	7 4	50 8
	6,089	2,844·73	39 9	8 4*	48 1

* Approximate only. In August it was stated that the average value of the tailing was 9s. In November it was stated to be 7s. 4d. † Estimated.

General Remarks.

This mine is developing very satisfactorily at the No. 5 and No. 6 levels. At the 460ft. level, the sampling carried out by the Bullfinch G. M. Co. proved a shoot of ore 360 feet in length averaging 52/4d. per ton over a width of 51 inches, so that the prospects of the mine are most encouraging.

At present there are two stopes in good shape for breaking ground but there are no means of filling these stopes. If the shrink stope method is continued it will be necessary from now on to break practically three tons of ore for every one ton sent to the mill. There is a conveniently placed mullock pass about 75 feet from the Gladsome boundary which has collapsed in places but which no doubt can be repaired and which will then admit of much cheaper mining.

In the meantime it is important that the No. 5 and No. 6 levels should be continued until they are under the Gladsome shaft and connection made both for ventilation and for filling purposes.

If this mine is properly opened up now it gives promise of becoming a regular producer for quite a long time to come.

APPENDIX No. II.

Annual Report of the Board of Examiners for Colliery Managers' and Under-Managers' Certificates under the "Coal Mines Regulation Act, 1902-1926."

Office of the State Mining Engineer,
Mines Department,
Perth, 16th April, 1929.

The Under Secretary for Mines.
Perth.

Sir,

The Annual Report of the Board of Examiners for the year 1928 is submitted for the information of the Hon. Minister for Mines:—

During the year, two ordinary meetings were held, the first on the 24th April and the second on the 24th October, 1928. At the latter meeting Mr. T. Blatchford, Government Geologist, was unable to be present, as he was on a visit to the North-West.

At the October meeting, regret was expressed at the loss of Mr. A. Montgomery's services as Chairman of the Board, on account of his retirement from the Public Service.

Examinations for Certificates.

No applications were received to sit for examinations advertised to be held in April.

An examination for Second Class Certificates of Competency was held at Collie on the 3rd and 4th October, 1928, Mr. McVee, Inspector of Mines, Collie, acting as supervisor and conducting the oral examination. Messrs. W. Hetherington, A. Hicks, J. Faulds, J. C. Farrant, and A. D. Grant sat for this examination, and after full consideration of the papers by the Board, it was decided to grant a Second Class Certificate of Competency to each of the candidates.

A copy of the papers set for the Second Class Examination held in October is attached to this report.

We have, etc.,

A. M. HOWE,
State Mining Engineer, Chairman.

T. BLATCHFORD,
Government Geologist, Member.

JAS. McVEE,
Inspector of Mines, Collie, Member.

V. RUSSELL,
A/g. Secretary.

THE COAL MINES REGULATION ACT, 1902-1926.

Examination for Second Class Certificate of Competency as Under-Manager or Overman.

SUBJECT: VENTILATION AND DANGEROUS GASES.

Wednesday, 3rd October, 1928, 10 a.m. to 11.30 a.m.

Possible Marks.		
50.	(1)	The examining deputy on going beyond the wheelers' flat finds that the workings and roads are "foul" with gas. What should he do, and how should he proceed in the way of finding the probable cause of the accumulation?
50.	(2)	As Under-manager part of your duties will be to keep the ventilating records. Describe how you would carry out this important duty, and how you would enter the records in the book kept at the mine for that purpose.
50.	(3)	A district comprising 24 working places (14 bords and 10 pillar places) is ventilated by one current of air. How would you improve on this? Give a skeleton sketch showing what you would do.
50.	(4)	Ventilate the accompanying plan, having due regard to haulage, etc.
50.	(5)	What are the chief points to be considered in establishing and maintaining substantial ventilation in coal mines?
50.	(6)	Find the diameter of a shaft necessary for 200,000 cubic feet of air per minute with a velocity of 15 feet per second.
300		

SUBJECT: MINING OF COAL.

Wednesday, 3rd October, 1928, 11.30 a.m. to 1 p.m.

Possible Marks.		
50.	(1)	Lay out a section of work, bord and pillar in a seam 7 feet high, suitable for working coal cutters electrically. Show how you would arrange your cables with a view to— (a) short trailing cables; (b) transfer of machines from place to place; and (c) general safety of persons working and passing therein.
50.	(2)	A pillar working place 8 yards wide and 12 yards long has just finished, and the timber has to be drawn. Sketch the place, and show how you would start and continue drawing the timber.

50. (3) A stone drift is to be driven through a down throw fault in search of the coal seam. Its estimated length is 200 yards. What provision would you make for winding the débris, and for ventilating the drift? The slope of the drift is 1 in 5.

50. (4) Assume you have been appointed Under-Manager at a colliery with which you have not been previously acquainted. Explain to what matters you would first direct your attention.

50. (5) What do you understand by "panel working?" Describe the system with a sketch. Say what are the advantages of this method of mining coal.

50. (6) Sketch a pair of headings and the method to be adopted when approaching old workings containing water, and state the number and length of boreholes you think advisable to adopt.

300

SUBJECT: ARITHMETIC.

Wednesday, 3rd October, 1928, 2 p.m. to 3 p.m.

Possible Marks.

17. (1) A colliery has a daily output of 750 tons, 29 per cent. of which is small. The average cost of production is 4s. 9d. per ton. Large coal sells at 16s. 3d. per ton, and smalls at 9s. 6d. per ton. Find the balance for one day's output.

16. (2) A horizontal seam of coal having a specific gravity of 1.3, and of an average thickness of 6 feet extends over 750 acres of royalty. How many tons should be got, allowing a loss in working of 14 per cent.?

17. (3) Give the weight of water in a lodgment 40 yards long 8 yards wide and 7 feet deep.

17. (4) A square cistern is 4 feet deep, and contains 961 cubic feet. What is the length of each side?

16. (5) Find the cost by practice of 29 tons 17 cwt. 2 qrs. 21 lbs. at £3 7s. 6d. per ton.

17. (6) Your output is 1,150 skips per day. The average weight per skip is 18 cwt. What is the output in tons per fortnight of 11 days, and what is the amount of wages if the coal cost 5s. 3d. to produce?

100

SUBJECT: ROADWAYS.

Wednesday, 3rd October, 1928, 3 p.m. to 4 p.m.

Possible Marks.

50. (1) It has been decided to grade a main haulage road where there has been a system of main and tail rope haulage for a number of years. The conditions are dry and dusty. The grading necessitates shooting in the floor in some parts and in the roof in others. State fully the precautions you would take.

50. (2) A large fall has occurred on a main haulage road cutting off access to one-tenth of the working places of the colliery. Describe how you would organise the men for clearing it away and state what steps you would take to avoid loss of output as much as possible.

50. (3) What arrangement would you use at or near the top of inclines to guard against accidents caused through neglect to attach rope to the skips?

50. (4) When floor and roof are good, how wide would you make your main roads and why? Show how you would put timber in where the road is extra wide for flats or pass-byes.

50. (5) Describe three methods of securing the roof and sides on an engine plane, and state in what circumstances you would adopt each.

50. (6) Show by sketch the arrangement necessary for keeping an endless rope tight, and state where it should be placed to prove efficient.

300

SUBJECT: COAL MINES REGULATION ACT, 1902-1926.

Wednesday, 3rd October, 1928, 4 p.m. to 5 p.m.

Possible Marks.

16. (1) What are the requirements of the Coal Mines Regulation Act with regard to the division of the mine into parts?

17. (2) What are the provisions of the General Rules as regards coal mine ventilation?

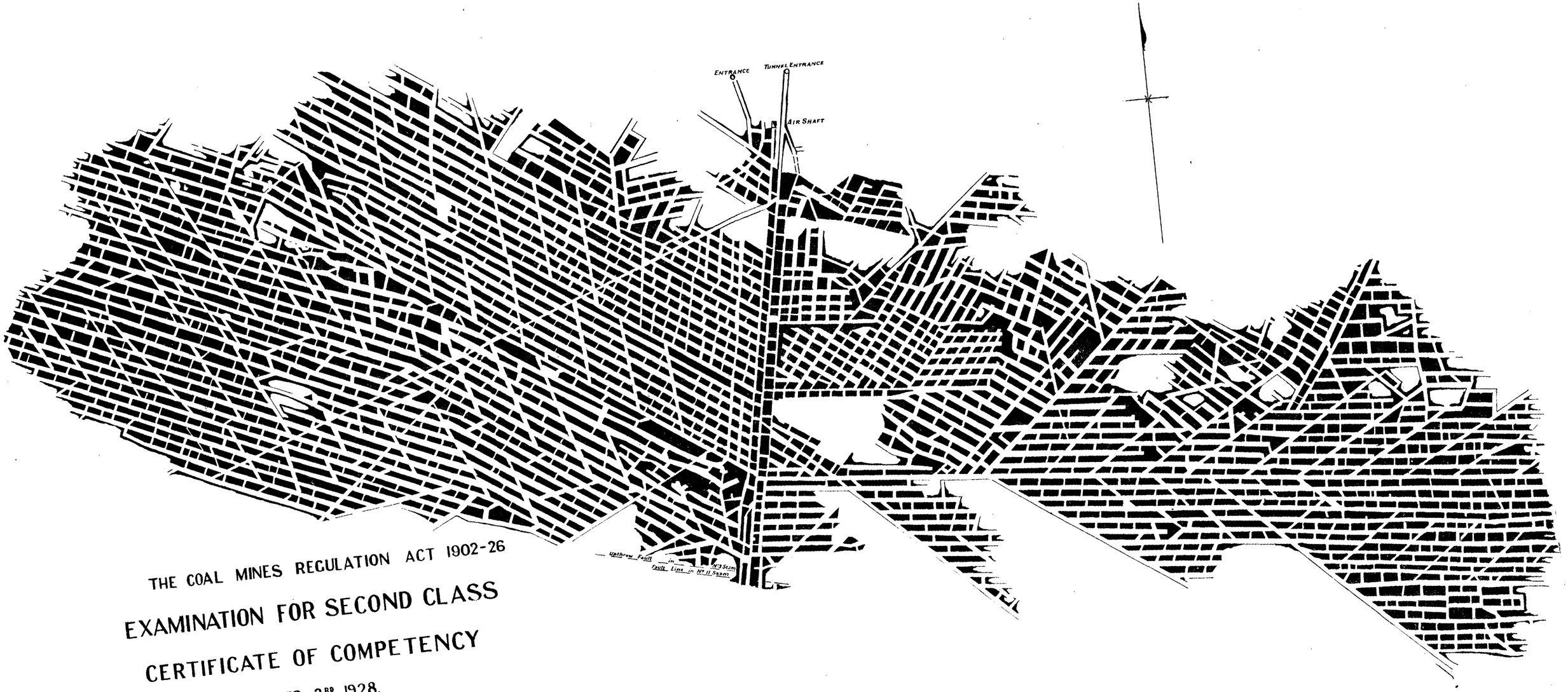
16. (3) Manholes are required by the Act under certain conditions below ground. What are these conditions, and also the distance apart of manholes under these conditions?

17. (4) State in substance what the Coal Mines Regulation Act requires in regard to the use of explosives in the coal mines of this State.

17. (5) Quote the rules pertaining to signalling in coal mines.

17. (6) What precautions are required when approaching a place likely to contain an accumulation of water or other liquid matter, or an area of unexplored disused workings?

100



THE COAL MINES REGULATION ACT 1902-26

EXAMINATION FOR SECOND CLASS

CERTIFICATE OF COMPETENCY

OCTOBER 3RD 1928.

Chs 0 1 2 3 4 5 6 Chs

Scale of Chains

APPENDIX No. III.

MINING DEVELOPMENT EXPENDITURE.

Advances outstanding 31st December, 1928.

	£	s.	d.
Advances authorised prior to 1928 ..	215,156	4	5
Advances authorised during 1928 ..	12,012	3	1
Total authorised	£227,168	7	6

	£	s.	d.
Principal moneys advanced—			
Prior to 1928	189,039	2	9
During 1928	13,591	4	5
Total advances made	£202,630	7	2

	£	s.	d.
Principal moneys repaid, including sale of Securities—			
Prior to 1928	27,391	17	2
During 1928	6,771	16	3
	£34,163	13	5
Balance principal moneys outstanding	£168,466	13	9

	£	s.	d.
Interest paid prior to 1928	14,749	3	5
Interest paid during 1928	1,443	9	2
	£16,192	12	7

	£	s.	d.
Interest outstanding at 31-12-27 ..	15,286	13	8
Interest outstanding at 31-12-28 ..	17,479	19	10
Total Principal and Interest outstanding at 31-12-28	185,946	13	7

DIVISION III.

REPORT OF THE SUPERINTENDENT OF STATE BATTERIES.

The Under Secretary for Mines.

For the information of the Hon. Minister I herewith submit my report on State Battery operations for the year ending 31st December, 1928.

When the year closed our batteries had produced bullion worth £6,100,878 from 1,474,367 tons of ore crushed, and treated 80,935 tons of tin ore for a return of £93,572, or a total recovery of £6,194,451 from all ores.

MILLING.

Tonnage.—Fifteen batteries crushed 382 parcels amounting to 16,274.75 tons, a reduction of 4,882½ tons as compared with that crushed in 1927, and 829½ tons less than in 1926.

Batteries treating more than 1,500 tons for the year were as follows: Cue 2,812.5 tons, Coolgardie 2,274.5 tons, Norseman 1,750.5 tons, Peak Hill 1,587 tons, Boogardie 1,526.25 tons.

Gross Value of Ore Milled.—The total estimated value of ore milled was £72,313 equal to £4 8s. 11d. per ton crushed, and is 1s. 1d. per ton higher than for the preceding year.

Return by Amalgamation.—Bullion of an estimated value of £54,006 5s., or 66.36 shillings per ton, was recovered by amalgamation, and represents an extract of 74.68 per cent., and is 3.06 per cent. higher than that recovered in 1927.

Repairs and Renewals.—The cost of repairs and renewals charged against the milling of 16,274.75 tons crushed amounted to £1,560 12s. 5d., or 1s. 11d. per ton, which shows the satisfactory nature of the heavy re-construction work undertaken in 1926 and 1927, as the repairs and renewals are only 1d. per ton more than in 1927.

Milling Revenue.—The total Revenue received was £7,412 1s. 11d., or 9s. 1.29d. per ton, a falling-off or 1s. 0.85d. per ton on the 1927 figures. This reduction is due to an increase in the free crushings under Clause 2 and a larger percentage of ore crushed by time.

Expenditure and Cost per Ton.—The milling expenditure amounted to £17,128 5s. 6d., or 21s. 0.48d. per ton, as against 20s. 2.17d. in 1927, an increase of 10.31d. per ton, and is due solely to the decrease in tonnage handled during the period.

Stamp Duty.—The stamp duty for the three 10-stamp mills was 4.08 tons per 24 hours, and for the 14 5-stamp mills 4.32 tons.

Low-grade Rebates.—Rebates on crushing charges made to owners of low-grade ores were paid on 4,709 tons, and amounted to £625 0s. 11d. This amount is paid from Mines Development Vote. Out of the 2,812.5 tons crushed at Cue 1,557.25 tons came under this category.

Loss on Milling.—The expenditure exceeded the revenue by £9,716 3s. 7d., as against £10,542 12s. 2d. in 1927.

TAILINGS TREATMENT.

10,469 tons of tailing worth over 2 dwt. 8 grs. per ton and containing 4,123.8 ozs. were accumulated for treatment, and 3,060.25 tons worth less than 2 dwt. 8 grs. were segregated as being unprofitable.

Head Value and Extraction.—During the year 15,216 tons were treated at 11 plants, and, in addition, 258 tons of highly refractory tailings were put through our Coolgardie plant.

The estimated average head value of the amenable tailings was 7.253 and the tail value after treatment 1.453 dwts., showing an estimated extraction of just under 80 per cent., the actual extraction obtained being 82 per cent. The bullion call was £18,925, and that recovered £19,356.

Details of treatment at each battery and comparative figures of 1927 and 1928 are shown below.

Revenue and Expenditure and Cost of Treatment.—The average cost per ton was 10s. 0.49d. and revenue received 11s. 9.79d., as against 10s. 2.08d. and

12s. 8.40d. respectively in 1927. The cost has remained stationary whilst the revenue declined approximately 1s. per ton, due to the slightly lower value of the tailing, and the fact that the revenue for 1927 included £600 more from gold premiums.

The profit from tailings treatment was £1,373 0s. 5d.

TAILINGS TREATMENT SHOWING VALUES AND DETAILS OF EXTRACTION FOR 12 MONTHS ENDED 31ST DECEMBER, 1928.

Plant.	Tons.	Head Value.	Contents.	Tail.	Contents.	Extraction.
		dwts.	dwts.	dwts.	dwts.	%
Bamboo Creek	550	8·596	4,728	1·618	890	81·17
Boogardie	858	9·537	8,183·5	1·913	1,642	79·94
Cue	2,297	4·95	11,370	1·121	2,575	77·35
Coolgardie	2,334	6·982	16,296	1·542	3,599	77·91
Meekatharra	445	8·25	3,671	2·29	1,019	72·24
Norseman	1,917	6·54	12,540	1·43	2,742	78·13
Ora Banda	1,188	4·072	4,838	·883	1,050	78·31
Peak Hill	1,388	4·92	6,830	1·162	1,613	76·38
Sandstone	2,430	9·677	23,516	1·698	4,127	82·45
Warriedar	702	4·59	3,222	1·000	702	78·21
Wiluna	1,107	13·70	15,171	1·94	2,153	85·83
Totals ...	15,216	7·253	110,365·5	1·453	22,112	79·96
Coolgardie Sulphides ...	258	6·058	1,563	2·85	709	52·95
	15,474	...	111,928·5	...	22,821	...

COMPARATIVE SYNOPSIS.

	1928.	1927.
Tons treated	15,474 ...	16,915
Head Value	7·253	7·427
Tail Value	1·453	1·448
Estimated Extraction	79·96	81·14
Actual Extraction	82·00	82·11
Amount of Call	£18,925 ...	£21,290

TIN TREATMENT.

Our tin-dressing plant at Greenbushes was idle for the whole of the year, a loss of £20 2s. 7d. being incurred in caretaking, etc.

TOTAL OPERATIONS.

Mainly as a result of the decrease of 4,882½ tons milled, the total tonnage handled dropped from 38,184¼ to 31,748¾ tons. The total expenditure was £24,922 2s. 3d., or 15/7.4 shillings per ton, as against an average cost of 15s. 8.25d. in 1928.

The total loss on all operations was £8,363 5s. 9d.

COMPARATIVE SYNOPSIS OF RESULTS AT STATE BATTERIES FOR 12 MONTHS ENDED 31ST DECEMBER, 1927, AND 1928.

——	1928.			1927.		
	Tonnage.	Expenditure.	Revenue.	Tonnage.	Expenditure.	Revenue.
		s. d.	s. d.		s. d.	s. d.
Milling	16,274·75	21 0·48	9 1·29	21,062·25	20 2·17	10 2·04
Tailing Treatment ...	15,474	10 0·49	11 9·79	16,915	10 2·08	12 8·40
Tin Treatment	...	...	...	207	9 6·33	4 3·16

RECEIPTS AND EXPENDITURE.

——	Tonnage.	Expenditure.	Revenue.	Profit.	Loss.
		£ s. d.	£ s. d.	£ s. d.	£ s. d.
Milling	16,274·75	17,128 5 6	7,412 1 11	...	9,716 3 7
Tin Treatment	...	25 2 7	5 0 0	...	20 2 7
Tailing Treatment	15,474	7,768 14 2	9,141 14 7	1,373 0 5	...
	31,748·75	24,922 2 3	16,558 16 6	1,373 0 5	9,736 6 2
			Less Profit ...	... ...	1,373 0 5
			Net Loss		£8,363 5 9

STAFF.

Mr. A. M. Howe's appointment as State Mining Engineer resulted in the control of State Batteries devolving on me. No appointment of an Inspector being made has kept the head office staff very fully employed.

No changes in the management have taken place, eight managers now control 17 batteries, and the work has been fairly evenly distributed.

Work in all departments has been well done and a high average extraction maintained in the tailings plants. The freedom from complaints is a tribute to the tact and service rendered by managers, often under trying conditions, and I wish to place on record my appreciation of the loyal service given me by the whole of the Head Office and Goldfields staff.

GENERAL.

The tonnage for the year declined considerably from that handled in 1927, but was less than 1,000 tons below the 1926 figures, and no improvement is apparent at present.

No new batteries have been erected for some years, and the closing down of plants in districts which have become unproductive has decreased the number in operation.

Economy compatible with efficiency has been practised, and our plants are all in good condition, as is shown by the small cost of repairs and renewals. The use of cars has been amply justified by the Managers being able to transport skilled labour to outback centres where it is unprocurable, and though the expense is considerable, added efficiency and freedom from breakdowns has resulted, and the undue responsibility removed from managers which occurs in supervising continuous running plants with inefficient labour.

Tailing treatment at many centres has been considerably hampered by the difficulty of procuring suitable labour and teams. With the small tonnage forthcoming, and the starting of mills when 150 tons are accumulated, the present system of handling the tailing is the only one possible, and when inaugurated labour and horses were plentiful, but in some isolated centres like Wiluna the cost of handling has increased very considerably.

Administration.—Head Office expenditure was £2,434 2s. 5d., a reduction of £684 14s. 10d. on the figures for 1927.

The comparative cost of assistance to prospectors through State Batteries for the years 1928 and 1927 is as follows.—

——	1928.	1927.
	£ s. d.	£ s. d.
Loss of Working ...	8,363 5 9	8,461 12 10
Cartage Rebates ...	3,626 16 2	4,283 14 7
Low Grade Rebates	625 0 11	739 10 3
Loan Expenditure ...	1,236 0 4	2,885 7 7
	£13,851 3 2	£16,370 5 3

The above does not include interest on capital account, and it will be seen that £2,519 2s. 1d. less was expended than in 1927.

Twelve schedules showing details of operations are attached.

D. F. BROWNE,
Superintendent of State Batteries.

28th May, 1929.

SCHEDULE 1.

Return showing the number of Tons crushed, yield by Amalgamation, and total Value for year ended 31st December, 1928.

Battery.	Tons crushed.	Gold Yield, Bullion.	Yield, Value.
		ozs.	£
Bamboo Creek	514	941.25	3,388.50
Boogardie	1,526.25	1,113.70	4,009.32
Coolgardie	2,274.5	3,382.00	12,175.20
Cue	2,812.5	1,237.85	4,454.46
Marble Bar	197	642.50	2,313.00
Meekatharra	854.75	1,611.50	5,801.40
Mt. Ida	157	129.50	466.20
Norseman	1,750.5	949.35	3,417.66
Ora Banda	1,129.75	729.57	2,630.45
Payne's Find	900.5	1,352.85	4,870.26
Peak Hill	1,587	834.55	3,004.38
Sandstone	925	905.05	3,258.18
Warriedar	661.5	193.50	695.98
Wiluna	689.5	786.40	2,831.04
Youanme	295	191.80	690.48
	16,274.75	15,001.37	54,006.51

SCHEDULE 2.

Return showing the number of Tons crushed, Gold Yield, average per ton, and value since inception to 31st December, 1928.

Battery.	Tons crushed.	Gold Yield.	Value.
		ozs.	£
Bamboo Creek	13,452.00	23,749.76	85,499.14
Boogardie	74,521.65	54,145.21	196,306.13
Coolgardie	130,320.25	91,800.29	330,534.68
Cue	24,822.75	24,643.00	88,712.99
Darlot	33,210.00	37,637.74	138,928.25
Laverton	19,336.75	21,578.63	78,854.79
Leonora	56,753.45	62,817.90	229,618.76
Linden	19,783.00	22,531.70	81,114.21
Marble Bar	13,642.25	17,848.95	64,256.37
Meekatharra	85,634.00	101,920.16	369,591.96
Mt. Egerton	7,893.25	4,084.86	13,972.32
Mt. Ida	43,846.15	55,092.66	201,635.75
Mt. Keith	9,787.00	8,618.75	31,027.50
Mt. Sir Samuel	9,681.25	7,505.97	27,021.48
Mulline	77,008.45	98,573.64	354,035.25
Niagara	64,866.00	57,770.81	210,163.11
Norseman	70,460.20	78,963.51	287,451.10
Ora Banda	26,931.25	15,260.87	54,943.06
Payne's Find	29,847.25	37,568.36	135,246.09
Peak Hill	31,022.80	27,773.09	101,136.36
Sandstone	78,124.15	80,497.12	289,984.96
Siberia	16,024.00	16,625.59	59,777.45
20-Mile Sandy	12,184.15	19,055.77	68,930.34
St. Ives	9,307.25	6,172.49	22,220.96
Tuckanarra	15,476.85	21,276.06	78,217.53
Warriedar	11,166.00	6,106.70	21,983.50
Wiluna	63,516.75	36,956.62	133,189.00
Yarri	49,689.25	33,127.44	119,258.59
Youanme	34,758.00	11,518.79	41,467.63
Batteries closed	259,629.34	270,313.31	981,998.47
	1,392,695.44	1,351,535.75	4,897,077.73
Wiluna Lode	81,671.75	34,540.18	124,667.40
	1,474,367.19	1,386,075.93	5,021,745.13
Ore Dressing Plant—			
Coolgardie	475.00	..	1,082.94
		Tons Black Tin	
Tin Plants—			
Greenbushes	1,658.25	9.673	
Plants closed	79,276.75	969.276	

Milling.

	tons.	ozs.		tons.	ozs.
Up to 1901 (3 years)	68,791	75,553	1915	49,595	39,095
1902	39,517	57,255	1916	47,330	31,734
1903	49,233	58,305	1917	42,947	38,015
1904	71,616	78,309	1918	39,329	33,523
1905	85,018	92,327	1919	40,291	27,027
1906	95,831	94,187	1920	46,494	28,450
1907	95,280	97,962	1921	34,761	24,035
1908	95,624	89,875	1922	35,722	32,736
1909	94,218	83,127	1923	29,715	21,876
1910	89,278	80,074	1924	18,063	18,515
1911	59,373	56,265	1925	18,093	19,300
1912	56,636	53,888	1926	17,104	16,669
1913	60,573	52,515	1927	21,062	18,503
1914	56,570	45,641	1928	16,274	15,001

Sand Treatment.

	Tons.
Up to 1902	29,255
1903	33,369
1904	42,559
1905	54,420
1906	60,422
1907	63,778
1908	62,081
1909	61,265
1910	43,915
1911	27,444
1912	18,599
1913	18,300
1914	6,219

Tailing Treatment.

	Tons.
1913	13,078
1914	32,723
1915	31,887
1916	34,725
1917	24,890
1918	24,364
1919	15,764
1920	15,437
1921	19,763
1922	24,234
1923	14,307
1924	19,767
1925	14,289
1926	16,122
1927	16,915
1928	15,474

Slime Treatment.

	Tons.
Up to 1904	691
1905	7,028
1906	..
1907	8,220
1908	5,818
1909	16,848
1910	28,819
1911	20,821
1912	8,085
1913	6,089
1914	6,246
1915	3,454
1916	15,536
1917	13,086
1918	11,892
1919	12,780
1920	11,525
1921	7,370
1922	7,492
1923	8,848
1924	4,615

SCHEDULE 3.

Tailing Treatment, 1928.

Battery.	Tons.	Yield	Value.
		Fine ozs.	£
Bamboo Creek	550	183.74	780.40
Boogardie	858	312.56	1,327.53
Coolgardie	2,592	693.22	2,944.13
Cue	2,297	452.53	1,921.91
Meekatharra	445	144.02	611.67
Norseman	1,917	491.05	2,085.53
Ora Banda	1,188	248.63	1,055.91
Peak Hill	1,388	238.98	1,014.94
Sandstone	2,430	1,003.12	4,260.28
Warriedar	702	116.79	496.05
Wiluna	1,107	672.87	2,857.70
	15,474	4,557.51	19,356.05

SCHEDULE 4.

Sand and Tailing Treatment from inception to 31st December, 1928.

Battery.	Tons.	Yield.	Value.
		Fine ozs.	£
Bamboo Creek	11,368	4,455·42	18,936·84
Boogardie	57,484	15,965·36	67,225·81
Burtville	16,788·75	5,464·13	22,793·76
Coolgardie	80,679	12,916·89	54,703·01
Cue	20,279	4,392·26	18,641·25
Laverton	18,016	3,239·29	13,563·90
Leonora	41,313·5	10,026·18	41,817·21
Linden	18,150	6,054·21	25,731·89
Meekatharra	59,874	12,653·70	53,573·53
Mt. Keith	7,053	816·70	3,468·72
Mt. Sir Samuel	5,988	1,367·56	5,809·39
Mulline	44,794·5	12,261·27	49,863·24
Mulwarrie	23,809·25	4,675·53	19,220·11
Niagara	44,828	6,839·37	28,471·79
Norseman	53,860·5	12,827·71	53,776·94
Ora Banda	14,559	3,288·08	13,966·68
Payne's Find	19,497	2,082·51	8,932·86
Peak Hill	5,087	1,268·48	5,387·09
Quinns	7,486	686·56	2,916·43
Sandy Creek	11,496·25	3,512·53	14,639·07
Sandstone	53,171	15,893·69	67,225·97
St. Ives	5,918	961·78	4,084·68
Siberia	5,550	1,201·56	5,105·20
Warriedar	9,436	4,096·13	17,396·24
Wiluna	23,506	11,320·35	47,986·43
Yarri	47,555	4,790·81	20,086·57
Youanme	13,602	3,730·98	15,844·76
Batteries closed	134,971·5	25,074·55	103,894·38
	856,120·25	191,863·59	805,063·75

Residue Treatment from inception to 31st December, 1928.

Battery.	Tons.	Yield.	Value.
		Fine ozs.	£
Linden	670	95·14	349·34
Menzies	24,270	1,579·26	6,679·01
Mulwarrie	4,618	546·85	2,325·02
	29,558	2,221·25	9,353·27

Slimes Treatment from inception to 31st December, 1928.

Battery.	Tons.	Yield.	Value.
		Fine ozs.	£
Mulwarrie	4,733·5	751·79	3,194·22
Wiluna	96,784·0	37,665·46	159,961·27
Slimes Plants closed	111,196·25	25,088·87	102,110·62
	212,713·75	63,506·12	265,266·11

Tin Residue Treatment from inception to 31st December, 1928.

	Tons.
Greenbushes B.E.	315
Greenbushes, Salt Water Gully	1,444
	1,759

SCHEDULE 5.

Return showing Number of Parcels Treated and Tons Crushed at State Batteries for Year 1928.

No. of Parcels Crushed.	Battery.	Tons.	Yield by Amalgamation. Bullion.	Yield by Amalgamation. Fine Gold.	Gross Contents of Tailings. Fine Gold.	Total Contents of Ore. Fine Gold.	Average per ton. Fine Gold.	Gross Value of Ore.
			ozs. dwt. grs.	ozs. dwt. grs.	ozs. dwt. grs.	ozs. dwt. grs.	dwt. grs.	£ s. d.
9	Bamboo Creek	514	941 5 0	797 17 14	193 14 8	991 11 22	38 14	8 4 0
50	Boogardie	1,526·25	1,113 14 0	944 0 14	417 3 16	1,361 4 6	17 20	3 15 9
87	Coolgardie	2,274·5	3,382 0 0	2,866 15 9	660 3 13	3,526 18 22	31 0	6 11 9
55	Cue	2,812·5	1,237 17 0	1,049 5 9	470 16 0	1,520 1 9	10 19	2 5 10
3	Marble Bar	197	642 19 0	545 0 0	...	545 0 0	55 8	11 15 2
35	Meekatharra	854·75	1,611 10 0	1,366 0 0	358 2 1	1,724 2 1	40 8	8 11 5
2	Mt. Ida	157	129 10 0	109 15 9	...	109 15 9	13 23	2 19 4
24	Norseman	1,750·5	949 7 0	804 14 9	342 5 13	1,146 19 22	13 2	2 15 7
27	Ora Banda	1,129·75	729 11 12	618 8 14	248 15 12	867 4 2	15 8	3 5 2
6	Payne's Find	900·5	1,352 17 0	1,146 15 0	77 12 10	1,224 7 10	27 4	5 15 5
29	Peak Hill	1,587	834 11 0	707 8 4	255 3 8	962 11 12	12 3	2 11 6
26	Sandstone	925	905 1 0	767 3 9	300 0 7	1,067 3 16	23 1	4 17 11
13	Warriedar	661·5	193 10 0	164 0 9	117 18 22	281 19 7	8 12	1 16 2
13	Wiluna	689·5	786 8 0	666 11 19	797 8 6	1,464 0 1	42 11	9 0 5
3	Youanme	295	191 16 0	162 11 14	68 13 21	231 5 11	15 16	3 6 6
382		16,274·75	15,001 16 12	12,716 7 13	4,307 17 17	17,024 5 6	20 22	4 8 11

SCHEDULE 6.

Expenditure from C.R. Vote and Loan Expenditure Fund on Erection of State Batteries for Year 1928, *and totals since inception.*

Battery.	From Revenue.	From Loan.
	£ s. d.	£ s. d.
Coolgardie	..	50 0 0
Payne's Find	..	553 10 1
Peak Hill	..	443 14 6
Marble Bar	..	16 14 8
Bamboo Creek	..	97 5 3
Peak Hill—General overhaul	..	74 15 10
		1,236 0 4
Erection of State Batteries:—		
Expenditure to 31st December, 1907	91,981 1 8	
Loan Expenditure to 31st December, 1927 ..	..	319,348 3 7
	£91,981 1 8	320,584 3 11
	£412,565 5 7	

SCHEDULE 7.

Direct Purchase for Tailing for Year 1928.

Battery.	Tons.	Amount.
		£ s. d.
Bamboo Creek	413.5	429 10 5
Boogardie	929.25	764 4 1
Coolgardie	1,484.5	1,251 17 5
Cue	1,219.0	531 9 11
Meekatharra	483.75	627 9 1
Norseman	1,575.25	790 17 0
Ora Banda	705.25	387 12 6
Peak Hill	651.25	213 4 0
Sandstone	767.25	592 6 0
St. Ives	181.5	55 11 8
Warriedar	423.5	282 12 11
Wiluna	350.5	1,286 9 4
Youanme	250.5	118 8 2
	9,435	£7,331 12 6

SCHEDULE 7A.

Return showing Tailing payable and unpayable and Gross Contents for 1928.

Battery.	Tailing payable.		Tailing Unpayable.		Totals.	
	Tons.	Gross Contents.	Tons.	Gross Contents.	Tons.	Gross Contents.
		ozs. dwts. grs.		ozs. dwt. grs.		ozs. dwt. grs.
Bamboo Creek	413·5	191 10 8	22	2 4 0	435·5	193 14 8
Boogardie	1,034	390 6 22	264	26 16 18	1,298	417 3 16
Coolgardie	1,644·75	642 1 1	201·75	18 2 12	1,846·5	660 3 13
Cue	1,381·25	409 8 11	819·75	61 7 13	2,201	470 16 0
Marble Bar	166	46 2 19	...	...	166	46 2 19
Meekatharra	720	357 12 16	6·25	0 9 9	726·25	358 2 1
Mt. Ida	133·5	45 8 13	...	...	133·5	45 8 13
Norseman	1,322·25	325 0 11	165·25	17 5 2	1,487·5	342 5 13
Ora Banda	748·75	229 5 6	210·25	19 10 6	959	248 15 12
Payne's Find	...	...	765·75	77 12 10	765·75	77 12 10
Peak Hill	1,049	231 14 6	296·5	23 9 2	1,345·5	255 3 8
Sandstone	766·5	300 0 7	...	...	766·5	300 0 7
Warriedar	290	91 18 7	271·75	26 0 15	561·75	117 18 22
Wiluna	549	794 13 0	37	2 15 6	586	797 8 6
Youanme	250·5	68 13 21	...	...	250·5	68 13 21
	10,469	4,123 16 4	3,060·25	275 12 21	13,529·25	4,399 9 1

SCHEDULE 8.

Statement of Receipts and Expenditure for the Year ended 31st December, 1928.

MILLING AND TIN.

Plant.	Tonnage.	Management.	Wages.	Stores.	Total Working Expenditure.	Cost per ton.	Repairs and Renewals.	Sundries.	Gross Expenditure.	Cost per ton.	Receipts.	Per ton.	Profit.	Loss.
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	s. d.	£ s. d.	£ s. d.	£ s. d.	s. d.	£ s. d.	s. d.	£ s. d.	£ s. d.
Bamboo Creek	514	82 19 4	333 7 7	129 5 8	555 12 7	21 7·44	56 4 5	73 6 3	685 3 3	26 7·92	269 17 0	10 6	...	415 6 3
Boogardie	1,526·25	180 10 7	533 12 4	462 16 4	1,176 19 3	15 5·06	39 0 1	165 5 6	1,381 4 10	18 1·17	699 2 9	9 1·93	...	682 2 1
Coolgardie	2,274·5	360 16 11	642 2 1	594 16 7	1,597 15 7	14 0·57	266 14 3	414 11 3	2,279 1 1	20 0·48	1,136 5 7	9 11·88	...	1,142 15 6
Cue	2,812·5	299 12 2	749 7 2	679 4 0	1,728 3 4	12 3·45	88 5 2	266 7 9	2,082 16 3	14 9·72	1,170 12 8	8 3·88	...	912 3 7
Laverton	...	...	...	6 4 0	6 4 0	...	...	...	6 4 0	...	1 6 6	...	...	4 17 6
Leonora	...	...	...	...	...	...	...	1 5 0	1 5 0	...	...	...	...	1 5 0
Linden	...	...	...	5 18 6	5 18 6	...	...	1 10 8	7 9 2	...	15 7 5	...	7 18 3	...
Marble Bar	197	94 10 9	192 15 1	120 3 0	407 8 10	41 4·32	65 4 2	50 2 3	522 15 3	53 0·84	103 19 0	10 6·64	...	418 16 3
Meekatharra	854·75	195 17 0	419 15 11	297 16 6	913 9 5	21 4·32	225 6 8	257 3 0	1,395 19 1	32 7·92	410 16 4	9 7·34	...	985 2 9
Mt. Ida	157	261 7 6	84 11 7	52 3 8	398 2 9	50 8·61	3 17 6	40 14 11	442 15 2	56 4·80	82 8 6	10 6·0	...	360 6 8
Mt. Sir Samuel	...	...	...	0 15 7	0 15 7	...	...	...	0 15 7	...	5 15 7	...	5 0 0	...
Norseman	1,750·5	321 13 4	606 6 0	567 10 2	1,495 9 6	17 1·03	208 10 7	215 13 11	1,919 14 0	21 11·04	724 17 11	8 3·38	...	1,194 16 1
Ora Banda	1,129·75	309 17 8	344 12 2	225 13 11	880 3 9	15 6·98	80 13 0	143 8 10	1,074 5 7	19 0·21	382 14 5	6 9·31	...	691 11 2
Payne's Find	900·5	109 14 1	313 0 6	273 17 6	696 12 1	15 5·65	195 12 1	136 9 0	1,028 13 2	22 10·08	472 15 3	10 6	...	555 17 11
Pingin	...	...	...	...	...	...	...	...	...	...	10 0 0	...	10 0 0	...
Peak Hill	1,587	135 6 2	521 18 7	236 10 2	893 14 11	11 3·14	37 5 7	337 6 6	1,268 7 0	15 11·80	647 15 2	8 1·94	...	620 11 10
Sandstone	925	184 11 10	433 4 6	297 1 6	914 17 10	19 9·37	111 9 9	139 2 8	1,165 10 3	25 2·40	489 13 3	10 7·03	...	675 17 0
St. Ives	...	4 15 0	53 14 5	13 11 8	72 1 1	...	...	5 1 3	77 2 4	...	...	...	...	77 2 4
Tuckanarra	...	...	...	...	...	...	...	...	...	...	13 8 0	...	13 8 0	...
Warriedar	661·5	66 15 11	216 11 6	127 17 10	411 5 3	12 5·20	41 4 0	73 10 11	526 0 2	15 10·84	333 10 0	10 0·98	...	192 10 2
Wiluna	689·5	83 1 6	265 18 2	129 11 6	478 11 2	13 10·57	156 7 11	241 3 4	876 2 5	25 4·96	303 7 4	8 9·58	...	572 15 1
Yarri	...	...	52 5 11	...	52 5 11	...	...	2 13 8	54 19 7	...	6 0 0	...	...	48 19 7
Youanme	295	29 8 0	115 10 10	151 2 9	296 1 7	20 0·86	14 17 3	21 3 6	332 2 4	22 6·24	132 9 3	8 11·76	...	199 13 1
	16,274·75	2,720 17 9	5,878 14 4	4,382 0 10	12,981 12 11	15 11·42	1,560 12 5	2,586 0 2	17,128 5 6	21 0·48	7,412 1 11	9 1·29	36 6 3	9,752 9 10
Tin Plant.														
Greenbushes	...	...	25 2 7	...	25 2 7	...	...	...	25 2 7	...	5 0 0	...	...	20 2 7
	16,274·75	2,720 17 9	5,903 16 11	4,382 0 10	13,006 15 6	15 11·78	1,560 12 5	2,586 0 2	17,153 8 1	21 0·96	7,417 1 11	9 1·36	36 6 3	9,772 12 5

SCHEDULE 9.

Statement of Receipts and Expenditure for Year ended 31st December, 1928.

TAILING.

Plant.	Tonnage.	Management.	Wages.	Assays.	Stores.	Total Working Expenses.	Cost per ton.	Repairs and and Renewals.	Sundries.	Gross Expenditure.	Cost per ton.	Receipts.	Per ton.	Profit.	Loss.
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	s. d.	£ s. d.	£ s. d.	£ s. d.	s. d.	£ s. d.	s. d.	£ s. d.	£ s. d.
Bamboo Creek ...	550	70 0 1	195 0 0	17 3 8	60 17 0	343 0 9	12 5·68	...	76 18 7	419 19 4	15 3·24	272 11 2	9 10·92	...	147 8 2
Boogardie	858	50 0 0	156 6 4	18 7 8	113 8 3	338 2 3	7 10·57	15 5 3	68 8 6	421 16 0	7 9·98	465 12 9	10 10·24	43 16 9	...
Coolgardie	2,592	73 11 11	521 11 8	46 16 1	159 17 5	801 17 1	6 2·23	23 19 5	184 15 7	1,010 12 1	7 9·57	1,546 16 10	11 11·23	536 4 9	...
Cue	2,297	134 16 4	392 7 0	21 0 10	144 11 11	692 16 1	6 0·38	79 3 3	182 12 2	954 11 6	8 3·74	1,223 0 2	10 7·77	268 8 8	...
Meekatharra... ...	445	64 1 11	107 8 11	16 15 4	34 9 6	222 15 8	10 0·14	...	24 10 6	247 6 2	11 1·36	335 2 5	15 0·73	87 16 3	...
Norseman	1,917	155 9 9	485 2 9	33 9 2	184 16 9	858 18 5	8 11·53	147 15 6	127 10 10	1,134 4 9	11 9·98	927 4 2	9 8·06	...	207 0 7
Ora Banda ...	1,188	88 7 7	305 8 2	19 2 10	140 17 3	553 15 10	9 3·86	...	86 18 10	640 14 8	10 9·43	431 17 5	7 3·24	...	208 17 3
Payne's Find ...	...	...	...	...	...	...	...	...	0 8 5	0 8 5	...	52 6 7	...	51 18 2	...
Peak Hill ...	1,388	70 0 8	322 3 0	3 14 0	90 16 8	486 14 4	7 1·65	6 0 3	99 19 0	592 13 7	8 6·48	399 18 10	5 9·14	...	192 14 9
Sandstone	2,430	148 7 7	583 3 9	63 11 0	212 18 5	1,008 0 9	8 3·55	9 18 6	165 9 0	1,183 8 3	9 8·88	1,769 6 9	14 6·74	585 18 6	...
St. Ives	...	...	...	...	...	...	...	...	...	...	...	19 1 1	...	19 1 1	...
Warriedar	702	32 8 1	136 7 6	47 14 8	106 15 5	323 5 8	9 2·52	12 12 1	77 17 6	413 15 3	11 9·45	339 13 10	9 8·13	...	74 1 5
Wiluna	1,107	96 16 7	352 1 1	29 4 8	119 19 6	598 1 10	10 9·64	53 6 2	95 17 2	747 5 2	13 6·0	948 12 1	17 1·65	201 6 11	...
Yarri	...	...	...	...	...	...	...	...	1 19 0	1 19 0	...	10 10 6	...	8 11 6	...
Transfer from Revenue Suspense Account	...	...	...	...	...	...	...	...	...	...	...	400 0 0	...	400 0 0	...
	15,474	984 0 6	3,557 0 2	316 19 11	1,369 8 1	6,227 8 8	8 0·57	348 0 5	1,193 5 1	7,768 14 2	10 0·49	9,141 14 7	11 9·79	2,203 2 7	830 2 2

SCHEDULE 10.

Balance Sheet, December 31st, 1928.

	£ s. d.		£ s. d.	£ s. d.
To Capital Expenditure—		By Batteries, Tailing and		
From General Loan Fund ..	320,584 3 11	Slimes Plants ..	412,565 5 7	
„ Consolidated Revenue ..	91,981 1 8	Less Depreciation	359,413 1 10	
	412,565 5 7			53,152 3 9
To Treasury	180,584 16 2	By Stores		10,000 11 5
„ Interest Sinking Fund	423,934 14 6	„ Sundry Debtors		3,074 13 8
„ Sundry Creditors	1,560 14 4	„ Profit and Loss Account ..		952,418 1 9
	£1,018,645 10 7			£1,018,645 10 7

Profit and Loss Account.

	£ s. d.		£ s. d.
To Expenditure	1,527,659 8 4	By Revenue	1,358,589 2 11
		„ Loss on Working carried down..	169,070 5 5
To Loss on Working brought down ..	169,070 5 5		1,527,659 8 4
„ Interest at 3½ per cent. and Sinking Fund at 1¼ per cent. on Capital Expenditure ..	423,934 14 6		
„ Depreciation	359,413 1 10		
	£952,418 1 9	By Gross Loss	£952,418 1 9

SCHEDULE 11.

Working Profit and Loss Account for Year ended December 31st, 1928.

	£ s. d.		£ s. d.
To Working Expenditure—		By Revenue—	
Batteries and Tin Plant	17,153 8 1	Batteries and Tin Plant	7,417 1 11
Tailing Plant	7,768 14 2	Tailing Plants	9,141 14 7
		Loss on Year's operations ..	8,363 5 9
	£24,922 2 3		£24,922 2 3

SCHEDULE 12.

State Battery Statistics from Inception to 31st December, 1928.

Year.	Milling.				Sand and Tailing Treatment.				Slime Treatment.				Tin Treatment.				Gross Loss. ‡
	Tons.	Expenditure per ton.	Revenue per ton.	Loss.	Tons.	Expenditure per ton.	Revenue per ton.	Profit.	Tons.	Expenditure per ton.	Revenue per ton.	Loss.	Tons.	Expenditure per ton.	Revenue per ton.	Loss.	
		s. d.	s. d.	£		s. d.	s. d.	£		s. d.	s. d.	£		s. d.	s. d.	£	£
1899 ...	18,806	...	...	2,827	...	...	...	...	...	...	...	...	...	...	...	...	2,827
1900 ...	22,675	22 10·1	17 4·5	7,611	...	...	...	...	...	...	...	...	...	...	...	...	7,611
1901 ...	26,775	18 0·0	16 6·0	1,983	9,534	16 9	...	1,337	...	...	...	...	...	...	...	...	646
1902 ...	39,516	14 8·6	14 8·2	169	9,721	22 3	...	724	...	...	...	...	1,170	12 2	...	286	†269
1903 ...	49,233	13 6·8	12 10·6	1,250	33,369	7 7	...	1,442	...	...	...	...	2,009	8 2	...	153	†2,539
1904 ...	71,616	14 4·4	12 6·5	6,423	43,251	7 10	...	1,448	...	...	...	...	2,337	8 2	...	165	5,141
1905 ...	85,018	12 4·0	12 2·5	957	54,420	7 3	9 8·5	6,689	7,028	12 1	...	410	3,697	5 8	5 0·3	324	†3,342
1906 ...	95,831	12 2·0	11 3·8	4,076	65,159	7 4	9 2·1	5,549	4,737	11 8	12 1·1	†2,254	11,428	4 2	4 3·3	†156	†2,880
1907 ...	95,280	12 6·0	11 4·8	8,724	64,514	6 8·7	9 2·8	6,474	8,220	8 7·6	13 5·5	†1,983	10,496	4 4·4	4 8·8	†191	1,688
1908 ...	95,628	12 1·9	9 3·6	13,669	62,272	6 4·7	8 11·0	8,017	5,818	12 0·9	11 8·0	120	5,573	4 5·2	3 6·3	254	7,278
1909 ...	94,218	11 1·7	9 6·6	7,568	61,032	6 5·8	8 9·7	7,096	16,848	10 0·7	9 6·7	423	5,043	4 8·2	3 7·5	267	1,965
1910 ...	89,278	11 3·3	9 6·6	7,709	43,391	6 2·9	8 6·1	4,903	28,600	8 9·1	9 11·5	†1,723	3,769	5 5·5	3 4·1	401	2,365
1911 ...	59,373	12 6·9	9 10·3	8,058	27,362	6 5·9	8 9·7	3,173	28,183	10 10·5	9 5·3	1,666	6,061	4 0·3	3 4·9	188	7,490
1912 ...	56,636	12 9·2	9 8·7	8,616	18,600	8 3·5	8 8·6	397	8,085	11 8·6	10 5·2	519	5,330	4 5·1	3 7·6	210	9,786
1913 ...	60,573	12 5·6	9 5·4	9,155	31,378*	7 5·0	9 5·2	3,160	6,089	12 4·1	9 6·1	862	8,032	5 5·1	4 1·7	513	7,711
1914 ...	56,570	12 6·8	9 2·9	9,413	38,942	6 6·5	8 2·2	3,202	6,246	10 10·2	9 0·0	578	3,340	7 10·6	4 6·6	557	7,418
1915 ...	49,595	11 10·7	9 2·6	6,642	31,887	6 9·3	8 0·6	2,041	3,454	12 6·2	9 10·1	462	1,767	8 1·2	3 11·7	364	5,415
1916 ...	47,304	12 6·7	9 1·9	8,018	35,665	7 1·7	8 7·3	2,510	15,536	8 8·2	8 7·3	56	943	11 11·6	4 0·3	374	5,982
1917 ...	42,947	12 1·5	9 0·0	6,714	24,674	8 3·3	8 10·3	727	15,408	9 8·5	8 3·1	1,104	1,118	11 2·9	3 8·2	422	7,554
1918 ...	39,330	13 2·9	8 11·4	8,442	24,364	8 3·7	9 5·7	1,420	11,892	9 4·8	7 9·0	982	5,985	4 10·2	3 0·2	558	8,650
1919 ...	40,290¾	12 4·1	8 2·0	8,426	15,764	9 2·4	9 3·8	91	12,780	9 1·1	7 4·6	1,089	1,204	10 0·9	3 11·2	369	9,925
1920 ...	46,494¼	12 6·4	7 11·5	8,954	15,437	9 0·4	13 4·1	3,325	11,525	9 11·2	8 8·4	713	737	8 11·2	9 3·3	†12	6,363
1921 ...	34,761	17 3·8	9 0·7	14,361	19,763	10 0·8	17 10·0	7,677	7,370	10 11·6	8 5·7	918	54	82 0·5	8 0·4	200	7,802
1922 ...	35,722	16 11·8	9 2·3	13,862	24,234	9 11·7	15 8·9	6,988	7,492	11 10·5	8 5·8	1,271	...	...	...	55	8,200
1923 ...	29,714	17 0·4	9 6·8	11,044	14,307	11 5·5	14 2·1	1,943	8,848	11 1·3	8 11·7	945	...	...	...	26	10,072
1924 ...	18,063	21 0·1	10 9·5	9,231	19,767	10 8·6	10 7·8	§69	4,615	12 4·1	8 7·6	854	392	13 4·8	3 7·7	192	10,346
1925 ...	18,361¼	22 7·4	10 8·5	10,768	14,289	11 6·6	16 2·1	3,301	...	...	...	...	268	12 6·5	3 8·6	118	7,585
1926 ...	17,104¼	23 9·3	9 7·5	12,113	16,122	11 5·7	13 8·2	1,780	...	...	...	...	...	...	...	46	10,379
1927 ...	21,062¼	20 2·1	10 2·0	10,543	16,915	10 2·0	12 8·4	2,135	...	...	...	...	207	9 6·3	4 3·1	54	8,462
1928 ...	16,274¾	21 0·4	9 1·2	9,716	15,474	10 0·4	11 9·7	1,373	...	...	...	...	...	...	...	20	8,363

* Tailing Treatment commenced 1913. † Profit. ‡ Details of Ore dressing and Residue Treatment not shown, but financial result included in the figure of this column. § Loss.

DIVISION IV.

ANNUAL PROGRESS REPORT

of the

GEOLOGICAL SURVEY

for the

YEAR 1928.

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Annual Progress Report of the Geological Survey for the Year 1928.

I have the honour to submit for the information of the Hon. the Minister for Mines my report on the work carried out by the officers of the Geological Survey for the year 1928.

STAFF.

There has been no alteration in the personnel of the professional officers, which comprises one Field Geologist, one assistant Field Geologist, a half time Petrologist and his assistant.

Mr. Glover, clerk-in-charge, having passed his final examinations in Accountancy, was transferred to the Crown Law Department.

His position was filled by Miss F. Armstrong, B.Sc. The benefit and economy effected by the clerk-in-charge possessing a scientific training in Geology has been amply evidenced in the production of a card catalogue of the Geological literature of the State, for author, subject, and locality, the collecting of the necessary and relevant data for reports, preparing maps for reports, editing and the ability to reply to much of the technical correspondence and every day enquiries.

FIELD WORK.

On the fifth January, in company with the Secretary for Mines, I attended a conference in Hobart, the main purposes of the meeting being to discuss Geophysical methods of prospecting and particularly to decide which were the best fields for active experimental work. We returned to Perth on January 27th.

At the latter end of February I visited Eradu to lay out fresh bore sites and make a survey setting out the relative elevations of the coal seams already cut in the first series of bores.

Continuing from Eradu I went to the Braeside Mineral Belt and fixed ten bore sites in positions to test the main lines of lead lodes at depths of from 250-400 feet.

Leaving Perth on May 8th in company with the Secretary for Mines I attended a second Geophysical Conference in Melbourne. I also attended the Geological Conference held at Adelaide a few days later. Minutes of these two meetings have been supplied by the Secretaries of the Conferences. I returned to Perth on June 3rd.

From June 3rd to August 24th my duties kept me in Perth attending to accumulated correspondence and preparing the Annual Report, etc. During the last days of August a trip was taken to the Fitzgerald River to sample the brown coal seam which had been partly developed.

On September 13th a second visit was paid to Braeside in connection with the boring there, and having completed that inspection I joined Dr. Woolnough at Port Hedland and travelled to the Freney Kimberley Oil Well at Poole Range to discuss the situation brought about by striking oil when boring in a wet hole.

Most of the month of November was occupied in sampling the alunite deposits at Lake Chandler, in company with Mr Bowley of the Government Analyst's Branch. These deposits were thoroughly sampled and my report is now waiting on the results of the analyses. A short break occurred in the work when I accompanied Mr. Broughton Edge to Ajana to inspect the lead deposits with the object of ascertaining their suitability or otherwise for geophysical investigations.

Early in December a short inspection was made of the Proprietary Coal Mine to ascertain whether a certain section of collapsed roof had left the surface unsafe for railway traffic. The final trip for the year was with R. Lockhart Jack while investigating the water question for the northern area set aside for the 3,500 Farm Scheme.

In addition to the foregoing, at the request of the Engineer-in-Chief, inspections were made of the Boya Quarry, Byford Brick Works, Canning No. 1 and No. 2 and Wongong reservoir sites. The text of those reports, which were not made for purely departmental purposes, is attached hereto.

F. R. Feldtmann and K. J. Finucane, B.Sc., Field Geologists.

Practically the whole of the time of these officers was spent in doing field work at Kalgoorlie for Dr. Stillwell, who was collecting data for a special report on the "Golden Mile."

Dr. C. O. G. Larcombe, Petrologist.

The greater part of the petrological work consisted of the examination of bore cores from Coolgardie, Mararoa G.M. Cue, Ajana, Big Bell Mine, Harbour Lights Gold Mine, Leonora, Sandstone, and Greenbushes. Some determinations were made of rocks collected in the Kimberley District by the Government Geologist and of various rock specimens submitted by the public generally.

T. A. BLATCHFORD, B.A.,
Government Geologist.

THE GEOLOGY OF THE TWO AREAS SET ASIDE FOR THE DEVELOPMENT OF THE 3,500 FARMS, PARTICULARLY WITH REGARD TO A WATER-BEARING ASPECT.

T. Blatchford, B.A., Government Geologist.

Geology.—Portions only of the area under discussion have been geologically surveyed in detail, the boundaries of the various rock formations being set out on the plans in Bulletin 71.

Broadly speaking, most of the two areas lies on a slightly elevated tableland consisting essentially of granites which have been intruded by narrow belts of more basic rock, which in turn have been intruded by later granites. Remnants of very old sediments undoubtedly of Pre-Cambrian age, also occur but are of no great importance to the question involved.

Apparently the whole of the area remained above sea level between Pre-Cambrian and Miocene times. During the latter period a submergence took place, for undoubted remnants of Miocene beds can be found as far north as Kojonup and Widgiemooltha. How much further the ocean may have crept in is not definitely known, but it is highly probable that the submergence extended much further north than the localities named.

Following Miocene times the whole area gradually rose and no doubt the depressions were left filled with sea water which on evaporation deposited considerable quantities of salts. The extreme salinity of the underground waters in the "dry" lake channels is probably largely due to this residual salt. Most of the salt in the underground waters, however, is in my opinion derived from the southern winds which are most persistent during the summer months. Right along the south coast the rusting of ironwork is most pronounced and is without doubt due to the salt in the air. Furthermore, all the rivers which flow south are more or less intensely salt. It would be difficult to imagine that the salt in these streams was derived from the residuals of the Miocene sea, seeing that most of the Miocene beds have been completly removed from the catchments, and the underlying rocks, though they may store water, are most unsuitable for water circulation. It should also be noted that the ratios of the various salts in the underground waters is very close to those of average sea water.

Summing up the geological evidence as far as it may be applied to underground water supplies, the main factors appear to be the low rainfall, absorption by vegetation and intense evaporation during the summer months. The area is essentially a granite tableland covered with shallow superficial deposits. In the depressions, particularly the "dry" lake areas, the underground waters are intensely charged with salt, the salt being possibly partly derived from the Miocene sea waters, but mostly from cyclic salts.

Cyclic salts from the southern winds are being constantly deposited, though no doubt this gradually falls off as we proceed north.

Under these conditions it is hardly to be expected that the area would contain extensive fresh surface or underground water supplies, and such do not occur. There are no permanent surface water supplies, either salt or fresh. The records of underground waters in the greenstones and Pre-Cambrian strata show the supply at times to be appreciable, but the water is invariably salt. Instances such as at Westonia show that salt water is to be expected in abundance in any extensive depression in the granite where there is no circulation of the water. In the instance quoted one mine alone pumped 60,000 gallons per hour for several years.

There are, however, limited supplies of fresh underground water, and such have been found almost invariably in the drainages from the higher portions of the granite, particularly where there has been a concentration of circulating water into a channel. Experience shows also that as the distance from the granite catchment becomes greater the salinity of such water increases.

Fresh water has been found in isolated instances along the coastal area, rising to the surface or in shallow wells. Such occurrences can be traced to local and very limited catchments where there is a free drainage. There is, however, a possibility of obtaining limited supplies by closer study of similar condtions.

As a whole, however, the fresh water supplies must be looked for in the surface deposits which have been charged with rain waters flowing from granite and to a much lesser degree, greenstone catchments.

BORING FOR COAL AT ERADU.

T. Blatchford, B.A., Government Geologist.

The Bores.—For convenience sake the boring at Eradu may be best divided into at least two sections: (a) those west of the Greenough River, (b) those lying to the east of the river.

Western Section.—Two calyx bores, Nos. 1 and 2, are in this section. In No. 1 bore the top coal seam was struck at a depth of 170 feet; in the second the same seam was struck at a level 43 feet higher. The rock cores agree more or less in these two bores and I have no doubt that the same strata has been met with in both. Fourteen chains north of the railway bridge and on the western bank an outcrop of rock is exposed which is very similar to the core from 90 feet in the No. 2 Bore. Taking this spot and the 90 feet level in the bore, the levels agree, so that if the two strata are the same, the strike must be somewhere in the direction of north west and south east. As far as I could ascertain (and the readings are in no way to be considered accurate) the dip of the outcrop on the river bank varies from west to south west, which is confirmatory as to the north west strike. It is therefore reasonable for the present to assume that the strata on the western side of the Greenough dips to the south-west and strikes north-west and south-east.

Eastern Section.—There are three calyx bores and four hand bores in this section. The plan of reduced levels shows that the top seam in No. 4 calyx and Nos. 1, 3 and 4 hand bores was struck at practically the same level while in the second calyx bore it was met at a depth of 10 feet greater. There was no trace of coal reported in either No. 2 hand bore or No. 3 calyx, which has now reached a depth of 785 feet. I can notice a slight similarity between the cores of No. 4 calyx and those of Nos. 1 and 2 calyx, but none between those of No. 3 calyx and either of the first three. No. 3 bore has been a disappointment and the absence of coal is apparently due to faulting. This bore has also been very troublesome to the drillers from 300 feet down to the present (785 feet). Practically no core has been obtained from the last 500 feet, and the enormous heap of sand testifies to the amount of pumping which has been necessary to set in the casing. The last two days the bore has been in shale and progress may improve from now on, but it is doubtful whether the casing will not be seized again by the loose sand coming from the sides.

On the plan showing the positions of the bores a spot has been marked some 3½ miles up the river from the railway, where there is a distinct outcrop of shales, and scattered pices of coal were also found. The shales are overlain by three distinct beds of conglomerates embedded in a coarse gritty sandstone. The shale beds were too much covered up with talus to permit an accurate observation to be taken for strike and dip, though it is evident the dip is to the westward, probably south-westward. If the dip of these beds continues to the south-westward and the angle continues the same or increases, none of the present bores has gone deep enough to reach them unless there is unknown faulting.

— PLAN SHEWING BORE SITES —

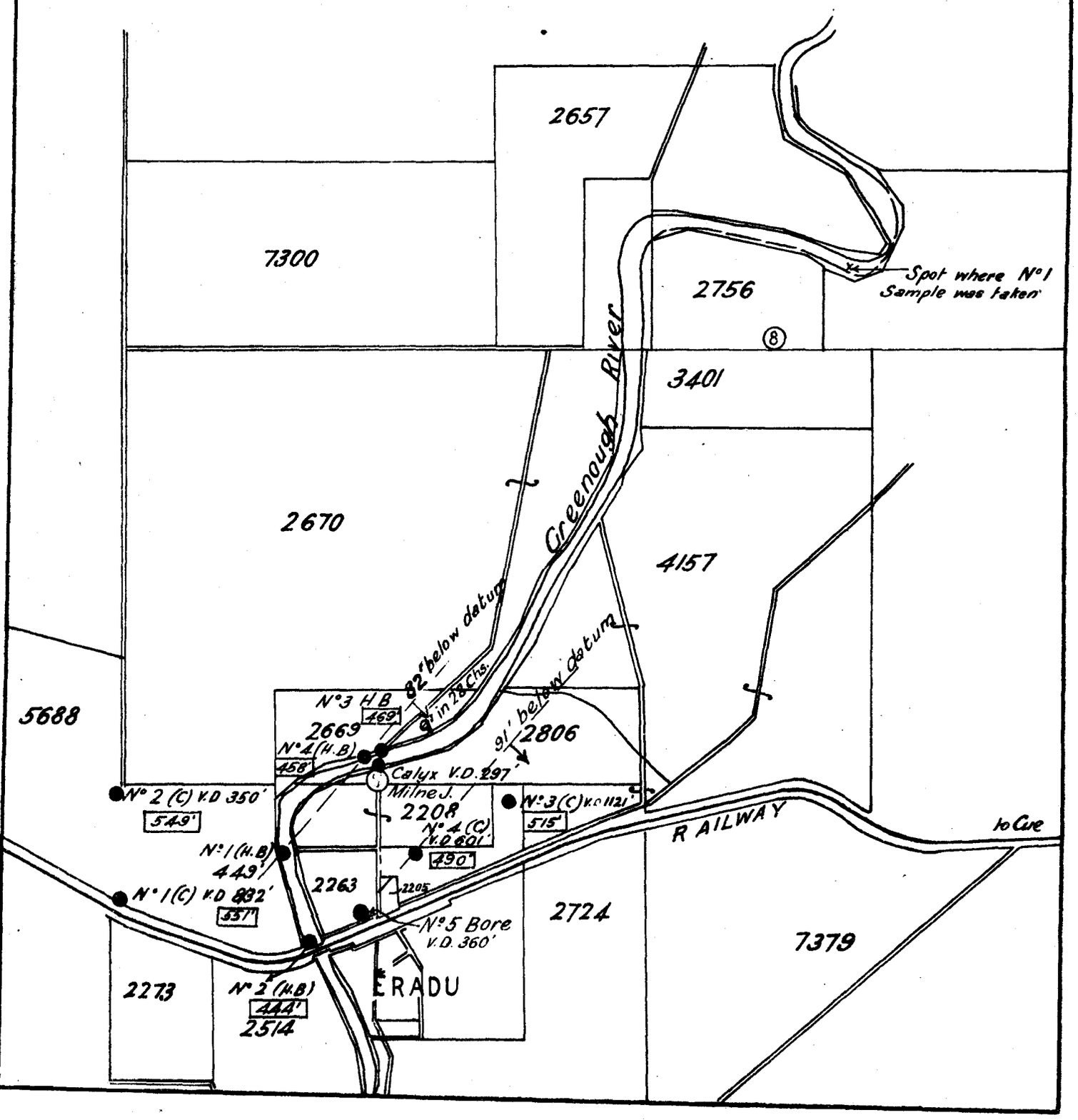
— AT —

— ERADU —

— Scale:- 40 Chains - 1 Inch —

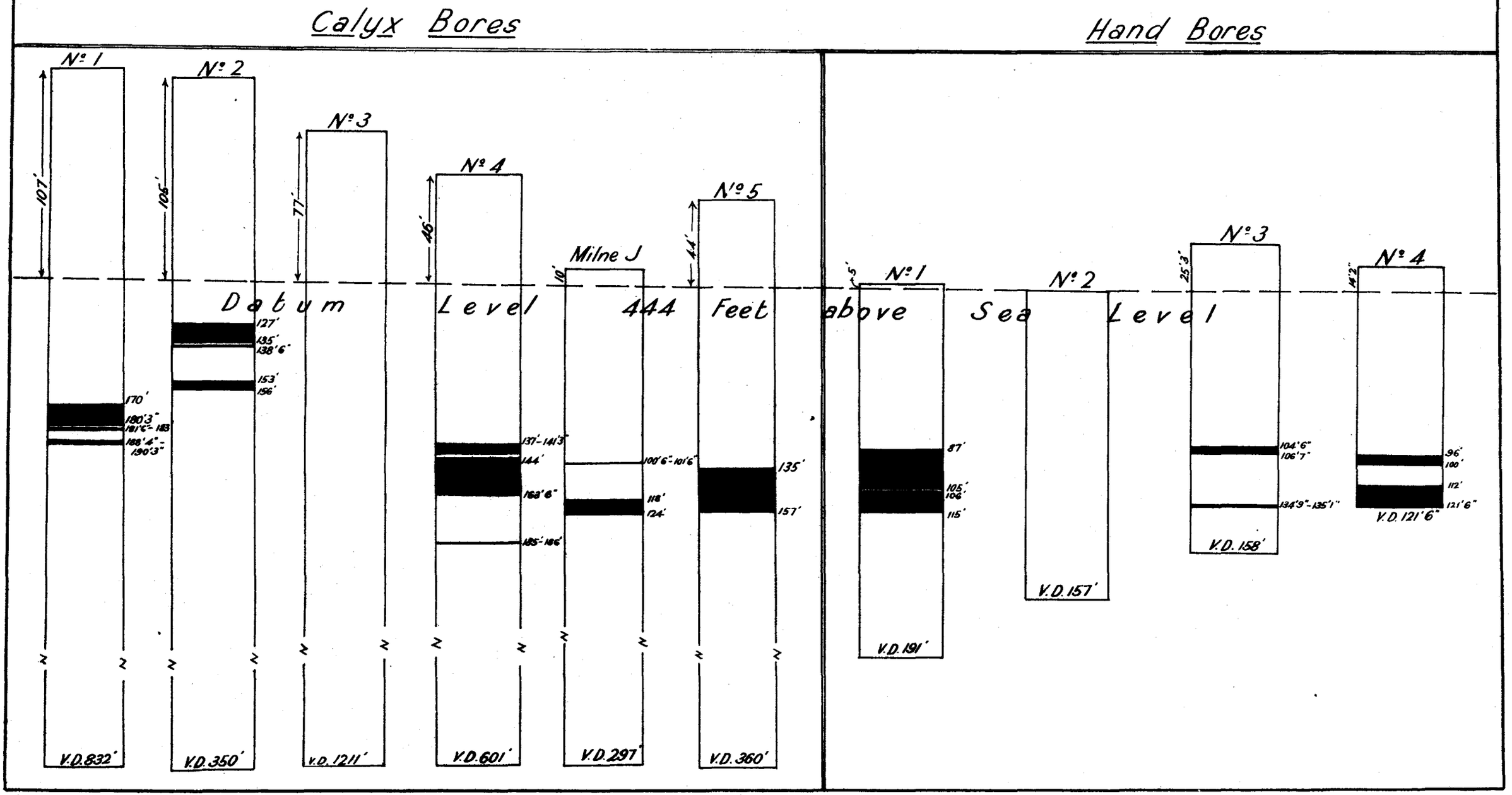
— LEGEND —

⑥ Bore Sites Suggested
523' Height above Sea Level
(C) Calyx
(H.B) Hand Bore
(V.D) Vertical Depth



Plan Shewing Surface Level of Bores at Eradu & Thickness & Relative Depths of Main Coal Seams

— Vertical Scale :- 60 Feet = 1 Inch —



With regard to the No. 2 section it appears to me, on the evidence we now possess, that there is a strong probability of the strata being more or less horizontal in this area, but that faulting has occurred somewhere in the vicinity of No. 1 hand bore and also between Nos. 3 and 4 calyx bores.

To test the coal seams further the following boring should be undertaken:—

(a). In the western section the dip and strike should be definitely decided by a bore placed say 20 chains on the river side of No. 1 calyx bore, near the railway line, and on a surface level of 523 feet. Coal should be struck here at between 150 and 200 feet. If successful a second bore much farther out on the dip should be put down to test the value of the seams at depth. The picking of the second site had best be deferred until the third bore is completed.

(b). In the eastern section the position is not so clear. I would like much to see one bore put down near the old calyx bore to test the seams more accurately, for there is too great a discrepancy in the logs of this and Nos. 3 and 4 hand bores to be satisfactory. As No. 2 hand bore failed to reveal coal, a calyx bore, say to 200 feet deep, should be put down somewhere between the Eradu siding and railway bridge to prove definitely what the dip and strike is and whether the coal seams continue in this direction.

As No. 3 bore is at present going through a strata not previously met with, this bore had best be continued, for if once abandoned it will surely fall in. In this case much will depend on whether drilling can be continued.

(c). Before removing the plant a hole should certainly be placed to go through the shales and coal seams on Block 2756.

Since writing the foregoing No. 5 bore has struck the main coal seam at 135 feet or 91 feet below datum level.

This is the same depth at which the seam was cut in No. 4 bore and so defines the strike as N.E. S.W. Coal was struck in No. 1 and No. 4 hand bores at 82 feet below datum and in No. 3 hand bore at 79 feet. The strike defined by these hand bores is so close to that by the calyx bores 3 and 4 that it can reasonably be assumed to be accurate.

The coal seams therefore, on the east side of the river strike N.E. S.W. and dip at the rate of 9 feet in 28 chains.

BORING FOR MINERAL OIL AT POOLE RANGE (FRENEY KIMBERLEY OIL CO.).

T. Blatchford, B.A., Government Geologist.

In company with Dr. W. G. Woolnough, Geological Adviser to the Commonwealth Government, I visited the oil bore at Poole Range.

What has taken place is briefly as follows:—

After exploring the strata to 1,000 feet with a pilot hole a 10-inch bore was carried down to 1,683 feet and all the top waters were cased off at this point by cementing.

On resuming the boring with an 8-inch hole, after a short distance heavy water came in again and eventually rose to a level of 127 ft. from the surface. Whether this water was due to the cement failing, or whether it was a fresh-water horizon which was struck, is not certain. Boring was continued in a wet hole through varying strata to a depth of 2,085 feet, when an oil was noticed coating the cable and floating on the water. This oil "show" continued to a depth of 2,115 feet and then diminished; a recurrence, however, was noticed between depths of 2,117 and 2,131 feet, when boring was definitely suspended.

When the oil was first struck it was noticed that the water had fallen a depth of 15 feet in the bore, but it is not certain as to the exact time when this occurred. The water level gradually rose to the original level, viz. 127 feet.

When we arrived the 8-inch casing with the packer had been lowered into the hole, the packer being set in the casing at a depth of 2,025 feet. The bottom of the casing which was resting on the bottom had been perforated to allow water to flow in.

All attempts to lower the water by bailing or swabbing had failed. At all bailings while we were present the water raised contained undoubted "shows" of mineral oil.

An attempt was made by Dr. Woolnough to ascertain whether the packer was holding or not by pouring a concentrated brine solution down between the 10-inch and 8-inch casings and testing the water from the bottom of the 8-inch casing for salinity. Unfortunately the test failed. At present it is not possible to state where all the water in the bore is coming from, though it is certain that there is at least one flow above the oil sands struck at 2,085 feet.

There appears to be no doubt that genuine oil sands have been struck, but it would not be reasonable to suppose that any appreciable quantity of oil would flow into the bore with a head of water equivalent to some 800 lbs. to the square inch acting against it.

The oil, which has shown, more than probably represents a portion only of what was liberated during the actual drilling.

As it is apparent that every effort should be made to try and test out these undoubted oil sands in a dry hole, and as the apparatus required was not on the spot and the rainy season about to start, it was unanimously decided on the spot to mud up the bore to the bottom of the 10-inch casing and so stop water circulation and at the same time ensure the safety of the hole.

This will give time to obtain up-to-date expert advice and purchase of the necessary plant which may be decided on.

FITZGERALD BROWN COAL DEPOSITS.

T. Blatchford, B.A., Government Geologist.

A further visit was made to the Fitzgerald Coal Deposits to sample the seam cut in a new shaft. The coal seam was struck in this shaft at a depth of 10 feet from the surface and 9ft. 6in. of coal was exposed, with a further 3 feet of carbonaceous shale immediately underlying. Samples were taken as follows:—

From Shaft.

1. Carbonaceous shale or clay underlying coal seam over 3 feet.
2. Coal—0-2′ bottom section.

3. Coal—2-4′
4. Coal—4-6′
5. Coal—6-8′
6. Coal—8-9′ 6″ top section.

   Two samples were also taken from the opening on the north side of the shaft from which the bulk parcel is being broken.
7. Top section over 2′ 9″; bottom section over 2′ 9″. These two samples should indicate the value of the bulk sample.
8. Another sample of coal was taken from a bore put down on an outcrop, about one mile downstream from the shaft. The seam proved to be about 8 feet thick at this spot. Only one sample was taken here.

A second bore was started some 300 yards up the Susetta River, but failed to reach the coal seam. This was due to the fact that a bed of wet sand or friable sandstone was cut and there was no suitable casing sent with the boring tools.

I found numerous blocks of coal in the river bed about 1½ miles upsteam from the shaft, and have no doubt that the coal seam extends in that direction for a considerable distance.

If the reported results of the two old bores be accepted, there seems to be little doubt that there is an extensive deposit of brown coal, more or less proved, with possibilities of a far greater area lying to the east of the river.

The following were the results of the analyses:—

Wheeler's Shaft.

Laboratory No.	2869	2870	2871	2872	2873	2874
Mark	Clay 0ft. to 3ft. from bottom	0ft. to 2ft. bottom section	2ft. to 4ft.	4ft. to 6ft.	6ft. to 8ft.	8ft. to 8ft. 6in. top section
Proximate Analysis.						
	%	%	%	%	%	%
Moisture	15·10	33·08	42·32	42·24	42·45	37·64
Volatile matter (including combined water)	11·67	24·82	26·81	30·13	27·67	32·39
Fixed carbon	6·41	14 24	14·47	17·50	17·32	18·17
Ash	66·82	27·86	16·40	10·13	12·56	11·80
	100·00	100·00	100·00	100·00	100·00	100·00

DRIVE FROM NEAR BOTTOM OF SHAFT IN CENTRE OF DEPOSIT.

Laboratory No.	2875/28	2876/28
Mark	Top section over 2ft. 9in.	Bottom Section over 2ft. 9in.
Proximate Analysis—	%	%
Moisture	42·93	43 40
Volatile matter (including combined water)	28·26	23·45
Fixed carbon	16·39	14·63
Ash	12·42	18·52
	100·00	100·00
Destructive distillation yielded—		
Crude heavy oil (gallons per ton)	11·3	10·6
Residue	31·4	36·1
Proximate Analysis of Residue—		
Volatile matter	3·77	4·70
Fixed carbon	58·85	47·42
Ash	37·38	47·88
	100·00	100·00
On artificially dried coal—		
Crude heavy oil (gallons per ton)	20·3	18·8

BORE ON OUTCROP ONE MILE DOWN THE RIVER FROM WHEELER'S SHAFT, OPPOSITE OLD CAMP.

Laboratory No.—2877/28.

Proximate Analysis—	%
Moisture	15·73
Volatile matter (including combined water)	7·67
Fixed Carbon	3·60
Ash	73·00
	100·00

A parcel of 30 tons has been sent to England to be tested by the Dvorkovitz Hydrogenation Process. The results of these experiments are not yet to hand, and it will largely depend upon them whether the coal deposits can be put to economic use.

PETROLOGICAL WORK.

C. O. G. Larcombe, D.Sc.

The following petrological work has been carried out in this Department during the year 1928:—

a. Petrological examination of cores from the bores at Coolgardie.

b. Petrological examination of cores from the boring done on the Mararoa Gold Mine (Reedy's), Cue.

c. Petrological examination of cores from the bores put down at Ajana to test the lead deposits.

d. Petrological examination of cores from the bores on the Big Bell Mine, Cue.

e. Petrological examination of cores put down at the Harbour Lights Mine, Leonora.

f. Petrological examination of cores from the last of the boring at Sandstone.

g. Petrological examination of cores from the boring for tin at Greenbushes.

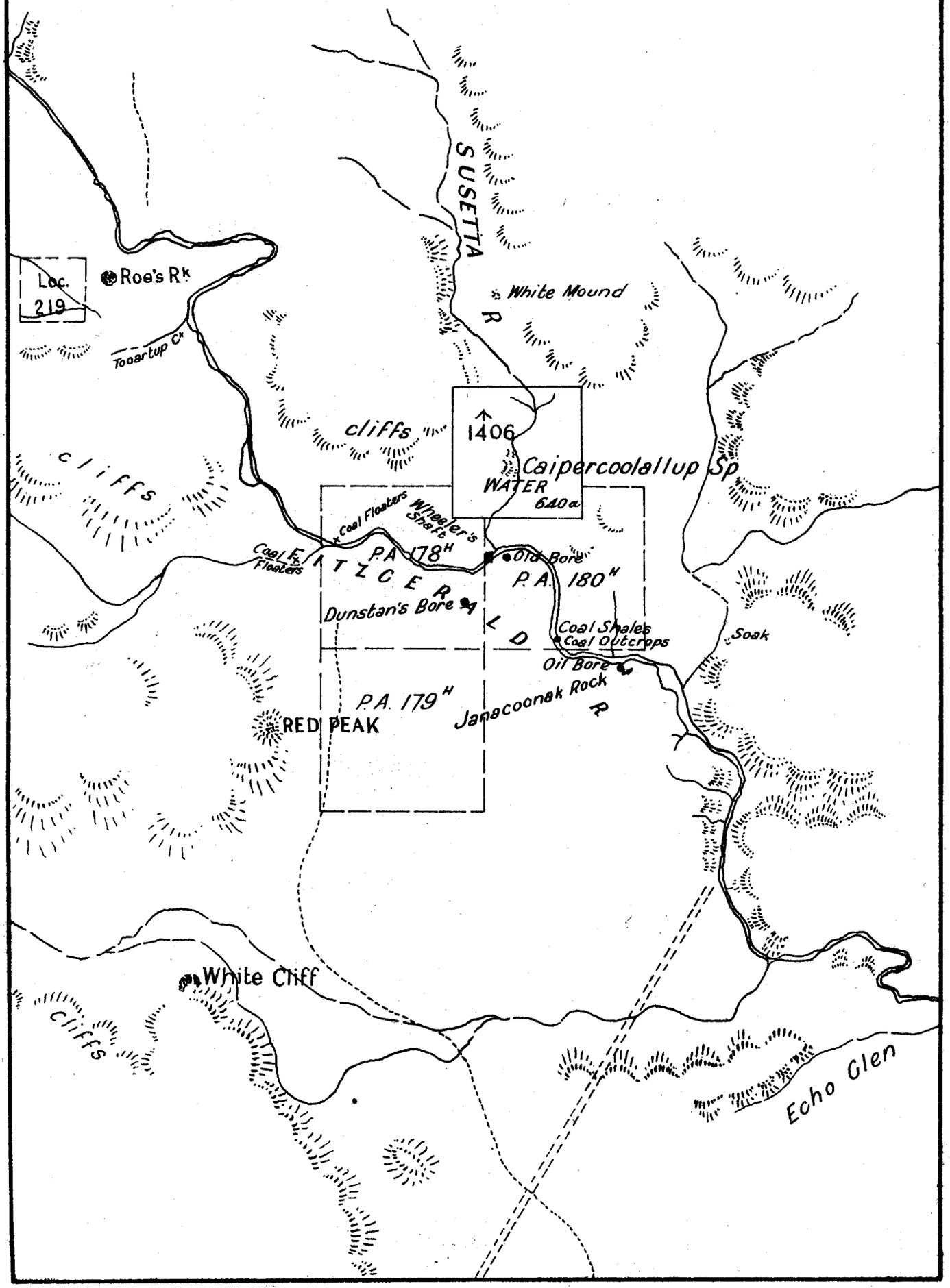
h. Petrological examination of rocks from the Kimberley Area.

i. Petrological examinations for the Department and the general public.

Plan Shewing Bore Sites at FITZGERALD RIVER

80 0 80 160

— Scale of Chains —



a.—BORING AT COOLGARDIE.

(Tindal's G.M.)

The No. 3 and No. 4 Bores—Final Report.

Boring was commenced at Coolgardie at the beginning of 1927. It was completed in August, 1928. Four bores were put down. The Nos. 1 and 2 bores were reported on and details—together with a plan showing bore sites, Plate X—in the Annual Report for 1927.

No. 3 Bore.

1. This was started 100 feet north of No. 2 Bore and drilled to a depth of 393ft. 4in., where a hole 17 feet across was encountered. Its angle of depression was 45° and direction westerly.

2. The record of rock formations met with is as follows:—

Depth in feet.	Nature of Rock.
0ft. to 67ft. 11in.	No core.
67ft. 11in. to 107ft. ...	Dense solid greenstone.
107ft. to 157ft. 8in.	Biotite-quartz rock.
157ft. 8in. to 357ft. ...	More or less massive greenstone—in part schisted.
357ft. to 391ft. 3in.	Powerful actinolite schist, really "channel" rock.
391ft. 3in. to 393ft. 4in.	Lode. White aplite, impregnated with iron pyrites.

3. *Assays.*—The only dyke met with in this bore was the pale pyritic aplite at 391ft. 3in. This rock consisted of pale aplite impregnated with fine-grained iron pyrites and traversed by quartz veinlets up to 3-10th inch wide. The dyke continued to 393ft. 4in. where the bore entered a hole and was stopped. The assay result of core between 391ft. 3in. and 393ft. 4in. was:—

Gold: 12dwt. 20gr. per ton.

From 107ft. to 157ft. 8in. is a weathered fine-grained clayey quartz-biotite rock not met with in the other bores. Only 2ft. 3in. of core was obtained from this rock, and in view of its different physical and mineralogical nature it was assayed, but no gold was obtained.

No. 4 Bore.

1. The No. 4 Bore was put down fifty feet north of No. 3 Bore.

2. The total depth reached along the inclination was 670 feet, *i.e.*, a vertical depth of 580 feet. The angle of depression was 60 degees and direction due west.

3. The zone of oxidation ended at 110 feet.

4. The dykes met with are as follow:—

1. 187ft. 6in. to 202ft. 2in. Somewhat weathered and with some intercalated schist from 196ft. 6in. to 199ft. 8in.
2. 577ft. 8in. to 581ft.... Dark dyke with a trace of pyrrhotite.
3. 610ft. to 660ft. ... Fresh pyrrhotitic aplite with occasional veinlets of pyrrhotite.
4. 664ft. 6in. to 670ft.... Pyrrhotitic aplite—end of bore. (This may be part of No. 3 dyke.)

No. 1 and No. 2 dykes contained no gold at all. The No. 4 dyke gave 2dwt. 17gr. of gold per ton from 666ft. 6in. to 668ft. 6in.; the remaining part of the dyke contained no gold.

The No. 3 dyke contained remarkably consistent values from 610ft. to 658ft. The assay results are as follow:—

Depth.	Gold per ton.		
	ozs.	dwts.	grs.
610ft. to 612ft. 9in. ...	...	1	12
612ft. 9in. to 615ft.	...	1	7
615ft. to 618ft.	...	12	20
618ft. to 620ft. ...	1	...	...
620ft. to 622ft. 4in. ...	...	8	1
622ft. 4in to 625ft.	...	4	3
625ft. to 628ft.	...	2	9
628ft. to 631ft.	...	7	6
631ft. to 634ft.	...	5	16
634ft. to 637ft.	...	3	6
637ft. to 640ft.	...	...	10
640ft. to 643ft.	...	6	16
643ft. to 646ft.	...	1	23
646ft. to 649ft.	...	4	14
649ft. to 652ft.	...	6	23
652ft. to 655ft.	...	2	18
655ft. to 658ft.	...	2	18
658ft. to 660ft.	...	*nil*	...

5. The rock formations passed through are as follow:—

Depth in feet.	Nature of rock passed through.
0ft. to 110ft. ...	Zone of oxidation; weathered greenstone.
110ft. to 169ft. ...	Dense actinolitic greenstone.
169ft. to 187ft. 6in.	Schisted greenstone.
187ft. 6in. to 196ft. 6in.	Dyke rock—somewhat weathered
196ft. 6in. to 199ft. 8in.	Greenstone schist
199ft. 8in. to 202ft. 2in.	Dyke rock—somewhat weathered.
202ft. 2in. to 577ft. 8in.	Greenstone schist.
577ft. 8in. to 581ft. ...	Dark dyke with a very little pyrrhotite.
581ft. to 610ft. ...	Powerfully altered and schisted greenstone with some biotite.
610ft. to 660ft. ...	White pyrrhotitic aplite with veinlets, and, in places small segregations of pyrrhotite.
660ft. to 664ft 6in.	Greenstone schist.
664ft. 6in. to 670ft. ...	White pyrrhotitic aplite.

The above table shows that (1) the main schist channel which carries the dykes commenced at 169 feet and continued throughout the bore. (2) The hanging wall country of the No. 3 dyke is very powerfully schisted, and this fact indicates that the "channel" is quite strong, as far north as boring has been carried out. (3) The small dykes in the No. 1 and most southerly bore do not continue this far north, and (4) the bore ended in dyke rock.

6. The petrographic investigations show the existence of a very large and auriferous dyke along the line of the No. 4 Bore, more or less continuous from 610 to 670 feet. The two distinct dykes met with in the No. 2 Bore are not so evident in the No. 4 Bore, and they may have converged, with change of strike, into the larger body.

7. *Petrology.*—It was only necessary to make a study of one section of the rich ore between 618 and 620 feet, where the assay return gave an ounce of gold to the ton. Under the microscope the ore at 619 feet was a medium grained holocrystalline aggregate consisting mainly of plagioclase felspar with small extinction angles near albite. Some untwinned areas are orthoclase. Much of the felspar has little shape, though some of it is well bounded, at least on two sides. The felspars are very slightly carbonated. The amount of interstitial quartz is comparatively small and allotriomorphic, and is not infrequently

segregated into mosaic-like areas. Biotite flakes are common. Patches of chlorite and calcite are frequent, the former evidently resulting from the alteration of some form of hornblende. Minute rods of apatite are scattered throughout the slide. The whole rock is impregnated with ragged and shapeless pieces of pyrrhotite.

b.—BORING AT MARAROA GOLD MINE, CUE.

(Reedy's Mararoa Leases.)

Final Report.

1. In accordance with the Government's programme, boring was commenced at this mine in April, 1928, and completed in September of the same year.

2. The object of the boring was to test at depth the lode formation worked in the upper levels by the Mararoa Company and tested to about 200 feet from the surface where a crosscut was put out from the bottom of the Prospecting Main Shaft.

3. Five bores were put down and marked 1 to 5. The location of these is shown on the attached plan, and the angle of depression of each bore, depth along inclination of bore, vertical depth of bottom of each borehole, position of lode channel along inclination of each bore, vertical depth of centre of lode channel, horizontal distance of centre of lode, and assay returns from each lode met with are set out in Table I. (page 81).

4. *Geology and Petrology.*—Only two rocks call for reference, viz.:—A, the Country rock; and B, the Lodestuff.

A.—*The Country Rock.*—This rock encloses the lode and is powerfully schisted. Its main constituent is a pale green hornblende which occurs in platy, prismatic, actinalitic and fibrous forms. Talc is often interlaminated with the hornblende, giving the rock a dark green and white banded appearance. In some places biotite is common, and the footwall of the No. 4 bore at 591 feet is a contorted actinolite-talc-biotite schist. In other places carbonates are strongly in evidence. The main constituent is, however, some form of hornblende.

The average type of country is a carbonated hornblende-talc-biotite schist, showing powerful foliation planes and in places distinct contortion—the result of enormous pressure effects.

B.—*The Lodestuff.*—(a) Mineralogical Constitution: The mineral constituents of the lodestuff are quarts, felspar (plagioclase), carbonates of lime and magnesia (calcite and dolomite), pale green hornblende, biotite, sulphide of iron (pyrites and possibly pyrrhotite).

Generally speaking the lodestuff is a dense dark grey fine-grained rock impregnated with abundant grains of iron pyrites, and sometimes with a brownish tinge due to the presence of microscopic flakes of biotite. Under the microscope the lodestuff presents the appearance of a mosaic of quartz, felspar and calcite. A feature characteristic of the ore is the presence of scattered plates, fibres and bundles of pale green hornblende. In some places biotite is common. Irregular shaped grains, patches, and sometimes crystals of iron pyrites are more or less uniformly scattered throughout the quartz-felspar-calcite mosaic.

(b) Origin: The lodestuff is a perfect metasomatic replacement of the enclosing country rock along a well marked line of weakness or trunk channel—now represented by the lode, where dynamic forces had full play, and at the same time afforded an opportunity for the auriferous, sulphidic, and carbonated alkaline solutions to carry on the processes of chemical alteration (metasomatism) whereby the country rock (hornblende-biotite-talc-schist) was converted or changed into lode material. The change from the country rock to lodestuff was thorough and complete, all that is left of the former being scattered plates of pale green hornblende in various forms. Only highly heated and deep seated solutions could affect such a change. The hornblende may be seen changing into carbonates (carbonation). The talc in some places is almost certainly derived from the hornblende, but in the lode the talc is further broken down into carbonates and quartz.

5. *Concluding Remarks.*—The petrological investigations into structure and mineralogical constitution indicate that the lode material penetrated by all five bores is the same. The country rock is similar throughout, and no foreign rock masses were encountered. The lack of values in the No. 5 bore may be due only to the natural selective deposition characteristic of lode formations, and probably varying conditions of temperature and width of channel had something to do with it. In any event the ore is of distinctly deep-seated origin, and when taken collectively the boring has fully justified itself.

MARAROA GOLD MINE.

Table I.—Showing Assay Results, etc. from the five Bores (1—5).

No. of bore-hole.	Angle of depression.	Depth along inclination of bore.	Vertical depth of bottom of hole (in feet).	Position of lode channel along inclination of bore (in feet).	Vertical depth of centre of lode channel (in feet.)	Horizontal distance of centre of lode.	Depth in feet.	Assay Results.
								Assay—
1	45°	418ft.	295ft.	367ft. to 379ft.	263·7	263·7	367ft. to 370ft.	Gold: 1 dwt. 10 gr. per ton.
							370ft. to 373ft.	Gold: 12 dwt. 3 gr. per ton.
							373ft. to 375ft.	Gold: 6 dwt. 3 gr. per ton.
							375ft. to 377ft.	Gold: 4 dwt. 12 gr. per ton.
							377ft. to 379ft.	Gold: 0 dwt. 3 gr. per ton.
2	60°	464ft.	402ft.	417ft. to 438ft.	370	214	417ft. to 419ft.	Gold: 8 dwt. 7 gr. per ton.
							419ft. to 422ft.	Gold: 12 dwt. 4 gr. per ton.
							422ft. to 425ft.	Gold: 13 dwt. 16 gr. per ton.
							425ft. to 428ft.	Gold: 11 dwt. 10 gr. per ton.
							428ft. to 431ft.	Gold: 4 dwt. 12 gr. per ton.
							431ft. to 434ft.	Gold: 10 dwt. 11 gr. per ton.
							434ft. to 436ft.	Gold: 4 dwt. 1 gr. per ton.
							436ft. to 438ft.	Gold: 3 dwt. 22 gr. per ton.
3	60°	603ft.	522ft.	450ft. 6in. to 484ft. 10in.	404	234	450ft. 6in. to 453ft. 6in.	Gold: 0 dwt. 10 gr. per ton.
							453ft. 6in. to 456ft. 6in.	Gold: 0 dwt. 5 gr. per ton.
							456ft. 6in. to 459ft. 6in.	Gold: 5 dwt. 9 gr. per ton.
							459ft. 6in. to 462ft. 6in.	Gold: 0 dwt. 17 gr. per ton.
							462ft. 6in. to 465ft. 6in.	Gold: 4 dwt. 9 gr. per ton.
							465ft. 6in. to 468ft. 6in.	Gold: 16 dwt. 18 gr. per ton.
							468ft. 6in. to 471ft. 6in.	Gold: 2 dwt. 4 gr. per ton.
							471ft. 6in. to 474ft. 6in.	Gold: Under 5 gr. per ton.
							474ft. 6in. to 477ft. 6in.	Gold: 3 dwt. 4 gr. per ton.
							477ft. 6in. to 479ft. 10in.	Gold: 1 dwt. 7 gr. per ton.
							479ft. 10in. to 482ft. 10in.	Gold: 0 dwt. 10 gr. per ton.
							482ft. 10in. to 484ft. 10in.	Gold: 6 dwt. 8 gr. per ton.
4	60°	642ft.	556ft.	573ft. 6in. to 589ft. 6in.	503	291	573ft. 6in. to 575ft. 6in.	Gold: 2 dwt. 4 gr. per ton.
							575ft. 6in. to 577ft. 6in.	Gold: 1 dwt. 7 gr. per ton.
							577ft. 6in. to 579ft. 6in.	Gold: 6 dwt. 16 gr. per ton.
							579ft. 6in. to 581ft. 6in.	Gold: 17 dwt. 5 gr. per ton.
							581ft. 6in. to 583ft. 6in.	Gold: 10 dwt. 21 gr. per ton.
							583ft. 6in. to 585ft. 6in.	Gold: 18 dwt. 0 gr. per ton.
							585ft. 6in. to 587ft. 6in.	Gold: 10 dwt. 4 gr. per ton.
							587ft. 6in. to 589ft. 6in.	Gold: 15 dwt. 1 gr. per ton.
5	60°	468ft.	405ft.	408ft. 7in. to 436ft. ...	366	211	The channel from 408ft. 7in. to 436ft. did not contain any gold; only one sample, 412ft. 9in. to 415ft. showing a trace.	

C. O. G. LARCOMBE,
Acting Petrologist.

c.—BORING AT AJANA.

Final Report.

Two bores were put down at the Surprise Lead Mine, viz., No. 1 and No. 2.

No. 1 Bore.—This bore was put down at an angle of depression of 55 degrees, in a direction North 86° East. Drilling was completed at 922 feet along the inclination of the bore.

The object was to cut the lode channel at a vertical depth of about 700 feet, but a careful examination of the core showed no lead ore, nor were there any special indications of a lode channel.

The main rock encountered in this bore was a garnetiferous granite containing pegmatitic and, in places, very siliceous zones. From 415 to 628 feet the bore passed through a dark green highly-altered basic to ultra-basic rock.

The order of succession of rock formations is briefly as follows:—

Depth in feet.			Nature of rock.
0ft.	to 8ft.	...	No core.
8ft.	to 22ft.	...	Somewhat weathered granite.
22ft.	to 311ft.	...	Garnetiferous granite.
311ft.	319ft. 6in.	...	Greenstone.
319ft. 6in.	to 333ft.	...	Very siliceous alaskitic rock.
333ft.	to 415ft.	...	Granite.
415ft.	to 628ft.	...	Highly altered basic to ultra-basic rock.
628ft.	922ft.	...	Garnetiferous granite, etc.

Petrology.—The garnetiferous granite or gneiss is apparently of great age, and probably the oldest rock in the State. At 761 feet the core was of unusual interest, the section showing cordierite altered to pinite, fibres of sillimanite, some green spinel, warm brown biotite, and curious bleached ash-coloured biotites full of sagenitic webs.

The main original basic rock was some form of quartz dolerite or gabbro now represented by carbonated fibrous amphibolites with leucoxene and other albitised forms. In places epidote-zoisite rocks with interstitial quartz and some pale fibrous hornblende were noted. Talcose rocks developed at other points.

No. 2 Bore.—This bore finished at a depth of 450 feet. Its inclination was 55 degrees.

There was not sufficient indication of an ore deposit of lead to warrant sending samples for analysis.

The rock formations passed through were as follows:—

Depth of bore.			Nature of rock.
0ft.	14ft.	...	Zone of oxidation (0ft. to 4ft. sand; 4ft. to 10ft.: clay; 10ft. to 14ft.: decomposed granitic rock).
14ft.	262ft. 9in.	...	Garnetiferous granite and gneiss with some pegmatite.
At 261ft. 6in.		...	Three inches of granitic core with a very little galena and iron pyrites.
262ft. 9in.	to 325ft.	...	Very basic altered dyke rock. Carbonated albitised and epidotised quartz-dolerite.
325ft.	to 450ft.	...	Garnetiferous granite and gneissic rock.

General Remarks.—Mr. Feldtmann (p. 16, G.S. W.A. Annual Report, 1920) points out that "the lode may contain no ore even where the shear zone is of moderate width, and shearing and brecciation are

fairly well marked." It is quite clear that these bores did not locate "ore," but in view of the intense alteration and great age of these rocks, one cannot say positively that no channel rock was met with in these bores.

d.—BORING AT BIG BELL GOLD MINE, CUE.

In all, five bores were completed in prospecting the Big Bell Lode. The second bore was abandoned at a depth of 165 feet, and No. 2 new bore started from near the same position.

The petrological determination and assays of bores 3, 4, and 5 are not yet to hand.

Report on No. 1 Bore.

1. This bore was started 75 feet north of the centre of the main shaft and 100 feet from the eastern wall of the lode. The direction of boring was westerly and the angle of depression 45 degrees.

2. The bore was completed at 300 feet 6 inches along its inclination, a vertical depth of 212 feet.

3. From 0-55 feet there was no core. From 55-107 feet consisted of black biotite schist. At 107 feet a remarkable granulated and for the most part pyritic quartz-muscovite schist was met with. This white schist, which forms the "formation" or lode in this mine, continued definitely to 201 feet, *i.e.*, 94 feet along the direction of inclination of the bore or 66 feet in horizontal width. Below 201 feet on the western side of the lode the rock gradually passes into dense dark siliceous biotite-actinolite rocks of no value.

The succession of rock formations met with is briefly as follows:—

0ft. to 55ft. ...	... No core.
55ft. to 107ft. ...	... Black biotite schist.
107ft. to 201ft. ...	... *Lode or "formation"* carrying values. Pyritic quartz-muscovite schist penetrated along its foliation planes by innumerable pegmatite, alaskite, and almost pure residual quartz veins containing pyrites.
201ft. to 237ft. ...	... Non-pyritic white sheared arkosic sandstone.
237ft. to 300ft. 6in.	... Dense dark aphanitic rock made up of varying proportions of more or less schisted biotite-hornblende-quartz rocks with some zoisite.

4. The "values" in this bore were essentially confined to the lustrous white quartz-muscovite schist that extended from 107-201 feet. Details of depth of core, amount of core received, nature of rock, and assay results are shown in Table 1.

TABLE I.—BIG BELL MINE, CUE.

Assay Values, No. 1 Bore—107ft. to 201 feet.

Depth in feet.	Core received.	Nature of Rock.	Assay Result (Gold per ton).
	ft. ins.		oz. dwts. grs.
107ft. to 114ft. 3in. ...	0 10	Pyritic quartz-muscovite schist with occasional pyritic glassy quartz veins	0 4 9
114ft. 3in. to 121ft. 4in. ...	0 10	Pyritic white schist with 1-inch veins of pegmatite ...	0 9 1
121ft. 4in. to 128ft.	1 2	Pyritic white schist	0 0 10
128ft. to 132ft. 4in. ...	1 0	Strongly pyritic white schist	0 0 5
132ft. 4in. to 136ft. 4in. ...	1 6	Pyritic white schist with 1½in. vein of glassy quartz and small pegmatitic veinlets up to lin. wide	1 9 9
136ft. 4in. to 140ft. 4in. ...	2 0	White schist with alaskite veins	0 4 6
140ft. 4in. to 146ft. 7in. ...	2 6	Mainly white schist—pyritic	0 1 0
146ft. 7in. to 152ft.	2 1	Pyritic white schist	0 3 19
152ft. to 156ft.	1 3	White schist with a little alaskite	0 14 4
156ft. to 162ft. 8in. ...	2 0	Pyritic white schist	0 4 1
162ft. 8in. to 165ft.	2 0	do. do.	0 11 7
165ft. to 169ft. 6in. ...	1 10	do. do	0 1 2
169ft. 6in. to 172ft. 6in. ...	1 6	do. do.	0 3 22
172ft. 6in. to 175ft. 6in. ...	1 5	do. do.	0 3 11
175ft. 6in. to 178ft. 10in. ...	1 0	White schist broken by pegmatite veins	0 15 6
178ft. 10in. to 182ft. 10in. ...	1 4	Pyritic white schist	0 2 18
182ft. 10in. to 186ft. 10in. ...	1 6	do. do.	0 5 11
186ft. 10in. to 191ft. 7in. ...	1 0	Alaskite and strongly pyritic glassy quartz veins up to lin. in white schist	0 7 10
191ft. 7in. to 196ft. 6in. ...	2 0	Glassy alaskite veins in white schist	0 4 9
196ft. 6in. to 201ft.	2 0	Poorer and faintly pyritic schist with some pegmatite ...	0 0 10

In addition to the foregoing, further assays were made in order to test (1) the black biotite schist on the eastern wall of the lode, and (2) the dense dark quartzitic-looking rock from the western wall.

Depth (in feet).	Core received.	Nature of the rock.	Assay result of averaged samples.
60ft. to 76ft. 10in. ...	8 feet ...	Biotite schist (eastern wall)	Gold: *Nil.*
76ft. 10in. to 107ft.	9 feet ...	Biotite schist (eastern wall)	Gold: 5 gr. per ton.
201ft. to 300ft. 6in ...	... ...	Dense dark quartzitic biotite-hornblende rock (western wall)	Gold: *Nil* (8 assays made).

These assays show that the biotite schist on the eastern side of the lode is not devoid of gold, but the dense dark quartzitic biotite-hornblende rock which forms the western wall carries no gold at all.

5. On account of the friable nature of the lode-stuff, its granular character, and extreme schistosity, it did not core well. It was therefore arranged that the "fines" should be collected in about 2ft. sections. Sixty (60) samples were taken in this way from between 100 and 237 feet. The assay made from an average of these 60 samples yielded:—

Gold: 4dwt. 3gr. per ton.

6. *The Auriferous Zone.*—The ore body or "formation" carrying the values may perhaps be best regarded as a huge low-grade type of lode formation. The rock which makes up this lode is remarkably typical in appearance, viz., a powerfully schisted and somewhat granulated quartz-muscovite schist with distinctive white pearly lustred faces parallel to the foliation planes.

This schist has a sugary to granular appearance, and is more or less impregnated with grains, particles, and small crystals of iron pyrites. A feature of this white schist is its intrusion—along its foliation planes—by pegmatitic, alaskite and glassy veins and veinlets of quartz, often pyritic, and ranging from as much as two inches thick to mere streaks and veinlets.

There would seem little doubt that the position and extent of the "values" are controlled by the disposition of material emanating from the acid magmas that supplied the pegmatites, alaskite and quartz, and at the same time carried the gold and sulphide of iron.

7. *Nature and Origin of the Lode Material.*—This remarkable white quartz-muscovite schist is made up microscopically of a more or less uniformly-grained mass of quartz particles, shapeless and in places sharp-edged, and presenting quite a mosaic appearance with some felspar. Thousands of perfectly straight rods of muscovite are arranged in a wonderfully parallel fashion throughout the quartz mosaic, and nothing seems to interfere with the parallel alignment of the muscovite rods. Grains of iron pyrites are scattered throughout this quartz-muscovite schist.

The extreme granulation, great proportion of quartz, remarkable development of muscovite, together with the microscopic pseudo-elastic appearance, suggest a sedimentary origin for this rock. A close petrographic study of the core from 220 feet indicates that the original rock was a fine-grained siliceous arkosic sandstone of uniform grain, with some white clay.

Metamorphism has produced small rods of hornblende, while some muscovite is present.

While this arkose sandstone was in the zone of flowage, or under great shearing stress during its later stages of metamorphism, acid auriferous and pyritic solutions were squeezed into and through this mass of quartz-muscovite schist, which formed a convenient and natural trunk channel for the passage of solutions. In this way countless pegmatitic, alaskitic and pyritic glassy quartz veins and veinlets—together with their associated gold—were introduced. After final solidification and settling the lode formation was developed, to be later revealed by erosion in its present form. The origin and mode of occurrence of this deposit is certainly of more than passing interest.

Report on No. 2 Bore.

1. This bore was started 130 feet south of the centre of the main shaft, and 100 feet from the east wall of the lode.

2. Its direction was westerly, and angle of depression 45 degrees.

3. The bore was stopped in lode formation at 165 feet on account of some trouble in drilling.

4. The following is a record of rock passed through:—

0ft. to 59ft. ... No core.
59ft. to 63ft. ... Biotite schist.
63ft. to 165ft. ... Lodestuff—pyritic quartz—muscovite schist with pegmatite, alaskite and quartz veins and veinlets.

5. The ore-body started at 63 feet and continued to 165 feet, *i.e.*, 102 feet along the direction of the bore or a horizontal distance of 72 feet. At 165 feet the bore was still in lodestuff.

6. The description of the lodestuff given in the report on No. 1 Bore applies also to this bore. Values were more or less consistent from 59 to 165 feet, as shown in detail on Table 1. An interesting feature is that the biotite schist on the eastern wall is auriferous.

7. For reasons similar to those given in the report on No. 1 Bore, 37 samples of "fines" were taken from 59 to 156ft. 10in. An average assay yielded:—

Gold—3dwt. 9gr. per ton.

BIG BELL MINE, CUE.—No. 2 Bore.

Depth in feet.	Core received.	Nature of rock.	Assay results. (per ton)
	ft. in.		oz. dwt. gr.
59ft. to 63ft.	0 9	Biotite schist	0 1 10
63ft. to 64ft.	0 5	White schist with some glassy quartz	0 2 14
64ft. to 68ft.	1 0	White schist with 1½in. of glassy quartz	0 0 21
68ft. to 71ft.	1 4	do. do. do. do.	*nil*
71ft. to 74ft.	0 7	White schist	0 1 2
74ft. to 77ft.	0 10	White schist with pyritic veins	0 4 1
77ft. to 79ft. 3in. ...	0 8	Strongly pyritic sandy schist, tourmalinised and with glassy quartz veins	0 9 19
79ft. 3in. to 83ft. 9in. ...	1 4	Pyritic schist with glassy veins	0 6 23
83ft. 9in. to 86ft.	0 10	Pyritic schist	0 0 21
86ft. to 88ft 6in. ...	0 9	Strongly pyritic schist with minute glassy quartz veinlets	0 19 17
88ft. 6in. to 90ft. 6in. ...	1 0	Pyritic schist	0 10 5
90ft. 6in. to 93ft.	1 0	Pyritic schist with quartz veinlets	0 4 23
93ft. to 95ft. 3in. ...	1 0	Pyritic schist with little pegmatite and some quartz veins	0 10 16
95ft. 3in. to 97ft. 9in. ...	1 1	Pyritic schist	0 0 5
97ft. 9in. to 100ft.	0 10	Pyritic schist with pyritic alaskite veinlets	0 2 7
100ft. to 102ft. 5in. ...	0 6	Pyritic schist	0 1 12
102ft. 5in. to 105ft.	1 0	do.	0 1 5
105ft. to 109ft. 5in. ...	1 0	Pyritic schist with quartz veinlets	0 2 14
109ft. 5in. to 111ft. 9in. ...	0 9	do. do. do.	0 9 22
111ft. 9in. to 114ft. 1in. ...	1 0	Pyritic schist	0 1 23
114ft. 1in. to 116ft. 4in. ...	1 0	Pyritic silicified schist with a 1in. quartz vein	0 3 22
116ft. 4in. to 121ft. 6in. ...	1 0	Strongly pyritic schist	0 11 11
121ft. 6in. to 124ft 9in. ...	0 11	Glassy quartz with some white schist	0 2 9
124ft. 9in. to 127ft. 9in. ...	1 0	Granular pyritic schist	0 0 5
127ft. 9in. to 130ft.	0 6	Pyritic schist, white	0 1 23
130ft. to 135ft. 6in. ...	0 3	Slightly pyritic white schist with tourmaline	0 2 14
135ft. 6in. to 137ft. 8in. ...	0 3	Tourmalinised pyritic white schist	0 1 12
137ft. 8in. to 139ft. 9in. ...	0 5	Slightly pyritic white schist with some glassy quartz	0 1 21
139ft. 9in. to 141ft. 10in. ...	1 0	Pyritic white schist with one quartz vein	0 0 21
141ft. 10in. to 144ft.	1 0	Pyritic schist with small quartz veinlets	0 0 21
144ft. to 146ft. 7in. ...	1 0	Pyritic schist	0 1 15
146ft. 7in. to 149ft.	0 5	Heavily pyritic schist with glassy quartz veins ...	0 0 21
149ft. to 151ft.	1 0	Pyritic schist	0 0 5
151ft. to 153ft. 3in. ...	1 0	do. do.	0 4 17
153ft. 3in. to 158ft.	0 4	Core mixed with sludge	0 4 12
159ft. to 165ft.	1 1	Pyritic white schist with glassy quartz veins	0 6 13

Report on No. 2 New Bore.

1. Owing to difficulties met with in drilling the No. 2 Bore, it was stopped in lodestuff at 165 feet, and the new No. 2 Bore started 2 feet east and 1 foot north of No. 2 Bore.

2. The bore was completed at 281 feet. Its direction was westerly and angle of depression 45 degrees.

3. The succession of rock formations cut by the bore is briefly as follows:—

Depth in feet.	Nature of rock.
0ft. to 48ft.	... White micaceous schist.
48ft. to 63ft.	... Biotite schist with some quartz veinlets.
63ft. to 212ft. 6in.	Lode or "formation" carrying values. Pyritic quartz-muscovite schist penetrated along its foliation planes by innumerable pegmatitic, alaskitic and pure glassy quartz veins and veinlets carrying iron pyrites.
212ft. 6in. to 217ft.	... Biotite schist with glassy quartz veins and garnets.
217ft. to 235ft.	... Pure white hardened and semi-schisted metamorphosed arkose.
235ft. to 281ft.	... Dark greenish dense hornblende-biotite quartzites and schists, in places garnetiferous.

From the above table of rock formations it will be seen that this bore started in white micaceous schist which continued to 48 feet. Biotite schist followed from 48 to 63 feet. The lode proper commenced at 63 feet and continued without a break to 212ft. 6in., *i.e.*, 149ft. 6in. along the direction of the bore, or a horizontal width of 106 feet. The western wall of the lode passes from biotite schist into a somewhat massive but semi-schisted white rock showing cleavage facets of muscovite. This rock is a metamorphosed arkose. It extends to 235 feet, *i.e.*, a thickness of 18 feet. This arkose gradually passes into remarkable hornblende-biotite-quartz schists and quartzites, also evidently of sedimentary origin, which continues from 235 feet to 281 feet—the end of the bore.

4. *Assay Results.*—(a) The "values" in this bore were essentially confined—as with the No. 1 and No. 2 Bores—to the lustrous white quartz-muscovite schist and its associated acid igneous veins of alaskite, quartz and pegmatite, the whole "formation" extending from 63ft. to 212ft. 6in. Details of depth of core, amount of core received, nature of lodestuff, and assay results are shown in Table I.

(b) In addition to the assays of the lode formation shown in Table I. other assays were made as follows:—

Depth in feet.	Core received.	Nature of rock.	Assay result.
0ft. to 11ft.	6in. ...	Mealy white micaceous schist ...	Gold: 10 gr. per ton.
11ft. to 48ft.	5in. ...	Similar to 0ft. to 11ft.	Gold: A trace.
48ft. to 63ft.	12in. ...	Biotite schist with 1½in. honey-coloured quartz veins	1 dwt. 12 gr. per ton.

It should be distinctly noted that these assays from 0ft. to 63ft. cannot be by any means regarded as representative, because only 23 inches of core were saved out of 63 feet. The assays were made in order to ascertain—

(1) if there was any gold in the white schist beyond the limits of the typical lode formation; and

(2) whether the biotite-schist was auriferous.

This is of interest because the presence of glassy quartz veins and "values" in the biotite schist indicate a probable contemporaneous origin of this rock with the lode formation.

(c) On account of the friable nature of the lodestuff, so-called "fines" were collected at intervals of about 2 feet—just as was done with the No. 1 and No. 2 bores. These were assayed with the following results:—

(1) An average of 28 samples taken from between 145ft. 7in. and 200ft. yielded—

Gold—4wt. 3gr. per ton.

(2) An average of five samples between 200ft. and 212ft. 5in. yielded—

Gold—1dwt. 0gr. per ton.

(3) An average of 11 samples between 212ft. 5in. and 236ft.—beyond the limits of the main schisted channel and not regarded as typical lodestuff, yielded—

Gold—10gr. per ton.

5. *The Lode Formation.*—This was made of the same material as was met with in the No. 1 and No. 2 Bores, viz., a somewhat granulated quartz-muscovite schist impregnated in places with iron pyrites and traversed along its foliation planes by small veins and veinlets of glassy quartz, pegmatite, and alaskite. A somewhat detailed description of the physical features, mineralogical constitution and nature and origin of this lode material was given in my report on the No. 1 Bore.

6. *Petrology.*—Petrological investigations have shown that the occurrence and origin of the ore deposit, as well as of the country rock at the Big Bell Mine, are of more than ordinary interest. Petrographically there is (1) the Lode Formation, and (2) the Country Rock—the latter being practically confined to the western side of the deposit.

1. *Lode Formation.*—The granulated pyritic quartz-muscovite schist, of which the lode is composed, has been generally described in the report on the No. 1 Bore. In origin it most probably represents an arkose, originally of the nature of a medium-grained siliceous sandstone made up of uniformly sized quartz grains and grains and plates of felspar, with some sporadic scales of muscovite. Under conditions of extreme metamorphism, accompanied by heat, compression, shearing and schisting, the original arkose was converted into its present form, viz., the quartz muscovite schist. It is probable that during the period of schisting the auriferous sulphidic siliceous solutions were squeezed through the schist, and in this way originated the multitude of veins and

veinlets of pegmatite, alaskite and quartz, which are responsible for the "values" and consequent development of the lode formation.

2. *The Country Rock.*—The country rock on the western wall of the lode formation.

In No. 1 Bore the lode formation passes by gradations into a solid white and semi-schisted rock which is a metamorphosed arkose. In the No. 2 Bore (New Bore) there is 19 feet of this rock, followed by dark green dense hornblende-biotite quartzites and schists. The whole of the country rock is also apparently of sedimentary origin, and whether it develops hornblende, biotite, zoisite or garnets depends on

(a) The chemical composition of the original sediment, and

(b) The temperature and pressure effects associated with recrystallization.

The conditions of sedimentation no doubt changed from time to time, and the amount of sand, felspar, clay, mud and so on repeatedly altered, producing at least three types of sediment. These types, together with their metamorphic products, were possibly as follow:—

Original Rock.	Metamorphic product.
I. Arkose—a porous mixture of quartz sand and felspar with a little muscovite.	The lode formation—a granular sugary quartz muscovite schist.
II. Ferruginous argillaceous sandstone or grit.	Mealy Biotite—quartz schist, *e.g.*, eastern wall of lode formation— 55ft. to 107ft. No. 1 Bore 59ft. to 63ft. No. 2 Bore 48ft. to 63ft. No. 2 New Bore.
III. Dense fine-grained argillaceous sandstones.	(*a*) Hornblende-zoisite quartz schist and quartzite. (*b*) Biotite-hornblende-quartzites. (*c*) Hornblende-biotite quartz schist.

It would appear is if the lode formation developed in the white sandy arkose which lent itself to perfect schisting, and formed a channel or line of weakness eagerly sought by the siliceous solutions that made the pegmatite and associated quartz veins, for naturally these solutions would rise along the line of least resistance. The sediments in the western wall developed dense hard hornblende-biotite quartzites which offered resistance to and naturally diverted the main solutions into the channel represented in the lode formation.

BIG BELL MINE, CUE.

Assay Values from No. 2 New Bore—63ft. to 212ft. 6in.

Depth in feet.	Core received.	Nature of rock.	Assay Results (Gold per ton.
	ft in.		oz. dwt. gr.
63ft to 64ft.	0 10	Quartz muscovite schist with quartz veins	0 0 10
64ft to 67ft.	1 0	Quartz muscovite schist	trace
67ft. to 69ft.	1 3	A large 2in. quartz vein in white schist	*nil*
*69ft. to 74ft.	0 10	do. do. do.	*nil*
*74ft. to 82ft.	0 6	White schist with quartz veins	0 4 23
82ft. to 88ft. ...	2 1	Strongly pyritic white schist with several glassy quartz veins 2in. thick	0 6 0
88ft. to 90ft.	1 8	Pyritic white schist	Trace
90ft. to 92ft.	2 0	Pyritic white schist with small quartz and pegmatite veins	0 0 5
92ft. to 94ft. 7in. ...	2 0	Pyritic white schist with glassy quartz veinlets	*nil*
95ft. to 100ft.	2 6	do. do. do. do.	*nil*
100ft. to 100ft. 6in. ...	1 6	Pyritic white schist	0 2 21
100ft. 6in. to 103ft.	1 6	Pyritic schist, white	0 1 7
103ft. to 108ft	2 6	Pyritic white schist with quartz veins	0 1 7
*108ft. to 117ft. 7in. ...	1 2	do. do. do.	0 2 9
*117ft. 7in. to 126ft.	1 10	do. do. do.	0 1 10
*126ft. to 132ft. 6in. ...	0 5	do do. do.	0 1 7
*132ft. 6in. to 138ft. 6in. ...	1 0	Pyritic schist with many glassy quartz veins	0 5 6
*138ft. 6in. to 147ft.	1 0	Pyritic schist with pegmatite veins	0 3 11
*147ft. to 175ft. 10in. ...	2 0	do. do. do.	0 4 1
*175ft. 10in. to 179ft. 6in. ...	0 9	Slightly pyritic white schist	0 4 1
179ft. 6in. to 181ft. 8in. ...	1 10	Pyritic white schist	0 6 8
181ft. 8in. to 184ft.	1 2	Pyritic white schist	0 6 18
*184ft. to 186ft. 3in. ...	0 5	Pyritic white schist with pegmatite veinlets	0 1 7
*186ft. 3in. to 190ft.	1 0	Pyritic white schist	0 9 19
190ft. to 192ft.	1 0	While schist with very little pyrites	0 0 14
192ft. to 195ft.	2 0	do. do. do.	*nil*
195ft to 200ft.	3 0	Semi-schisted white rock	0 0 5
200ft to 206ft.	3 0	Non-pyritic white schist	*nil*
206ft to 208ft. 6in. ...	1 0	do. do. do.	*nil*
208ft. 6in. to 210ft.	1 0	Pyritic white schist	0 7 13
210ft. to 212ft. 6in. ...	1 6	Non-pyritic white schist	*nil*

Note.—White schist = Quartz muscovite schist. * The amount of core taken from these depths cannot be regarded as sufficient to give a reliable average assay return.

e.—BORING AT HARBOUR LIGHTS MINE, LEONORA.

Report on No. 1 Bore.

1. This bore was put down at an angle of 60 degrees.

2. It passed through a zone of oxidation from 0 to 160 feet.

3. From 160 to 253 feet the country was a strongly chloritised hornblende rock.

4. From 253 feet to the end of the bore—306 feet, the bore passed through a most powerful schist channel—really a siliceous carbonate schist. It consisted mainly of carbonate with quartz mosaics.

5. The whole of the rock from this schist channel (253-306 feet) was assayed. Seven samples contained no gold at all, and one sample from 273 feet to 277 feet 8 inches assayed a trace (under 3 grains of gold per ton).

Report on No. 1 New Bore.

1. This bore was put down in a westerly direction at an angle of depression of 60 degrees. Along its inclination it reached 797 feet, *i.e.*, a vertical depth of 690 feet.

2. A highly altered and powerfully schisted carbonated belt of country came in at 253 feet and continued to at least 636 feet, *i.e.*, 383 feet. The whole of the rock between 253 and 317 feet, *i.e.*, 64 feet, was assayed, and then averages were taken from 317-450 and 524-636 feet.

A summary of the 30 assays made of core from 253 to 450 and 524 to 636 feet is as follows:—

From 253 to 311—Gold: nil.
311 to 317—Gold: 1 dwt. 23 gr. per ton.
317 to 343—Gold: nil.
343 to 350—Gold: trace.
350 to 398—Gold: nil.
398 to 416—Gold: trace.
416 to 450—Gold: nil.
524 to 636—Gold: nil.

In addition to the above core assays 22 samples of sludge from between 280 feet and 600 feet (each sample of sludge was taken in 10-feet sections) were averaged and assayed, with the following results:—

From 280 to 440 feet—Gold: 1 dwt. per ton.
440 to 600 feet—Gold: 14 grs. per ton.

3. *Geology and Petrology.*—This bore was started in rotten oxidised ground which continued to 164 feet. A green chloritic greenstone rock—probably from epidiorite—continued from 164 to 253 feet. At 253 feet a very distinctive and strongly schisted and foliated zone was encountered. This zone was characterised by its abundance of carbonates. The rock was made of alternating white and dark green bands, the former consisting mainly of a mass of granular carbonates with mosaics of quartz. The dark bands form well-marked foliation lines of chlorite and biotite. Grains of pyrites are occasionally met with.

This foliation zone of carbonated quartz-chlorite-biotite rock continued to maintain its distinctive mottled and banded character from 253 feet to 636 feet, and the greater part of this zone of 383 feet was sampled and assayed with negative results shown in paragraph (2).

From 636 feet to the bottom of the bore, 797 feet, the average type of the country was a fine-grained greenstone made up of a mass of minute actinolite needles throughout which small plates of biotite, clear patches of quartz and some small scales of chlorite were distributed. Very dense biotite-calcite schist riddled with veinlets of carbonate occurs at intervals, *e.g.*, at 680 feet.

The order of succession of rocks met with is briefly as follows:—

Depth in feet.	Nature of rock.
0ft. to 164ft. ...	Rotten oxidised rock.
164ft. to 253ft. ...	Chloritic greenstone—probably from epidiorite.
253ft. to 636ft. ...	Powerfully schisted and foliated zone of mottled, banded white and dark green calcite-quartz-chlorite-biotite schist.
636ft. to 797ft. ...	Fine grained actinolite-biotite rock alternating with bands of dense biotite schist with veinlets of white carbonates.

4. The bore indicates, as a result of petrological examination that at the Harbour Lights Mine there is a powerfully foliated and highly carbonated zone of banded calcite-quartz schist with some chlorite and biotite, extending from 253 to the vicinity of 636 feet, lying between a chloritic greenstone that was probably a medium-grained epidiorite and a fine-grained actinolite rock.

As the zone from 253—636 feet was so highly altered, carbonated and in places pyritic most of its was averaged and assayed.

The true lode stuff in this mine would only be a more highly pyritic form of the rock found in the foliated zone. Such a rock was only noted over 1 foot 4 inches from 544 feet 5 inches to 545 feet 9 inches. Here it was a strongly pyritic, siliceous carbonate schist, but it contained no gold.

From 636 to 797 feet the actinolite and biotite rocks are absolutely barren of any definite mineralisation or channels sufficiently altered to regard them as lode formations, and, consequently no assays were made.

Lodes could be developed in this country, especially in the highly foliated zone between 253 and 636 feet, but along the direction of this bore no payable lode was discovered.

f.—BORING AT SANDSTONE.

Final Report.

Six bores were put down at Sandstone. The first three bores (1, 2, and 3) were put down vertically to test at depth the Black Range Reef which had been worked in the Black Range Mine. The other three bores (4, 5, and 6) were put down to test at depth the Sandstone Reef which had been worked in the Oroya Black Range Mine.

Details of the first five bores were published in the Annual Report for 1927 (pages 149 and 150).

Report on No. 6 Bore.

This bore reached a total depth of 828 feet. It was put down vertically.

The following assays were made:—

About 19ft.	Quartz and ironstones. Gold: *nil.*
594ft. 4in. to 597ft. 7in.	Sheared rock on footwall of dolerite dyke. Gold: *nil.*
803ft. 6in. to 805ft. ...	A foot of white glassy quartz, 804ft. to 805ft.; the rest siliceous fractured fine-grained greenstone. Gold: *nil.*

Ore Deposits.

At 594ft. 4in. the footwall country came in beneath the black dolerite dyke. It was somewhat semi-schisted from 594ft. 4in. to 597ft. 7in., and then passed into a partially shattered and cracked zone not worth assaying.

Between 804 and 805 feet there was a foot of glassy white quartz in somewhat fractured dense greenstone.

It looks as if the No. 6 bore passed through country where the main shear zone had become broken up through lack of strength of earth forces at this point in the mine. Apart from the assays made there was no rock sufficiently sheared, silicified, or mineralised to warrant further assaying.

The rock formations passed through were as follows:—

0ft. to 150ft. ...	Zone of oxidation.
150ft. to 585ft. 8in.	Dense grey greenstone similar to that in the Nos. 4 and 5 bores.
585ft. 8in. to 594ft. 4in.	Black dolerite dyke.
594ft. 4in. to 828ft. ...	Dense grey greenstone.

g.—BORING AT GREENBUSHES.

Final Report on First Eight Bores.

The object in boring at Greenbushes was to test the pegmatitic lodes at depth. Up to date (31-1-1929) eight bores have been completed.

Assay Results.

The number of the bore, its angle of depression, number of dykes cut, nature of lode and assay results are set out in Table 1. From this table it will be noted that the dykes cut in the bores contain a very low percentage of tin; in no bore was 1 per cent. recorded, the highest value being 0.91 per cent. in the Cornwall Lease.

The Cornwall Lease gave by far the best results, the amount of tinstone (cassiterite), though small, being consistently distributed through the dykes. Segregations of tinstone are likely to be met with in such an area. The large dyke on the "Dixie" Lease proved disappointing where cut by the bore—a trace being the highest assay. The extremely small dykes on the Lost and Found Mine were distinctly stanniferous.

Petrology.

The petrology of the area bored resolves itself into (1) Granitic and allied pegmatites with which the tin is associated, and (2) the Country into which the granitic rocks have intruded themselves, viz., reconstructed amphibolites and hornblende schists.

1. *Granitic Rocks.*—The dykes cut by the bores represent a variety of acidic rocks ranging from somewhat granular biotite granite, through normal pegmatites and albite-rich rocks to alaskite and glassy quartz veins. The rocks examined may be placed in five groups, viz.:—

A. Tourmalinised acid granites showing much quartz and white felspar. These white rocks, somewhat sugary in appearance and at other time grading into fine-grained biotite granite. Tourmaline in black prismatic forms and masses—blue-black under the microscope—is common, and at 270 feet in No. 2 bore irregular pieces of brown cassiterite were noted. These strongly tourmalinised granitic rocks were common in the bores on the Cornwall lease, and they were more or less consistently stanniferous.

B. Greisen, a pure quartz-white mica rock, was not abundant. It was met with in No. 1 bore on the Cornwall Lease, where it assayed 0.22 per cent. of tin dioxide.

C. Pegmatite. A normal form of pegmatite, *i.e.*, a coarse quartz-felspar-mica rock in big plates, was recorded from No. 4 bore on the Cornwall Lease, where it yielded 0.20 and 0.27 per cent. respectively of tin dioxide.

D. Alaskite, *i.e.*, an almost pure glassy quartz rock with a little felspar, or in places no felspar at all, was recorded from the Cornwall Lease, but its tin contents were very low, viz. 0.004 per cent.

E. White albite rock having the appearance of a white crystalline marble, but much harder. It is made of a holocrystalline aggregate of an albitic felspar with occasional lumps of quartz. It appeared to form the large dyke in the No. 5 bore on the "Dixie" M.L. 632. The tin contents of this albite rock are practically nil.

2. *Reconstructed Amphibolites and Hornblende Schists.*—These rocks constitute the country rock of the area into which the pegmatites and other acidic stanniferous dykes have forced their way. They are of some interest because they may easily be mistaken for hornblende gneisses, whereas they are products of extreme dynamic metamorphism and recrystallisation from basic rocks of the dolerite-gabbro type.

In the No. 1 Bore at 272 feet on the Cornwall Lease the rock is dark green and mottled owing to an admixture of dark ferro-magnesian mineral with white to glassy grains and cleavage facets. Under the microscope the mineral contents are: hornblende, biotite, plagioclase, quartz, magnetite, and apatite. In plain light the rock is seen to consist of water-clear material crowded with prisms, cross-sections, and irregular-shaped pieces of bright green hornblende, associated with a considerable amount of dark brown plates and cleavage flakes of biotite. Between the hornblende plates is a more or less granulated mass of plates and shapeless pieces of clear and well-twinned plagioclase with some quartz. Colourless rods of apatite are common in the water-clear material, and black grains and patches of magnetite are frequently seen. The rock is a reconstructed biotite amphibolite.

In No. 6 bore at 245 feet on the South Cornwall Lease is a similar rock, but without biotite and strongly schisted. It is a typical hornblende schist, almost identical with that figured by Harker (Petrology for Students, Fig. 91, p. 325), and stated to have been derived from the metamorphism of a dolerite.

Mr. Farquharson described (G.S.W.A. Bull. 59, pp. 172-175) what are evidently similar rocks under the heading of "Amphibolite and Hornblende Schists."

In the Lost and Found Mine the rocks are fine-grained hornblende schists. At 113 feet in the No. 8 bore the hand specimen is a dense dark-green semi-schisted greenstone. Microscopically it is a mass of small prisms of green hornblende with minute interstitial grains of felspar and quartz. The whole rock is studded with clear grains of sphene and occasional colourless pieces of epidote.

In the No. 3 bore at 145 feet the rock is heavily biotised, and forms a biotite hornblende schist.

Concluding Remarks.

The petrological investigations show that the area covered by the first eight bores is made up of reconstructed amphibolites and hornblende schists of varying grain and frequently typical mottled appearance. Pegmatites, and other varieties of granitic rocks, often characterised by much tourmaline and in places some tinstone, have forced their way through these schists. It has been pointed out that the tourmalinised rocks, greisen and pegmatite showed the most consistent tin contents, whereas the white albite rock was almost barren of tin. It is important to note that where seen under the microscope the tinstone formed an accessory though primary constituent of the rock. Although where cut by the bores on the Cornwall Lease the tin contents cannot be regarded as payable, it is of interest to note the consistent tin contents in the dykes. Payable ore is simply a concentration of the cassiterite, and these dykes showing "consistent tin contents" are likely zones along which to look for segregations or patches of payable ore.

TABLE I.

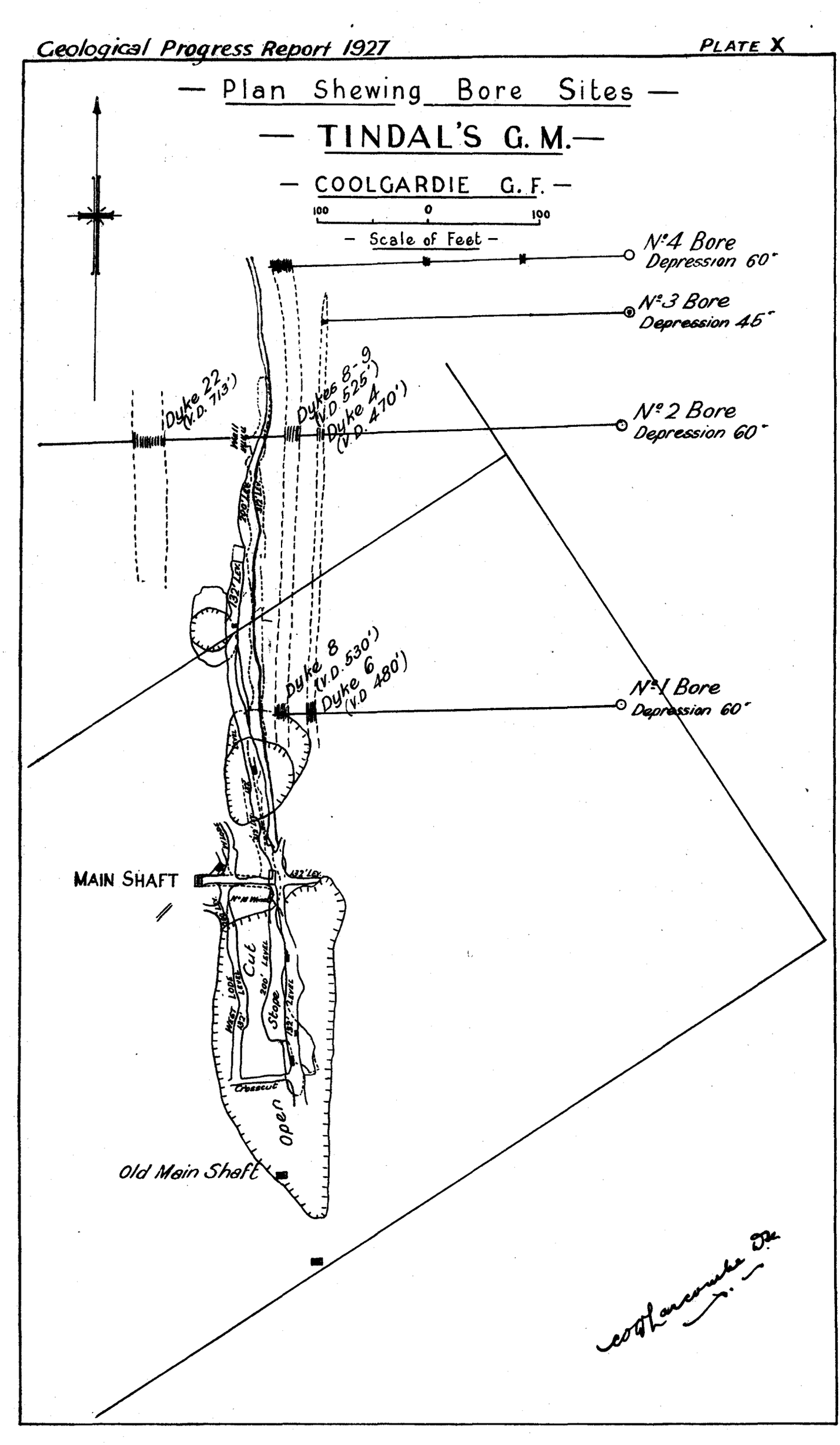
BORING AT GREENBUSHES. ASSAY RESULTS ETC., OF BORING FROM THE FIRST 8 BORES.

No. of Bore.	Angle of depression.	Dykes cut (Depth in feet).	Nature of rock.	Assay result
			Cornwall Lease.	
1	45°	A. 56ft. to 56ft. 6in. ...	Pegmatite-glassy quartz, felspar and white mica ...	Tin dioxide (SnO_2) ... 0·002 %
		B. 171ft. to 172ft. 4in. ...	Alaskite	Tin dioxide (SnO_2) ... 0·004
		C. 243ft. to 246ft.	Garnetiferous tourmalinised quartz-muscovite pegmatite	Tin dioxide (SnO_2) ... 0·22
2	45°	263ft. to 271ft. 3in. ...	Heavily tourmalinised quartz-felspar pegmatite	263ft. to 265ft. 6in. ... SnO_2 ... trace
				%
				265ft. 6in. to 268ft. ... SnO_2 ... 0·38
				268ft. to 270ft. 1in. ... SnO_2 ... 0·91
				270ft. 1in. to 271ft. 3in. ... SnO_2 ... 0·19
3	45°	(1) 105ft. to 113ft.	Medium-grained saccharoidal quartz-felspar rock with tourmaline	105ft. to 107ft. ... ... SnO_2 ... 0·16
				107ft. to 109ft. ... ... SnO_2 ... 0·12
				109ft. to 111ft. ... ... SnO_2 ... 0·83
				111ft. to 113ft. ... ... SnO_2 ... 0·17
		(2) 120ft. to 125ft.	Medium-grained tourmalinised saccharoidal quartz-felspar rock with white mica, and in places patches of pure white felspar (albites ?) rock	120ft. to 122ft. ... ... SnO_2 ... 0·09
				122ft. to 124ft. ... ... SnO_2 ... 0·16
				124ft. to 125ft. ... ... SnO_2 ... trace
		(3) 232ft. to 253ft. 6in. ...	Mainly white albite (?) rock with some quartz and a little tourmaline	252ft. to 253ft. 6in.... ... SnO_2 ... trace
4	45°	(1) 115ft. to 116ft.	Coarse greisen with some tourmaline	115ft. to 116ft. ... ... SnO_2 ... 0·13
		(2) 198ft. 3in. to 200ft. 1in.	Tourmalinised pegmatite with coarse white mica ...	198ft. 3in. to 200ft. 1in. ... SnO_2 ... 0·57
		(3) 212ft. to 215ft.	Tourmalinised greisen	212ft. to 214ft. 6in. ... SnO_2 ... 0·20
				214ft. 6in. to 215ft. ... SnO_2 ... trace
		(4) 256ft. to 258ft. 6in. ...	Tourmalinised quartz-felspar rock	256ft. to 258ft. 6in. ... SnO_2 ... trace
			Dixie M.L. 632.	
5	45°	(1) 153ft. to 153ft. 6in. ...	Tourmalinised white quartz-felspar rock	153ft. to 153ft. 6in. ... ... No tin.
		(2) 169ft. to 169ft. 4in. ...	Tourmalinised alaskite	169ft. to 169ft. 4in. ... ... Sn—a trace.
		(3) 220ft. to 223ft. 9in. ...	White aplitic rock	220ft. to 223ft. 9in. ... ... No tin.
		(4) 242ft. to 266ft.	Pegmatite	242ft. to 245ft. 6in. ... ... No tin.
				245ft. 6in. to 258ft. 4in. ... ... Sn—a trace.
				258ft. 4in. to 266ft. ... ... No tin.
		(5) 273ft. to 291ft. 2in. ...	Quartz-felspar rock	273ft. to 291ft. 2in. ... ... No tin.
		(6) 397ft. to 403ft.	Granular saccharoidal quartz rock	397ft. to 403ft. ... ... Sn—a trace.
			South Cornwall.	
6	45°	(1) 133ft. to 147ft.	Tourmalinised greisen with white to creamy coarse-grained quartz felspar rock	133ft to 147ft. ... ... No tin.
		(2) 199ft. to 200ft. ...	Tourmalinised quartz-felspar rock with garnet	199ft. to 200ft. ... ... Sn—a trace.
		(3) 231ft. to 235ft. 6in. ...	Tourmalinised medium-grained pegmatite with white mica	233ft. to 235ft. 6in. ... ... Sn—a trace.
				231ft. to 233ft. ... ... No tin.
			Lost and Found Mine.	
7	45°	124ft. to 125ft. 6in.... ...	Tourmalinised medium-grained white quartz-felspar rock	% 124ft. to 125ft. 6in. ... SnO_2 ... 0·90
8	70°	122ft. 2in. to 122ft. 6in. ...	Quartz-felspar rock with specks of tourmaline	122ft. 2in. to 122ft. 6in. SnO_2 ... 0·39

— Plan Shewing Bore Sites —

— TINDAL'S G. M. —

— COOLGARDIE G. F. —



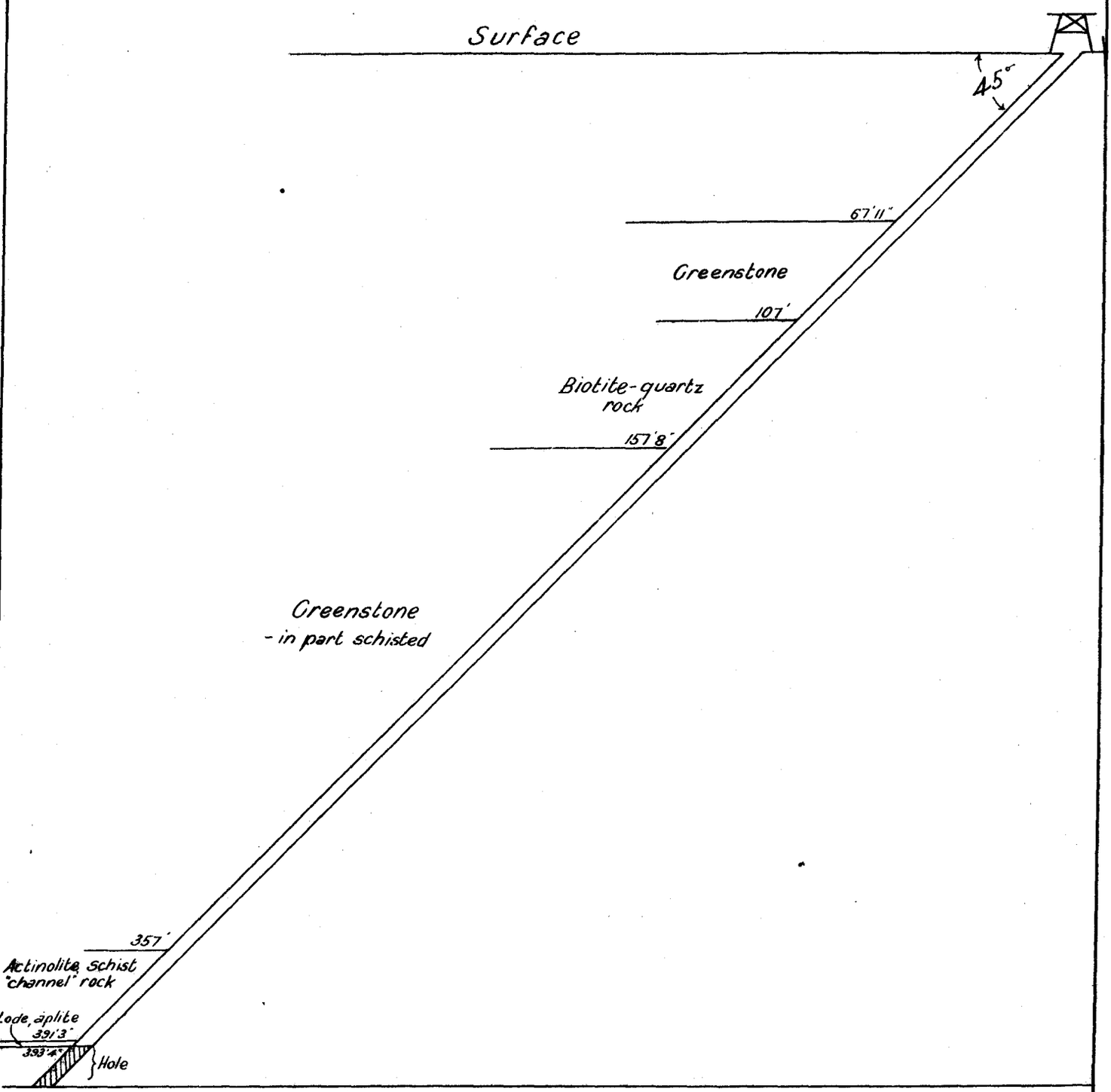
Section No 3 Bore

TINDAL'S

Coolgardie G. F.

40 0 40 80

— Scale of Feet —



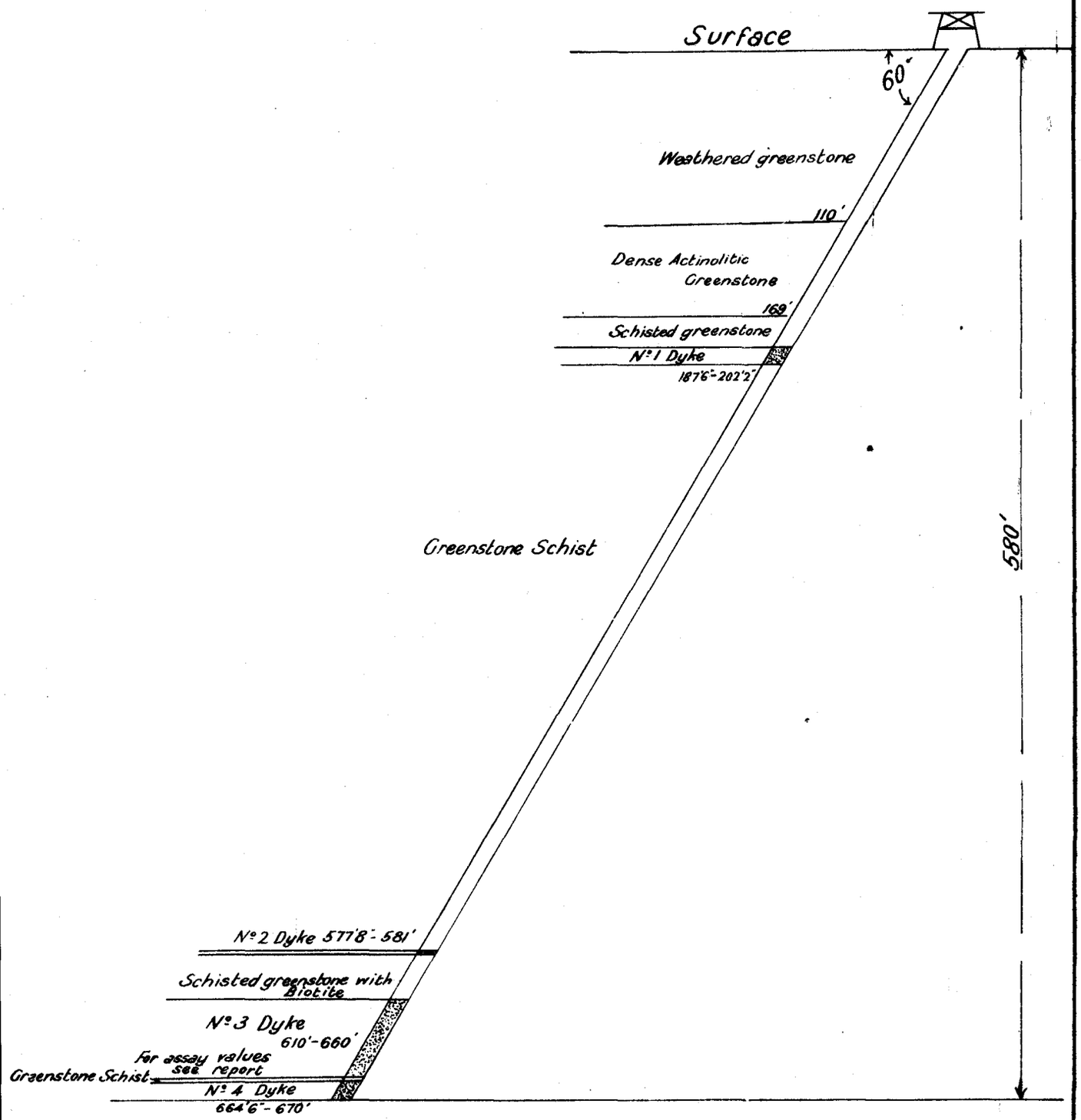
Section Nº 4 Bore

TINDAL'S

Coolgardie G.F.

80 0 80 160

— Scale of Feet —

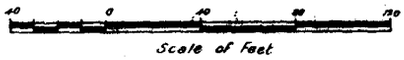


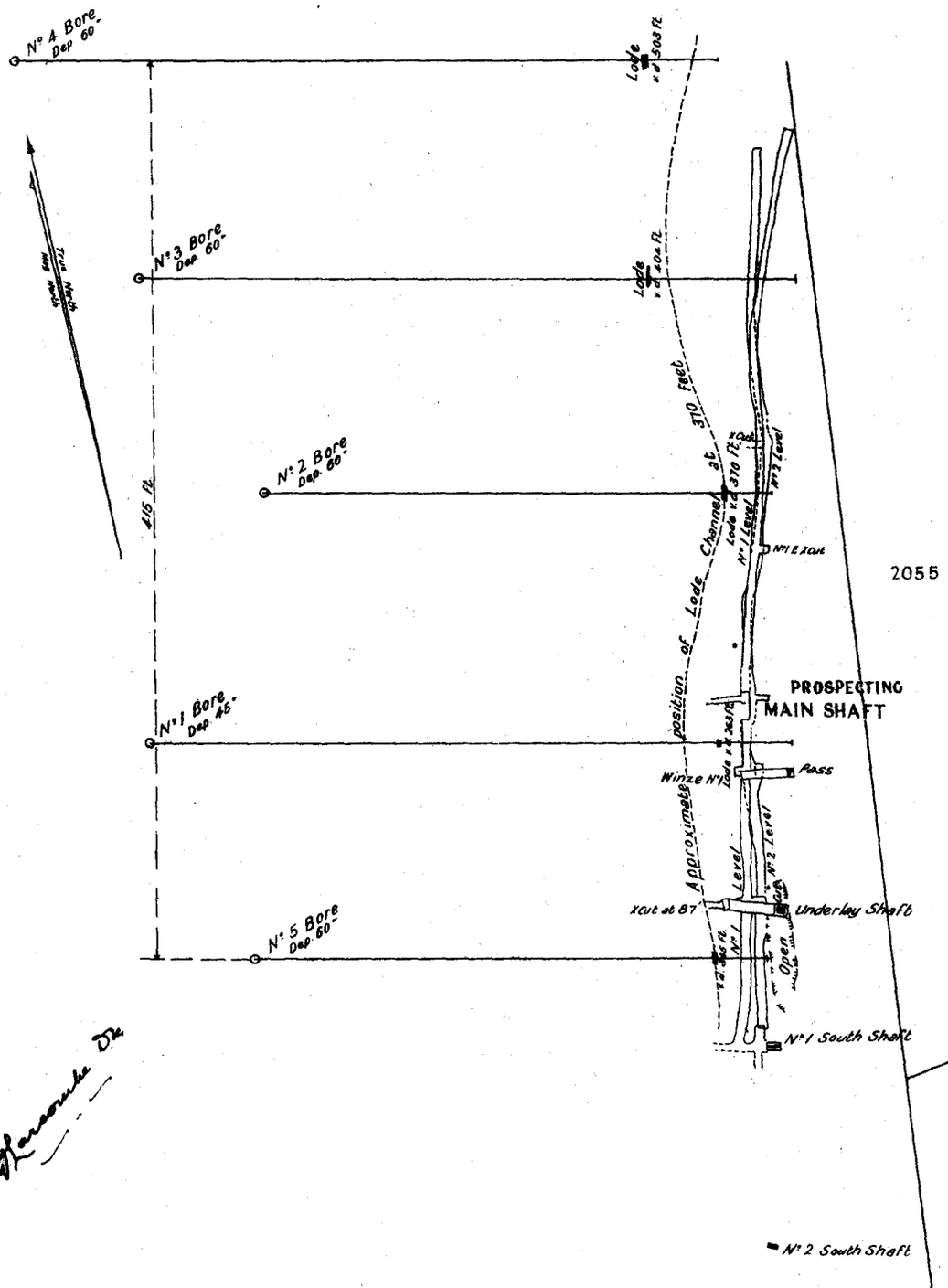
MARAROA GOLD MINING Co N. L.

Plan Shewing Location of Diamond Drill Bores

Emu North Lease - Reedy's Find

MURCHISON G.F.



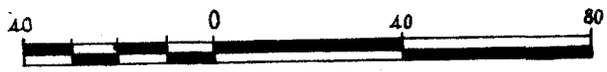


Section Nº 1 Bore

MARAROA G.M

REEDY'S FIND

30 Miles N.E of Cue



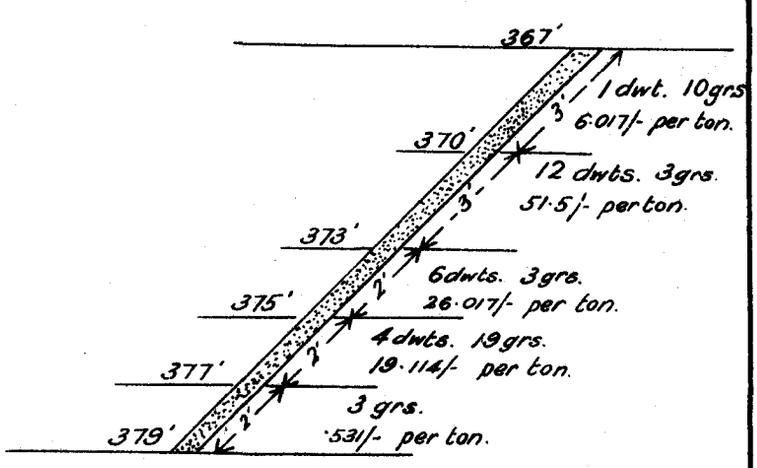
— Scale of Feet —

Rotten Oxidised Schist

Basic Greenstone Schist

Figures in brackets indicate the length of core recovered from corresponding section of boring.

Chart of assay results in lode material between 367' and 379'.



— Scale:- 4 Ft. = 1 In. —

Section Nº 2 Bore

MARAROA G. M.

REEDY'S FIND

30 Miles N. E. of Cue

40 0 40 80

—Scale of Feet—

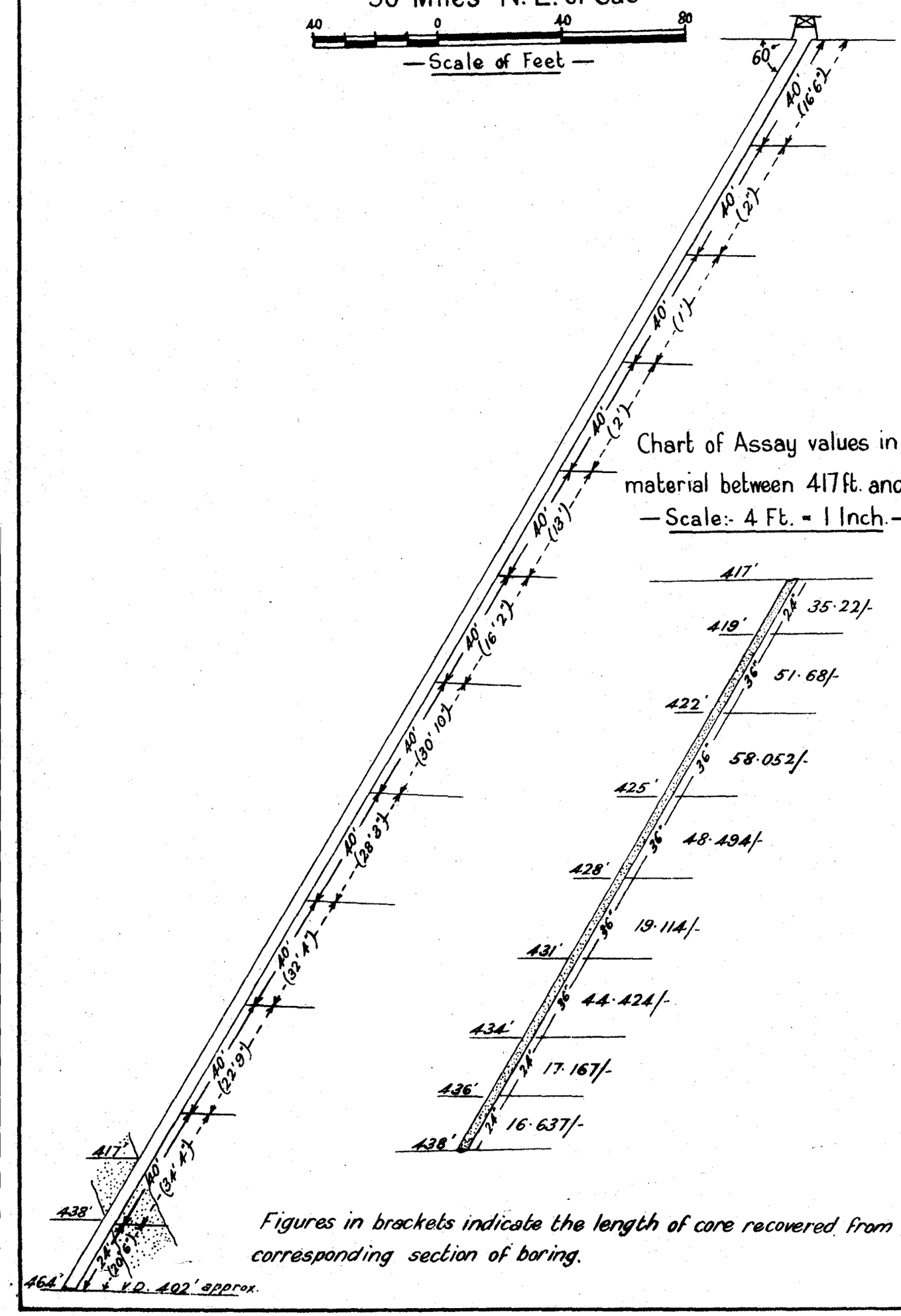


Chart of Assay values in lode material between 417 ft. and 438 ft.

—Scale:- 4 Ft. = 1 Inch.—

Figures in brackets indicate the length of core recovered from the corresponding section of boring.

Section Nº 3 Bore

MARAROA G. M.

REEDY'S FIND

30 Miles N.E. of Cue

60 0 60 120

—Scale of Feet—

Chart of Assay values in lode material between 450'6" and 484'10"
— Scale: 4 Feet = 1 Inch —

450'6"
1·77/-
453'6"
·885/-
456'6"
22·831/-
459'6"
3·009/-
462'6"
18·583/-
465'6"
71·149/-
468'6"
9·203/-
471'6"
Trace
474'6"
15·221/-
477'6"
5·486/-
479'10"
1·77/-
482'10"
26·902/-
484'10"

450'6"
484'10"
603'

60' (16')
60' (1')
60' (9')
60' (32'3")
60' (32'8")
60' (58'6")
60' (53')
60' (57')
60' (55'1")
63' (53')

552 Ft. Approx.

Figures in brackets indicate length of core recovered from the corresponding section of boring.

Section Nº 4 Bore

MARAROA G.M.

REEDY'S FIND

30 Miles N.E. of Cue

— Scale:- 64 Feet - 1 Inch —

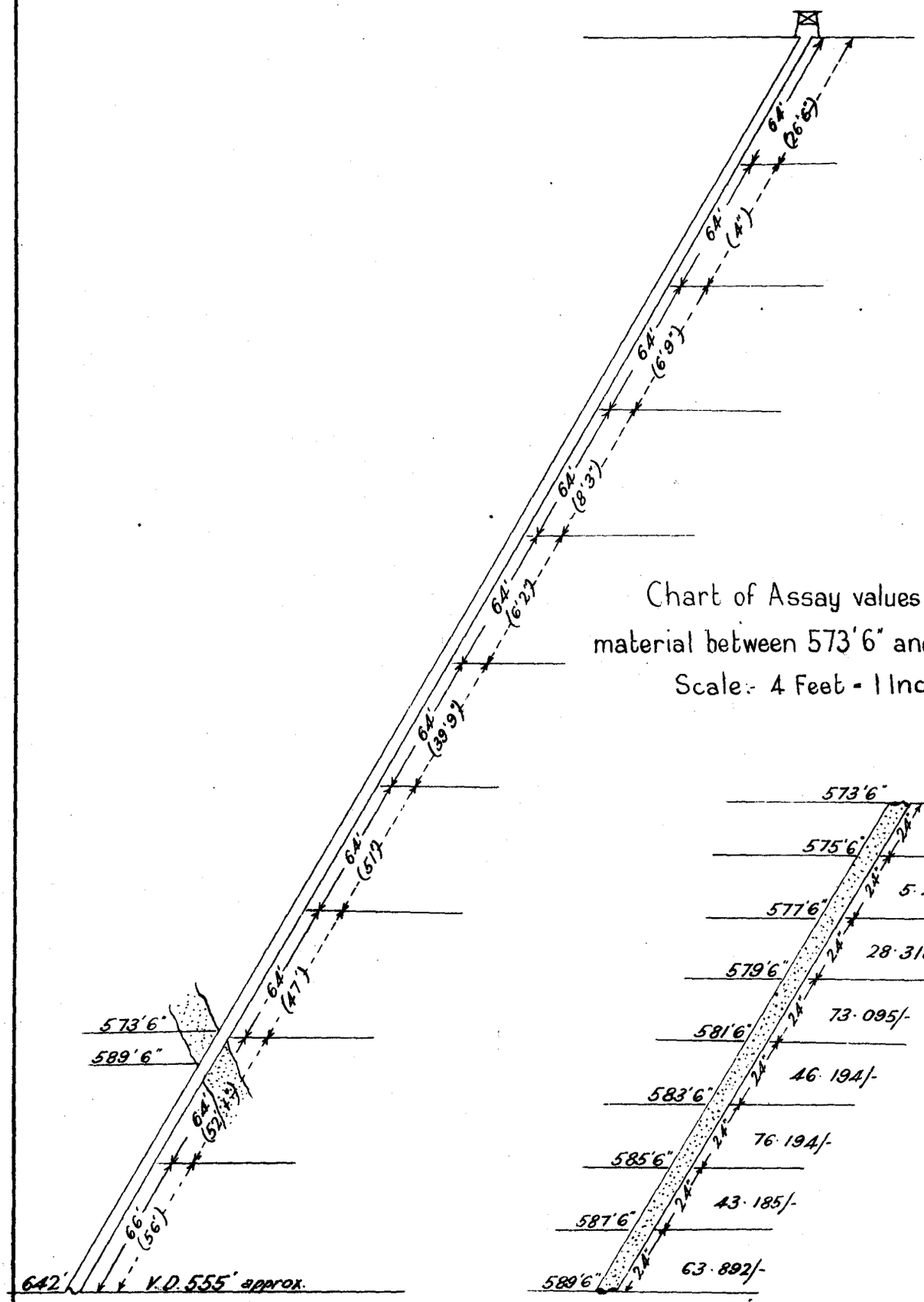


Chart of Assay values in lode material between 573'6" and 589' 6"
Scale:- 4 Feet - 1 Inch.

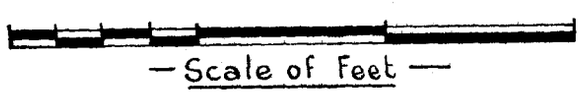
The figures in brackets indicate the length of core recovered from the corresponding section of boring.

Section N° 5 Bore

MARAROA G.M.

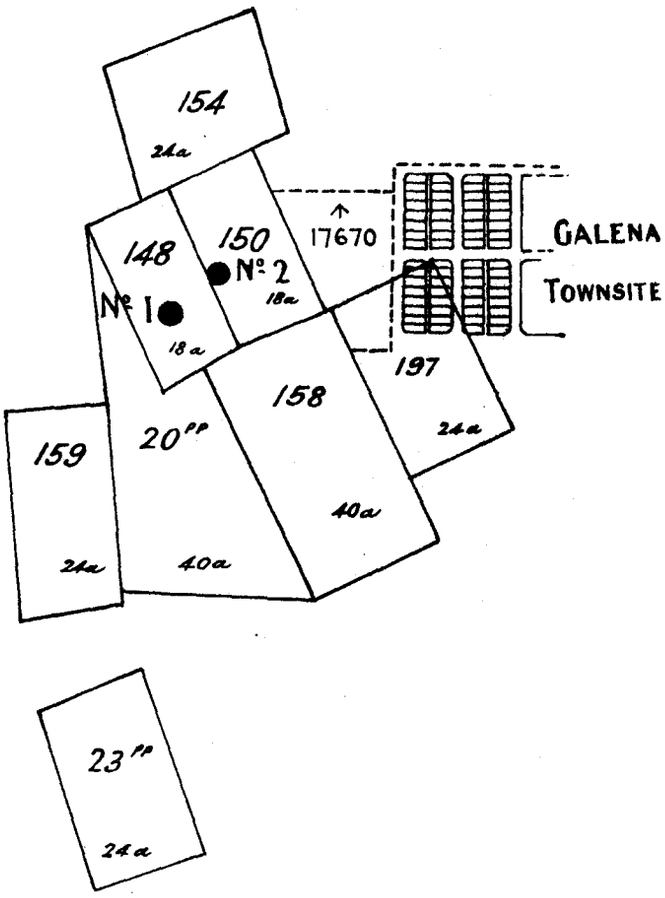
REEDY'S FIND

30 Miles N.E. of Cue



Figures in brackets indicate the length of core recovered from the corresponding section of boring.

Locality Plan
of Bores at
SURPRISE MINE
GALENA
— Scale:- 20. Chs. to an In. —

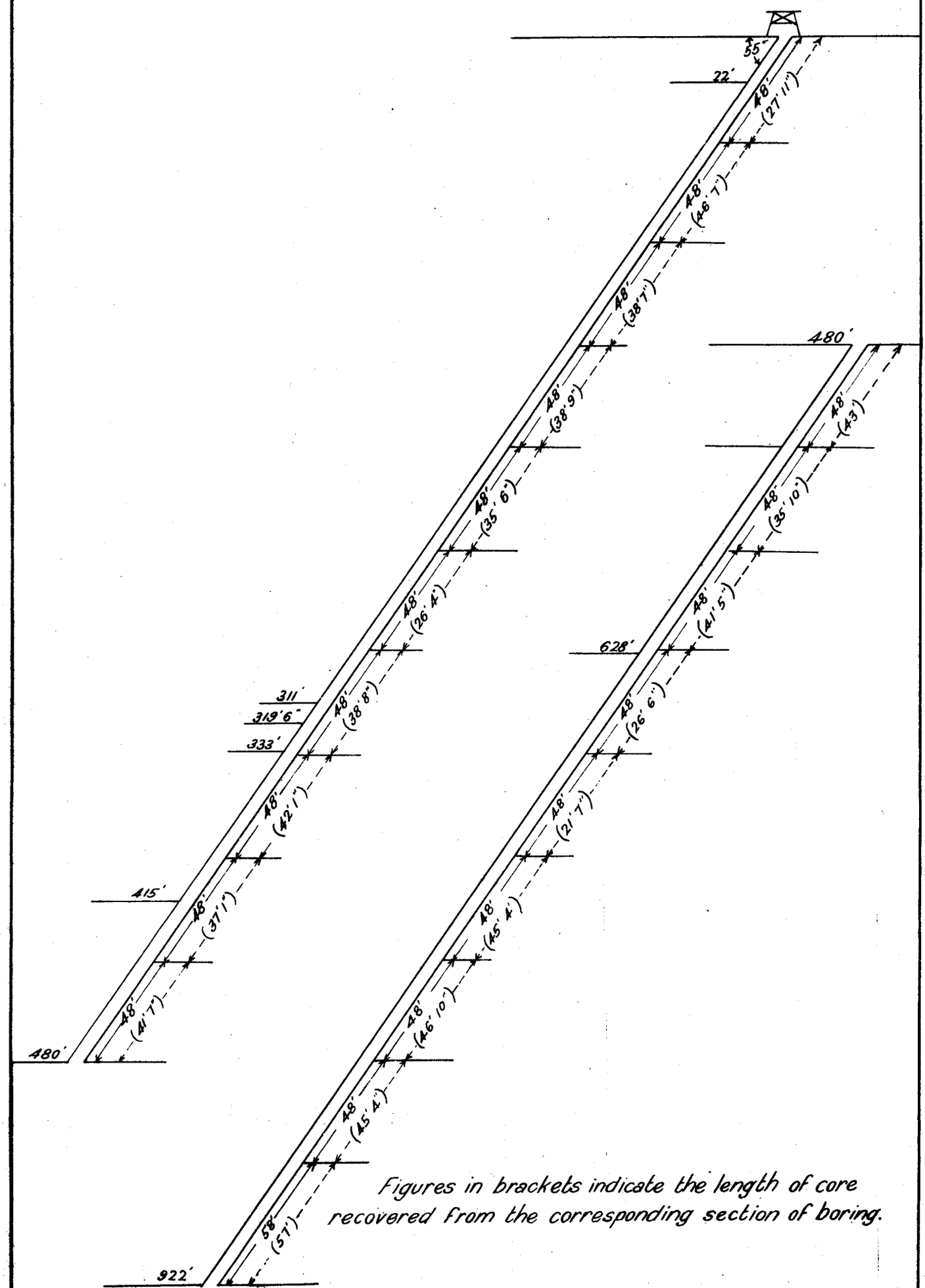


Section Nº 1 Bore

SURPRISE LEAD MINE

Galena, Northampton

— Scale:- 48 Ft. - 1 In. —



Figures in brackets indicate the length of core recovered from the corresponding section of boring.

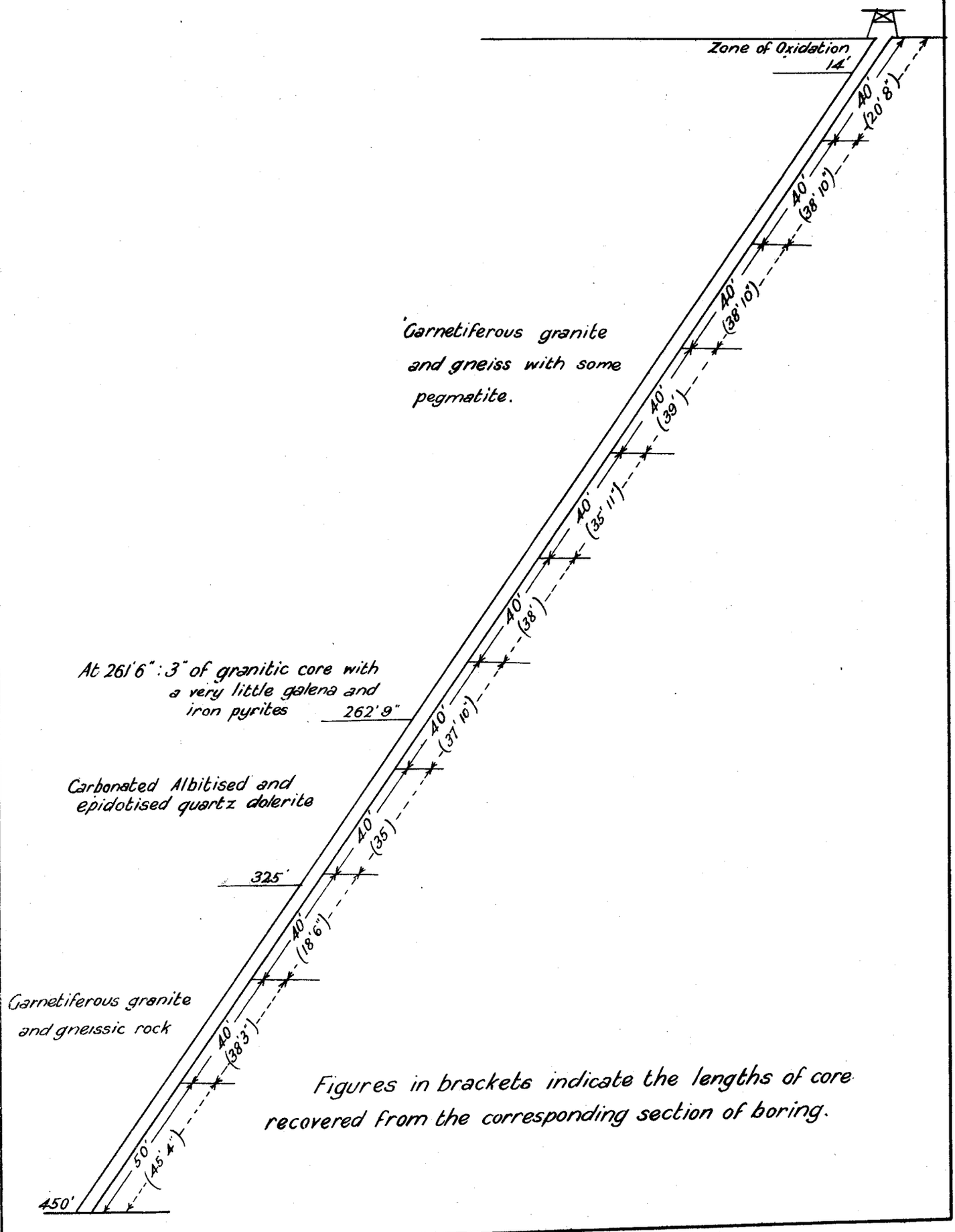
Section Nº 2 Bore

SURPRISE LEAD MINE

Galena, Northampton.

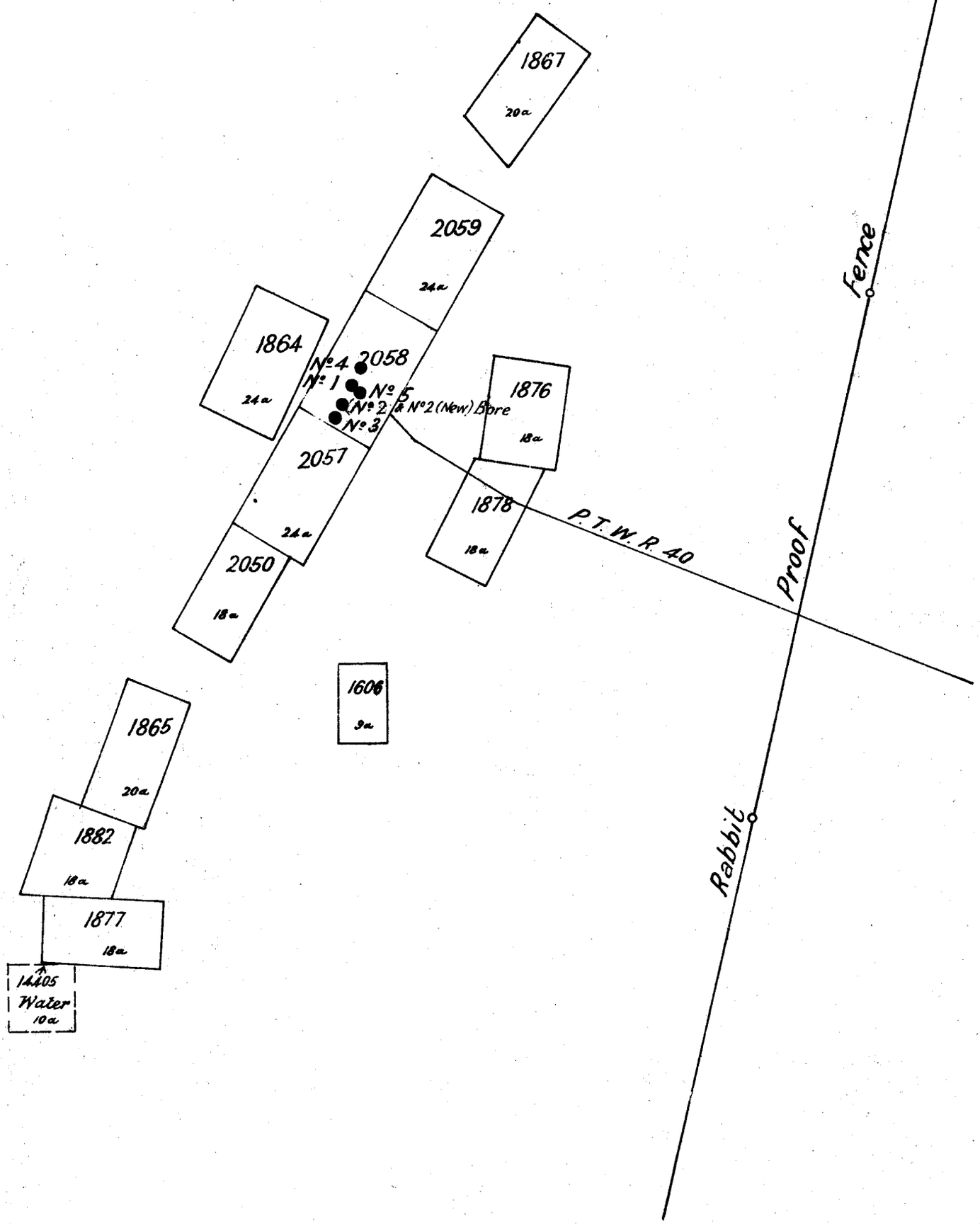
40 0 40 80

—Scale of Feet—



Figures in brackets indicate the lengths of core recovered from the corresponding section of boring.

Locality Plan
of Bores at
BIG BELL
COODARDIE
— Scale:- 20 Chs. to an In. —

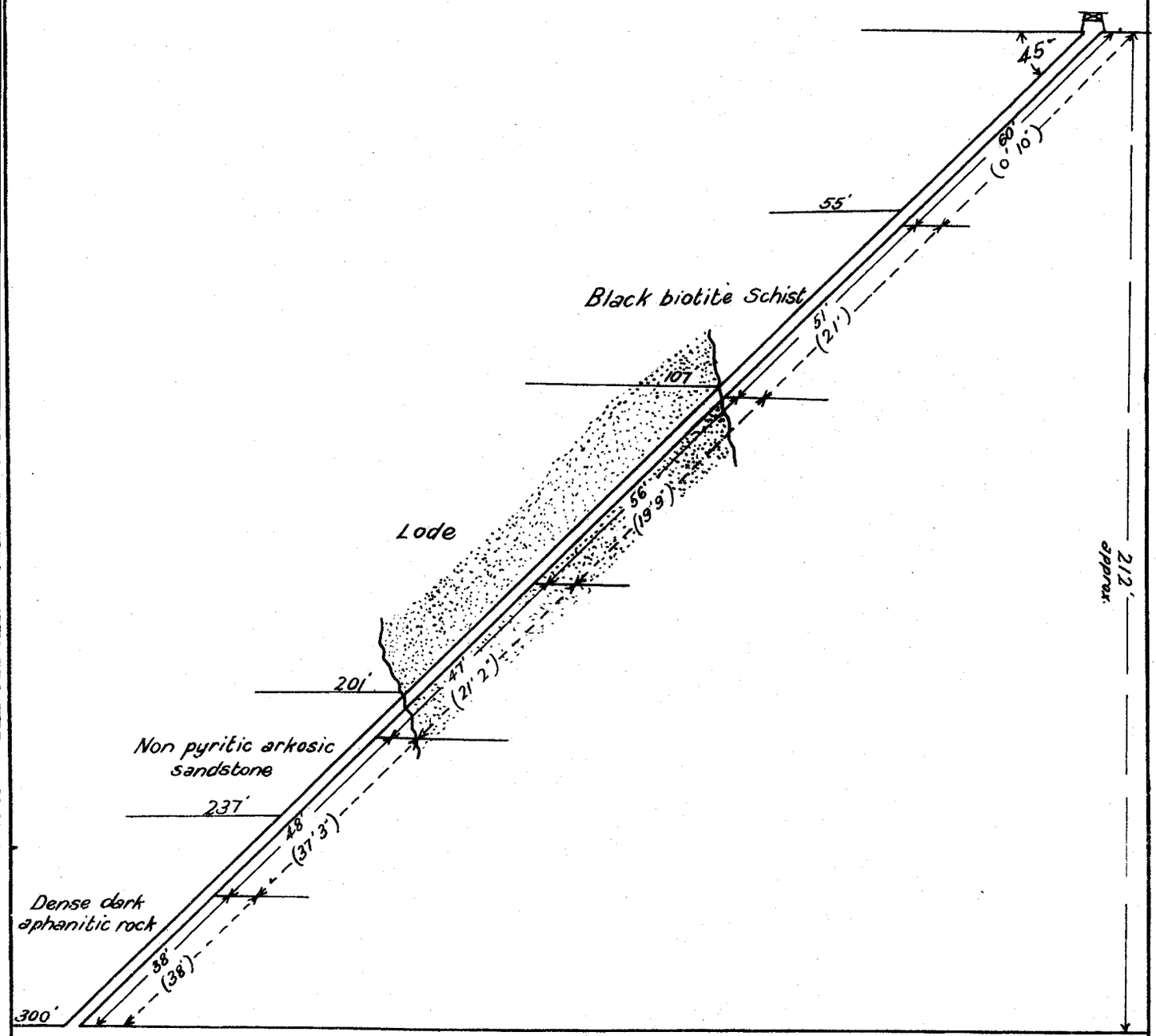


Section Nº 1 Bore

BIG BELL MINE

Cue

—Scale:- 32 Feet - 1 Inch —



Figures in brackets indicate the length of core recovered from the corresponding section of boring.

BIG BELL MINE

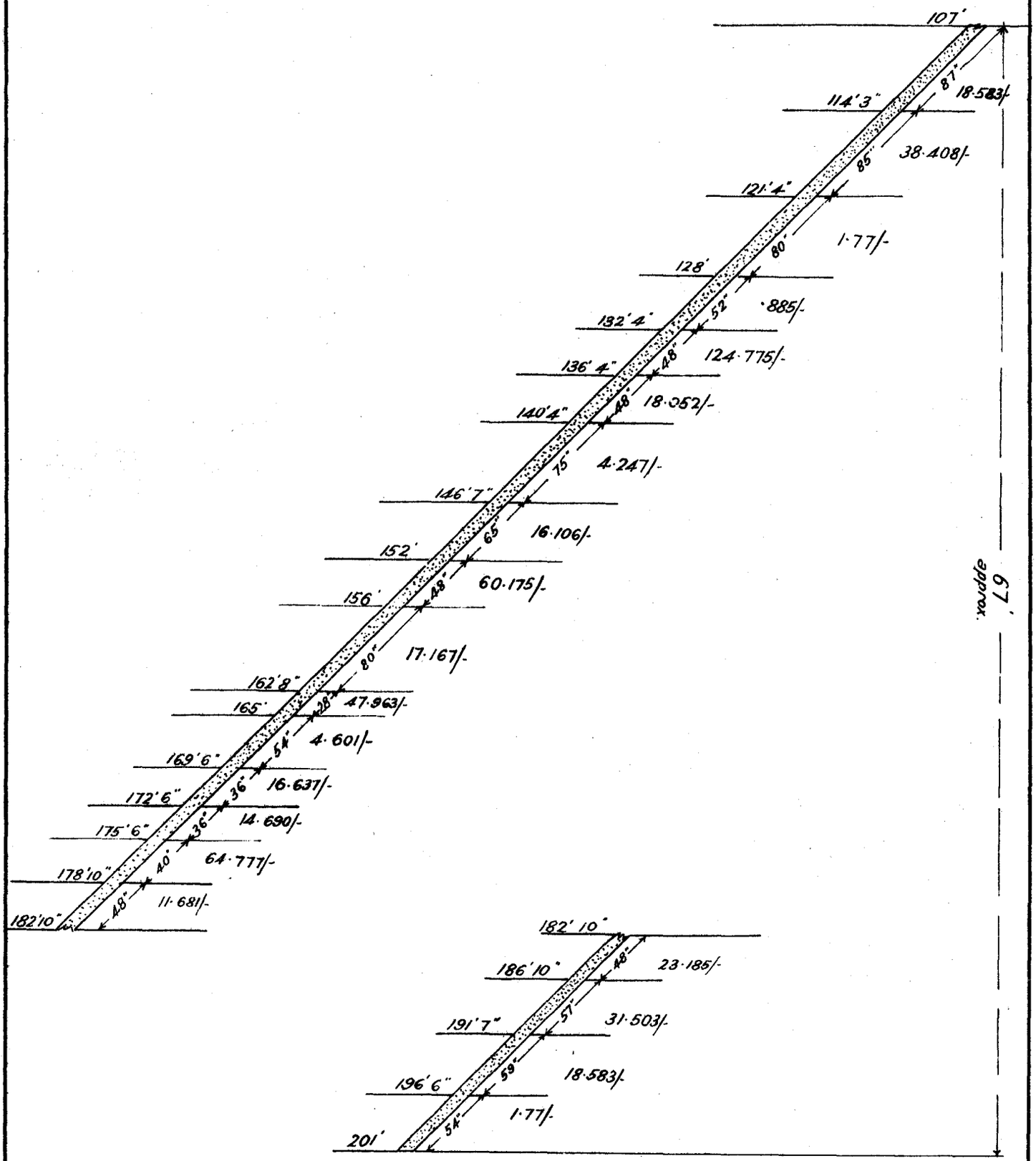
Cue

Section Nº 1 Bore

Chart of Assay values in lode material between 107 ft. and 201 ft.

8 0 8 16

— Scale of Feet —

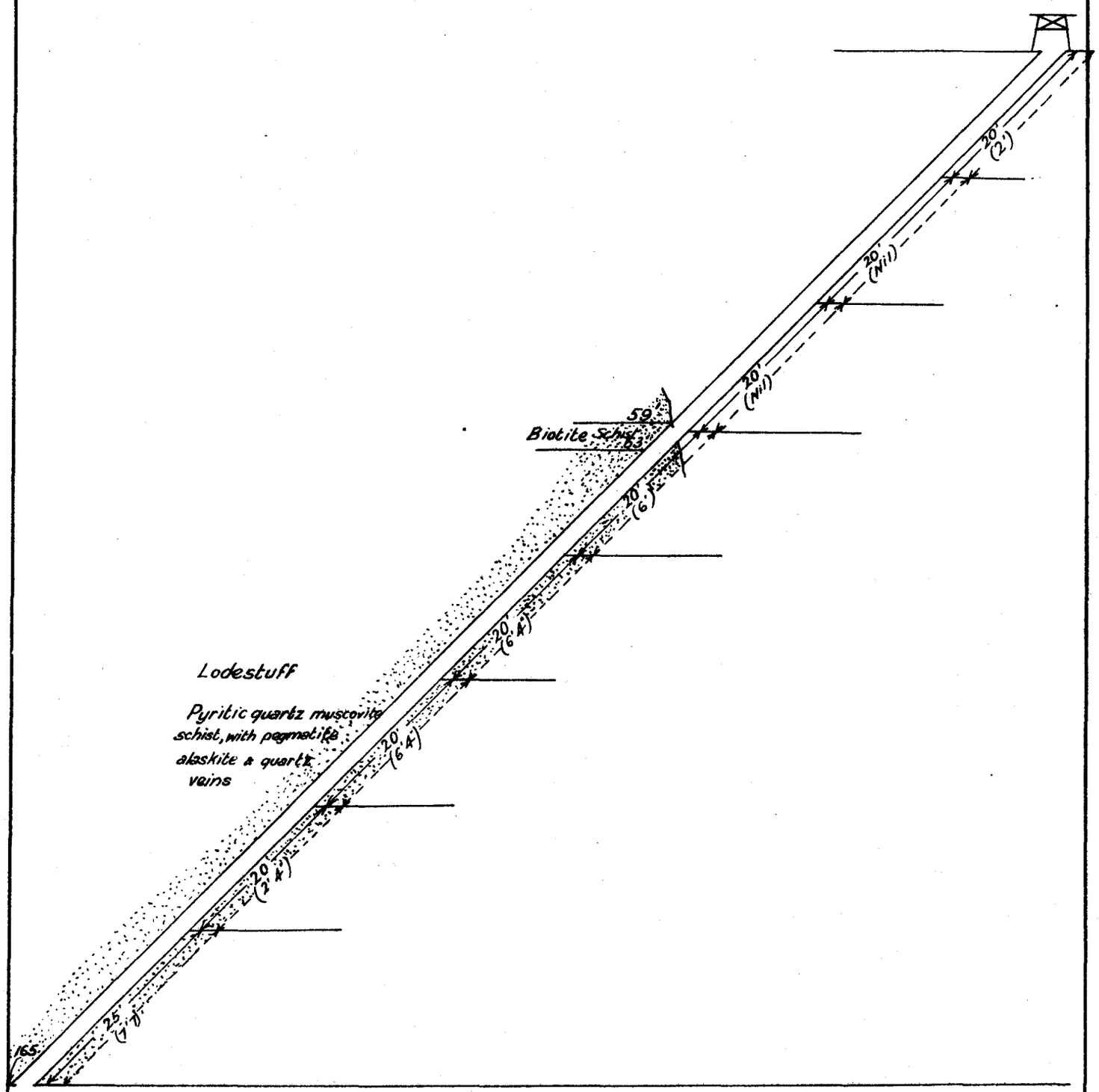


Section Nº 2 Bore (Abandoned)

BIG BELL MINE

Cue

— Scale: 16 Feet = 1 Inch —



Figures in brackets indicate the length of core recovered from the corresponding section of boring.

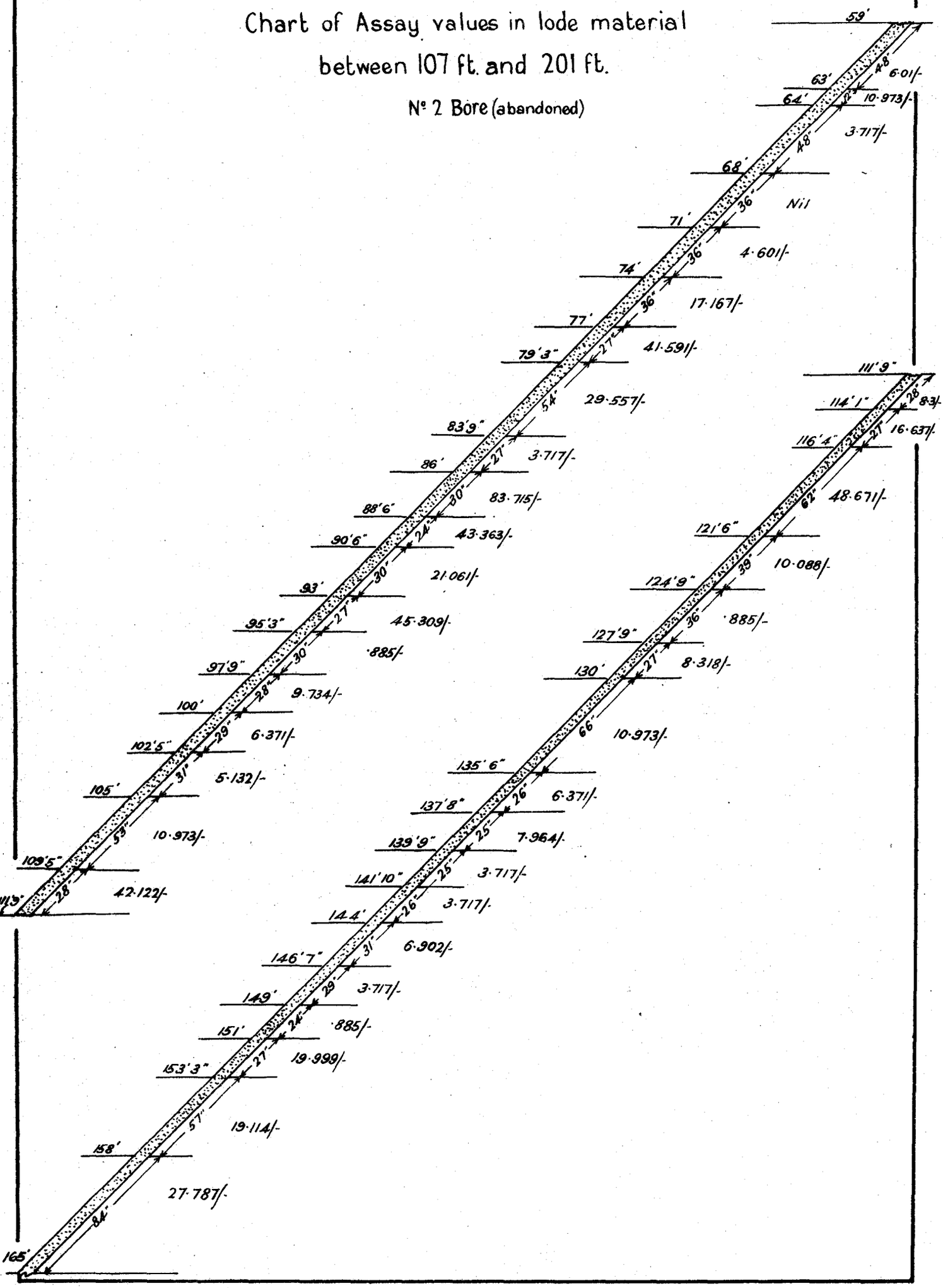
BIG BELL MINE

Cue

— Scale:- 5 Feet = 1 Inch —

Chart of Assay values in lode material between 107 ft. and 201 ft.

Nº 2 Bore (abandoned)

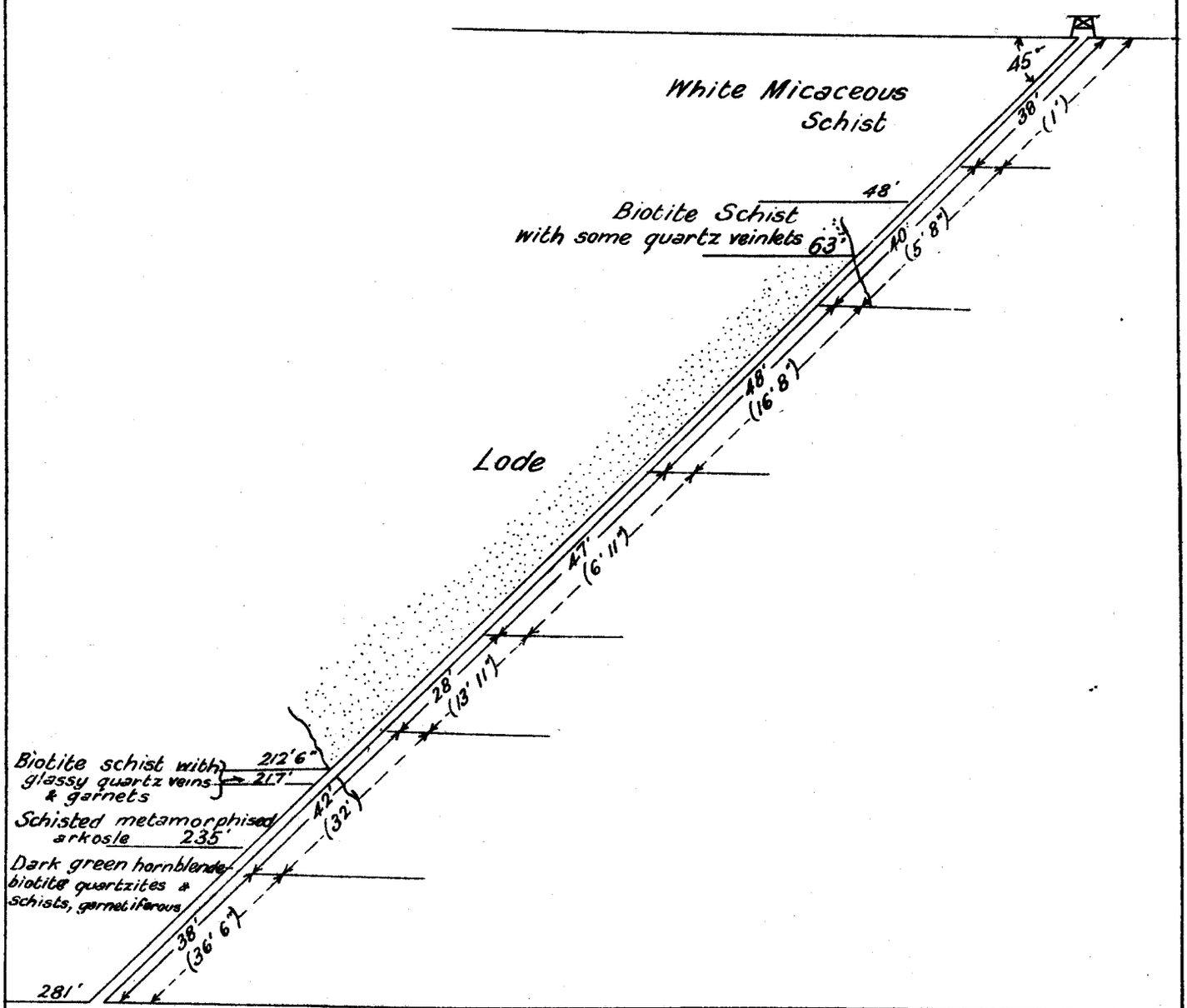


Section Nº 2 (New) Bore

BIG BELL MINE

Cue

—Scale:- 32 Feet - 1 Inch.—



Figures in brackets indicate the length of core recovered from the corresponding section of boring.

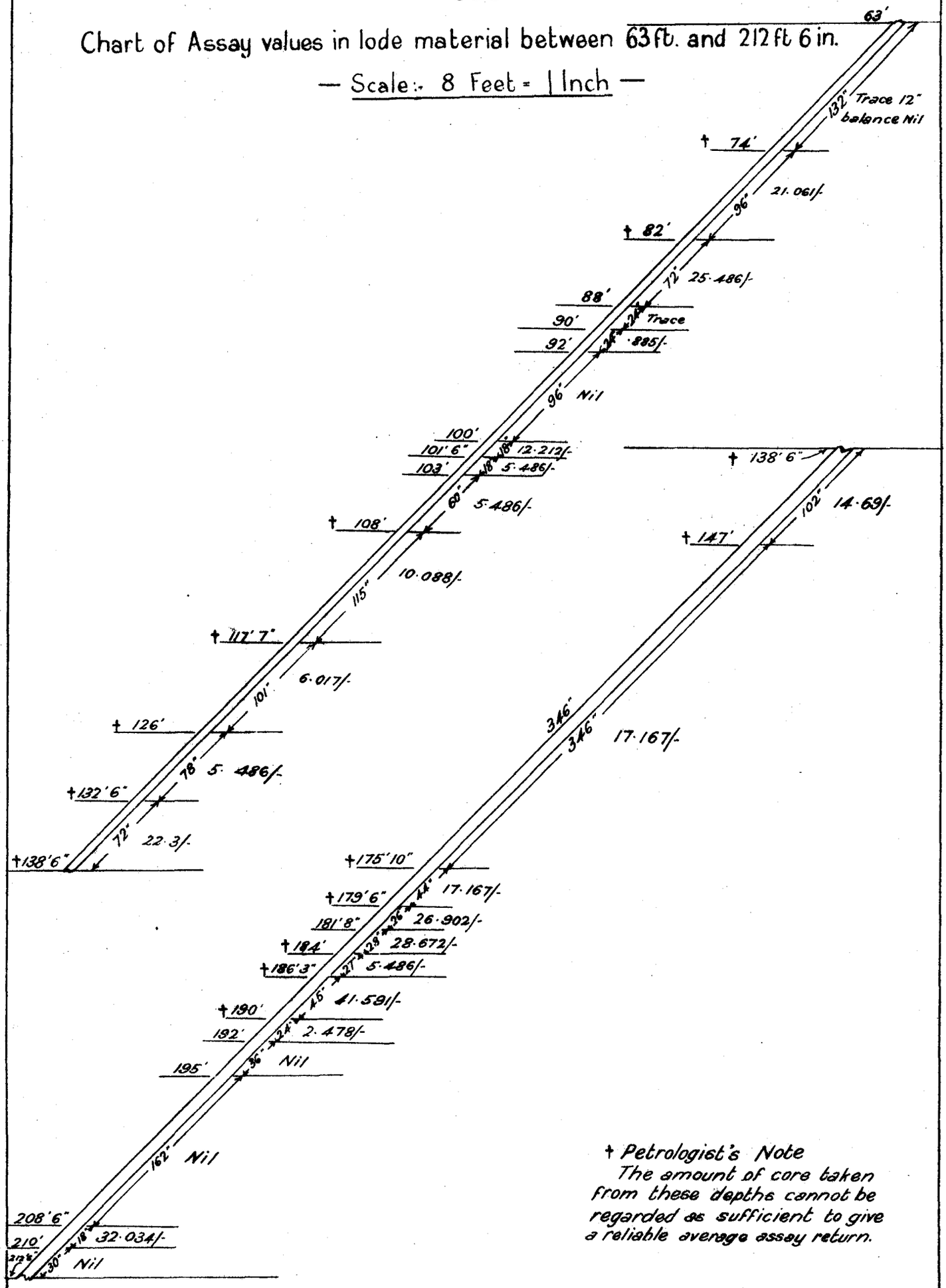
Section N°2 (New) Bore

BIG BELL MINE

Cue

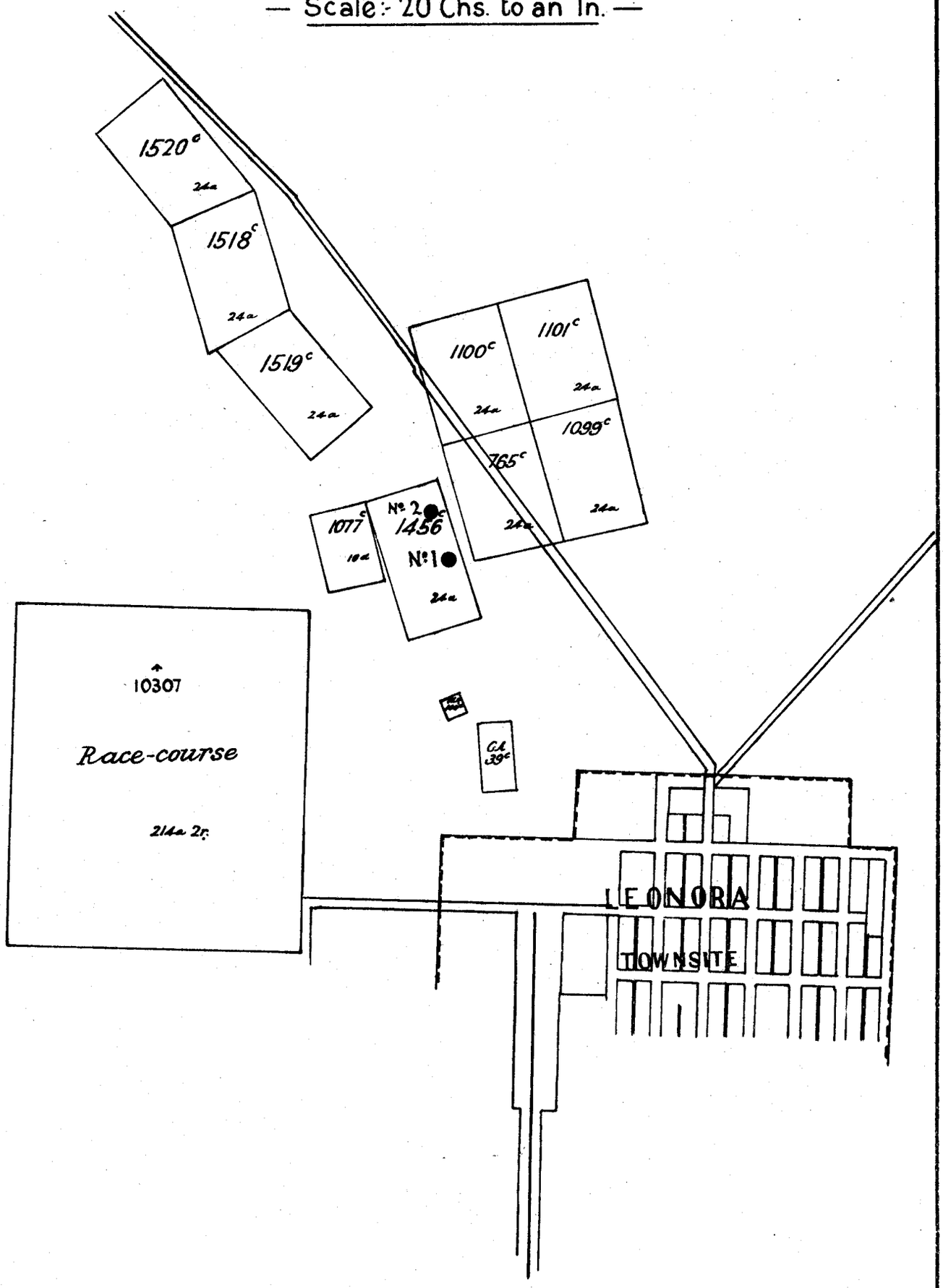
Chart of Assay values in lode material between 63 ft. and 212 ft 6 in.

— Scale:- 8 Feet = 1 Inch —



† Petrologist's Note
The amount of core taken from these depths cannot be regarded as sufficient to give a reliable average assay return.

Locality Plan
of Bores at
HARBOUR LIGHTS
LEONORA
— Scale:- 20 Chs. to an In. —



Section Nº 1 (New) Bore

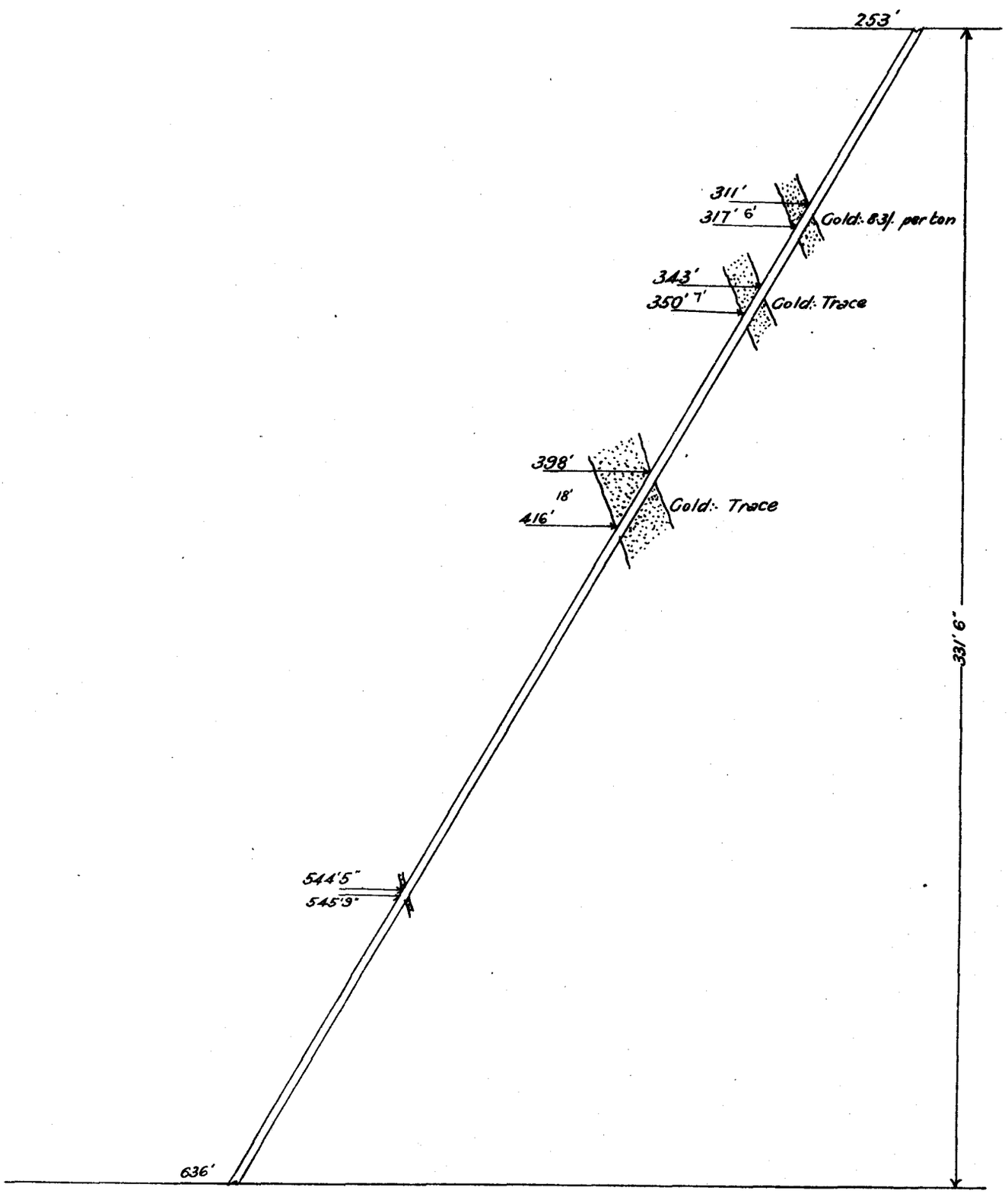
HARBOUR LIGHTS MINE

LEONORA

Assay chart of values in lode between 253 ft. and 636 ft.

40 0 40 80

— Scale of Feet —



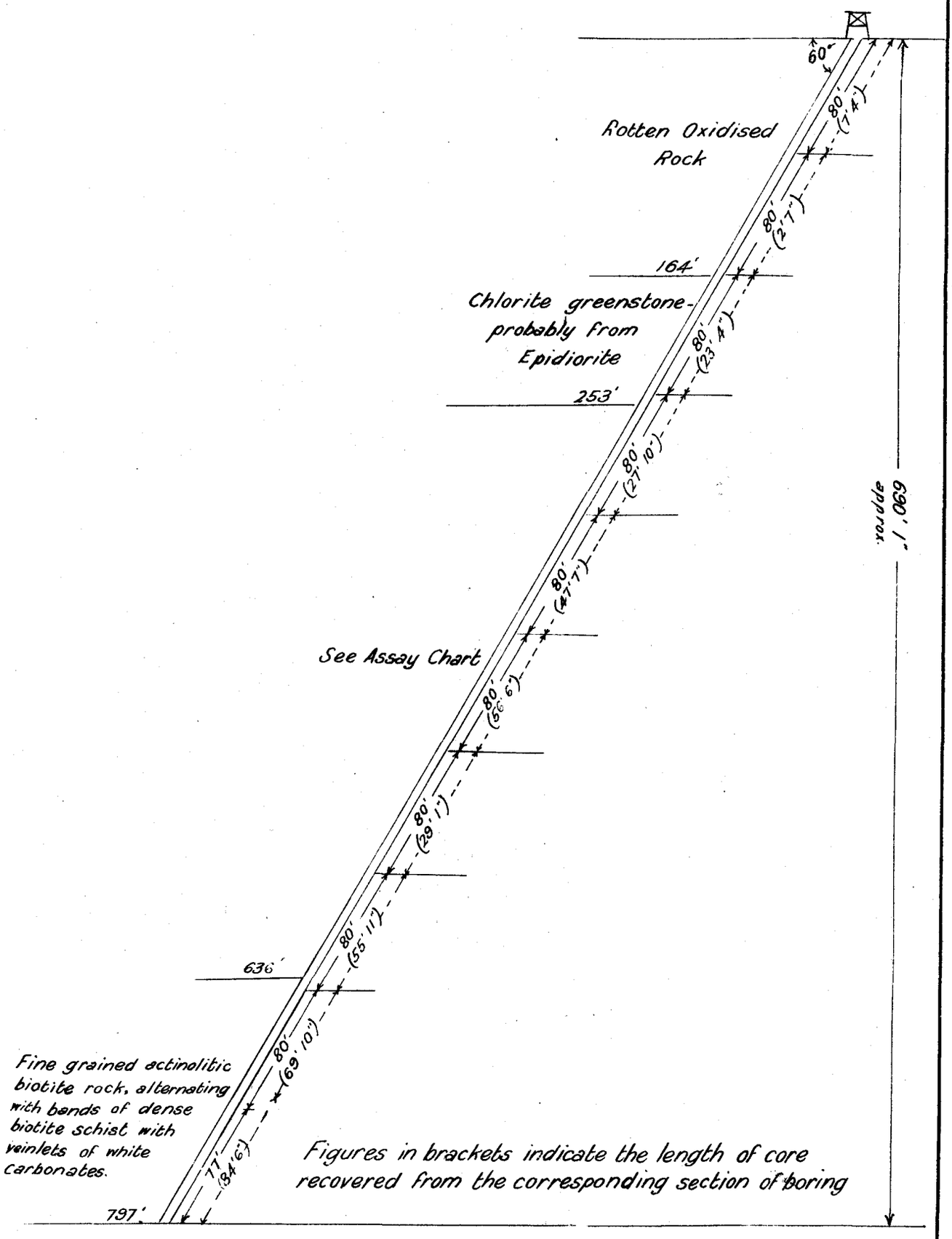
Section No. 1 (New) Bore

HARBOUR LIGHTS MINE

LEONORA

80 0 80 160

—Scale of Feet—

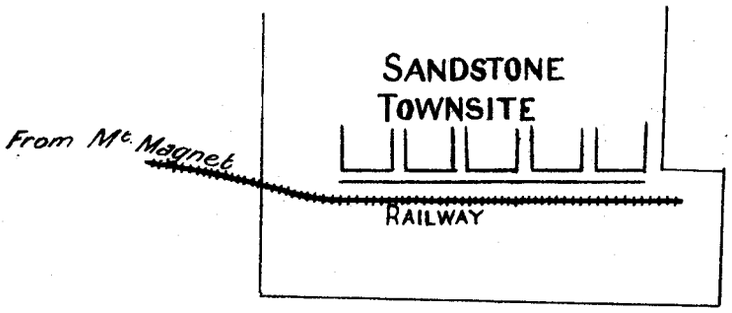


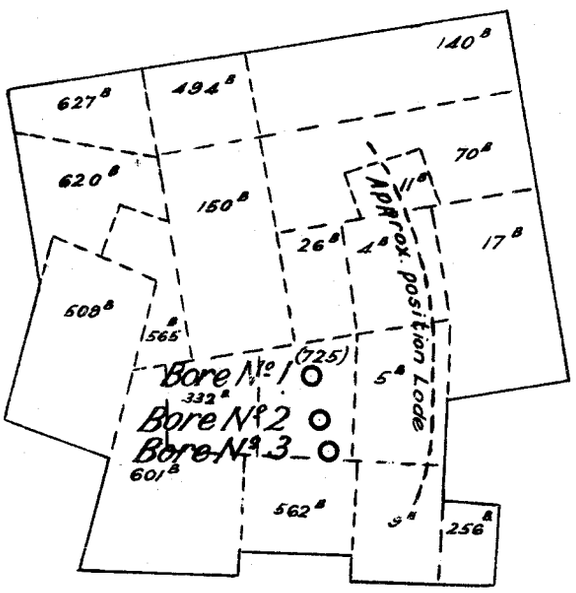
Figures in brackets indicate the length of core recovered from the corresponding section of boring

Locality Plan

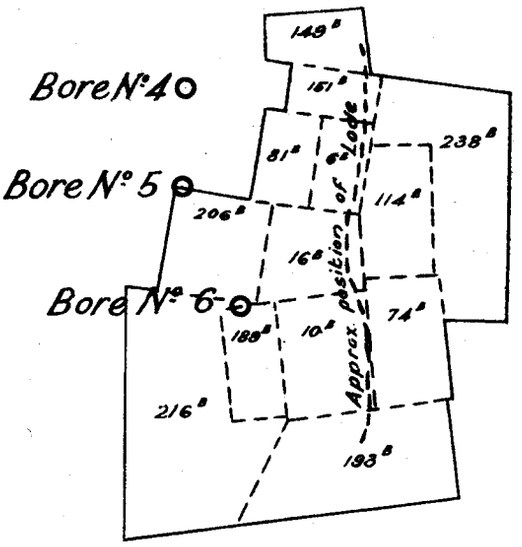
SHEWING POSITION OF BORES AT SANDSTONE

Scale:- 20 Chains = 1 Inch





Black Range & Black Range West
Gold Mining Cos. Leases.

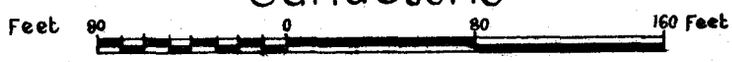


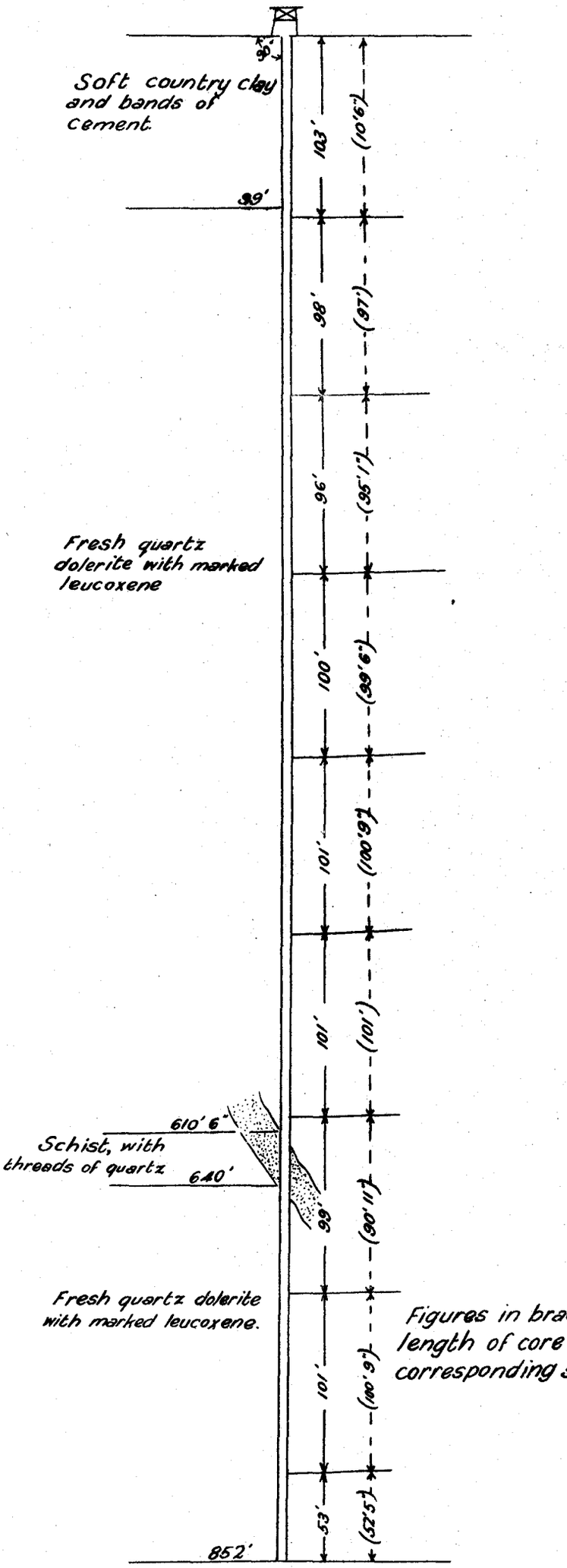
Oroya Black Range
Gold Mining Cos. Leases

Section Nº 1 Bore

BLACK RANGE G. M.

Sandstone





Figures in brackets indicate the length of core recovered from the corresponding section of boring.

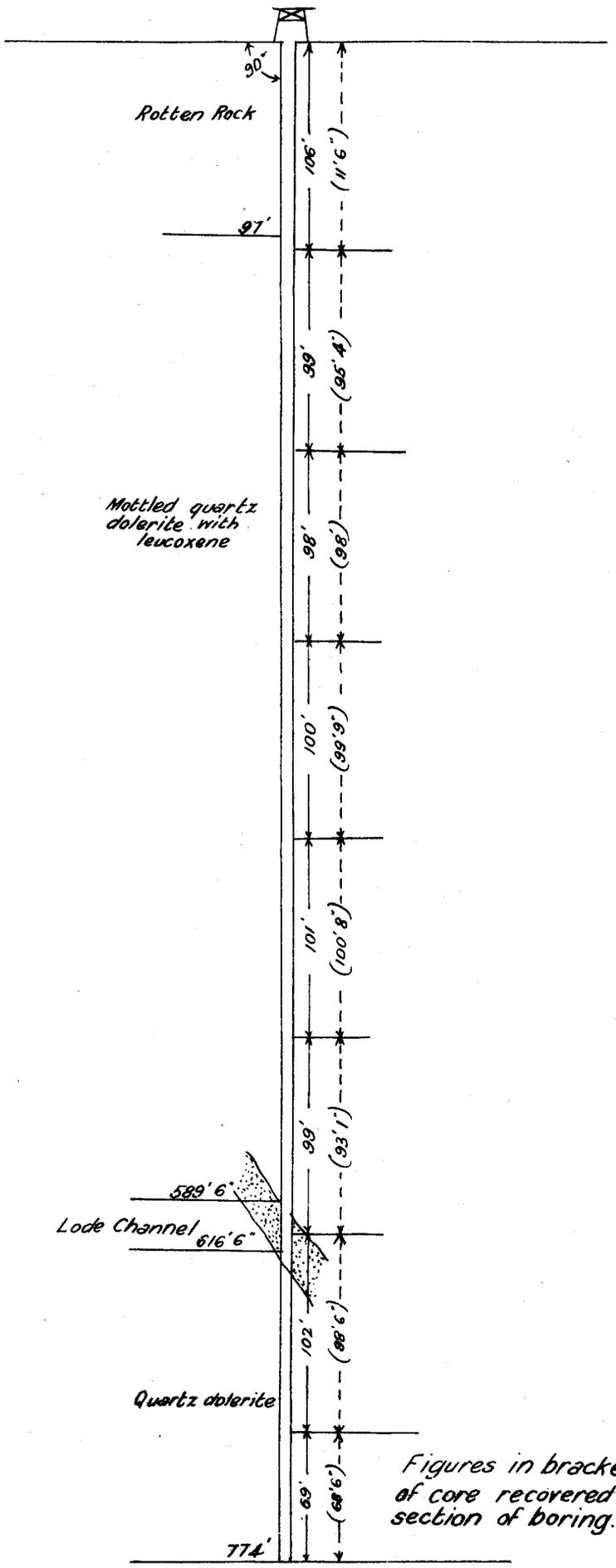
Section № 2 Bore

BLACK RANGE G.M.

Sandstone

80 0 80 160

— Scale of Feet —



Figures in brackets indicate the length of core recovered from the corresponding section of boring.

Section No 3 Bore

BLACK RANGE G. M.

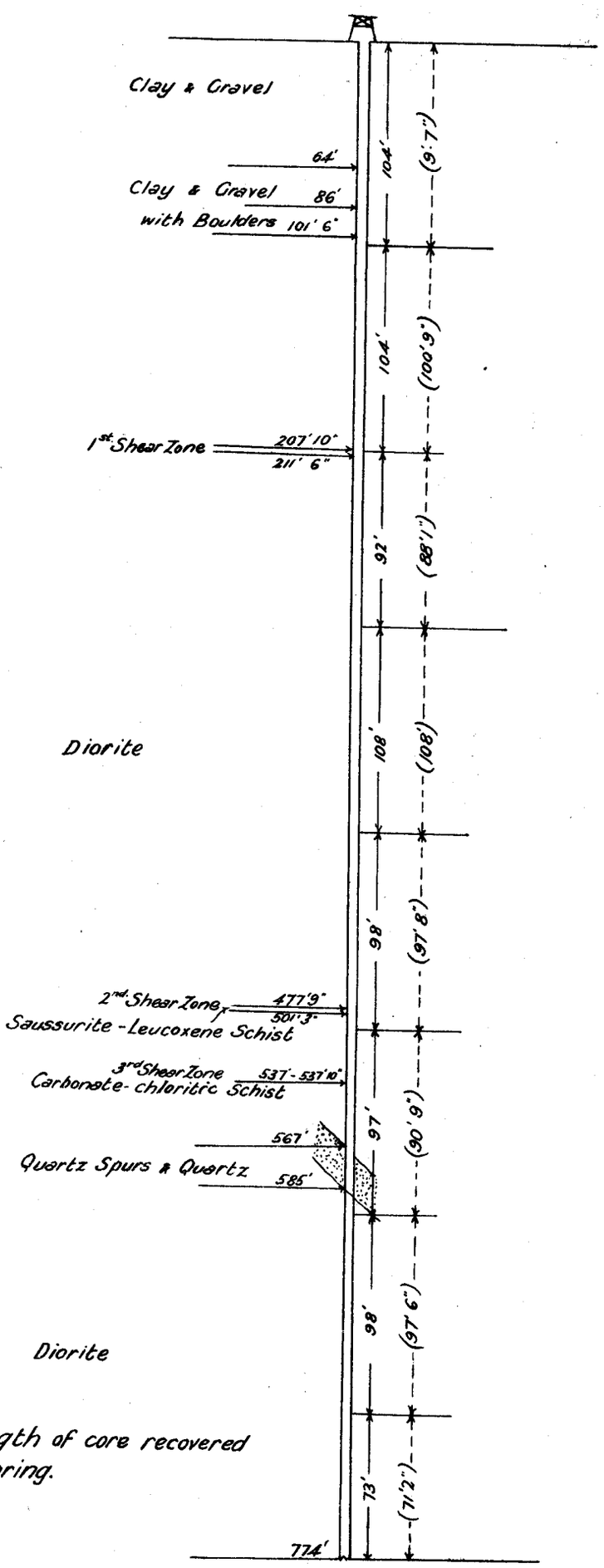
Sandstone

80 0 80 160

— Scale of Feet —

— Quartz —

207'6"	- 210'	Spurs
227'		1"
358'	- 368'	Threads
386'4"		1"
395'10"		3"
397'		1"
406'		3"
449'		2½"
453'		1½"
488'7"	- 489'2"	7"
568'9"	- 573'7"	Spurs
573'7"	- 579'7"	72"
595'10"		2"
730'		4"
759'		14"



Figures in brackets indicate the length of core recovered from the corresponding section of boring.

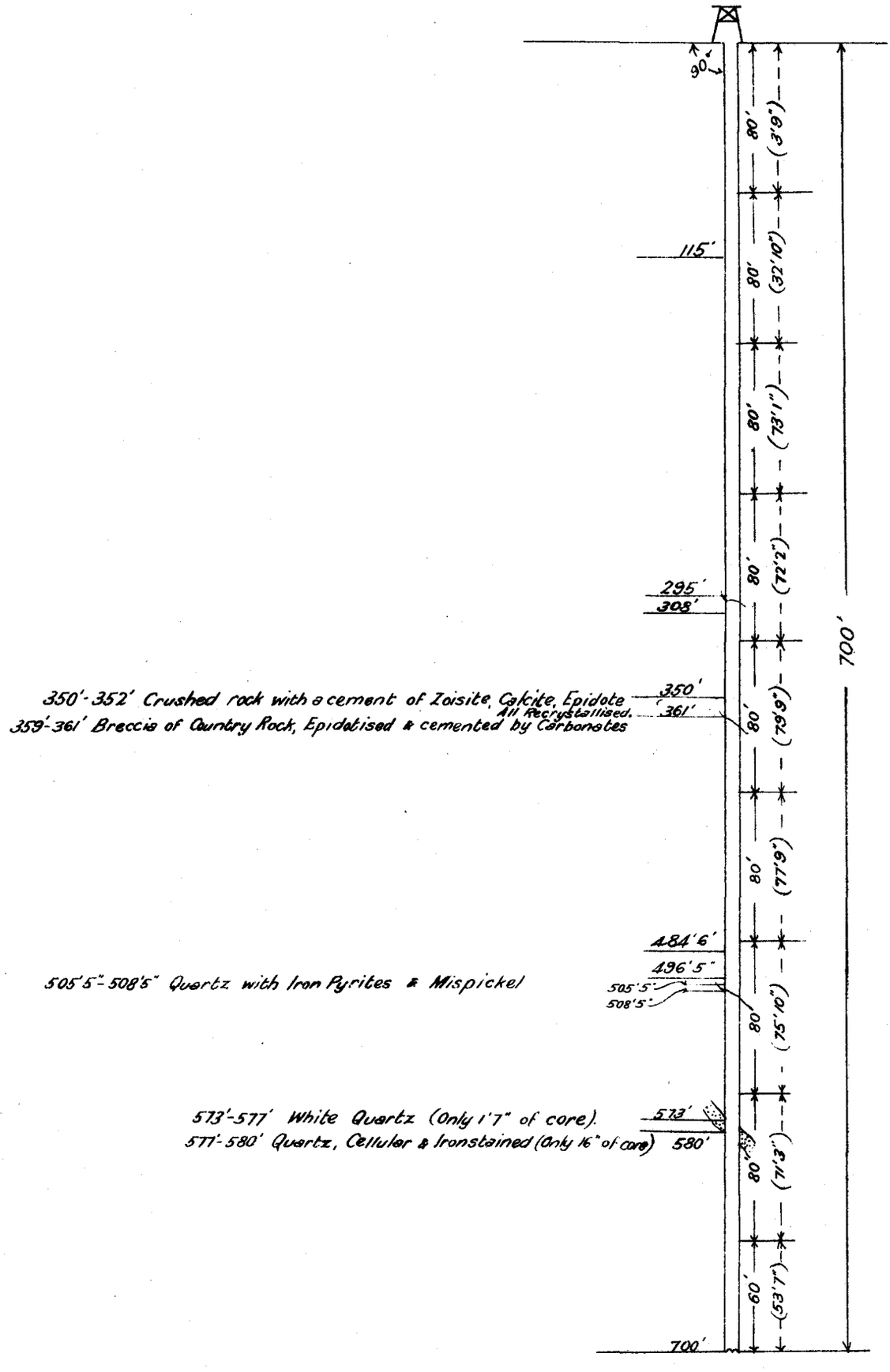
Section Nº 4 Bore

OROYA G. M.

Sandstone

80 0 80 160

—Scale of Feet—



Figures in brackets indicate the length of core recovered from the corresponding section of boring.

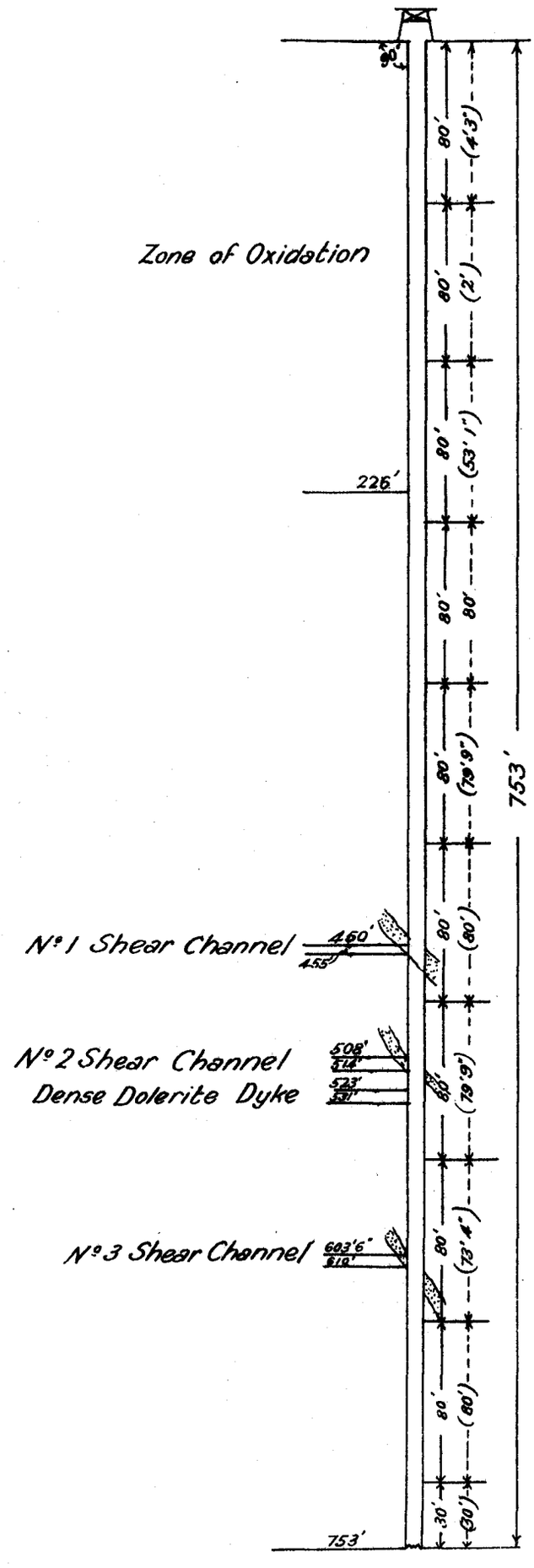
Section Nº 5 Bore

OROYA G. M.

Sandstone

80 0 80 160

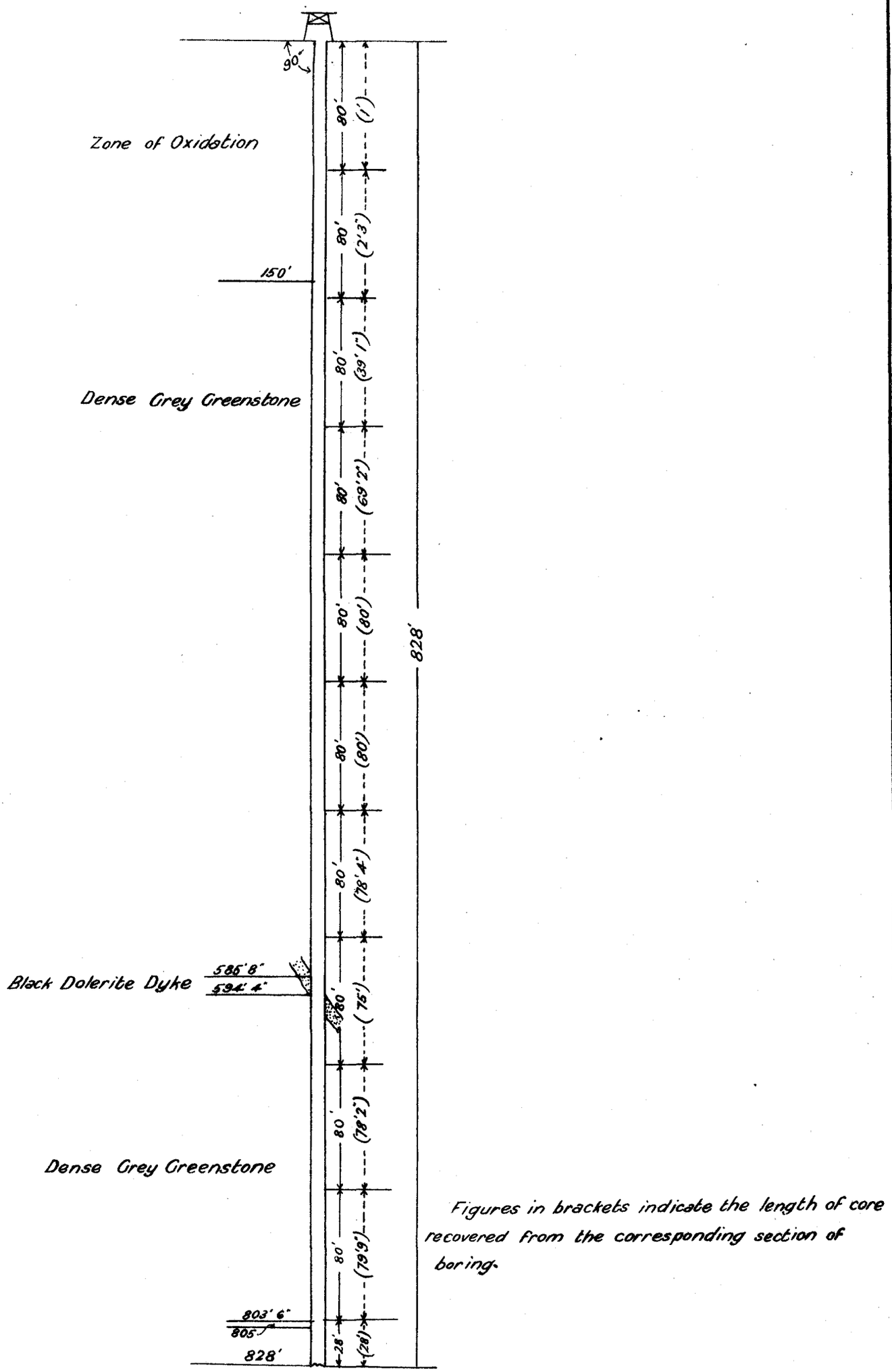
-Scale of Feet-



Figures in brackets indicate the length of core recovered from the corresponding section of boring.

Section Nº 6 Bore
OROYA G. M.
Sandstone

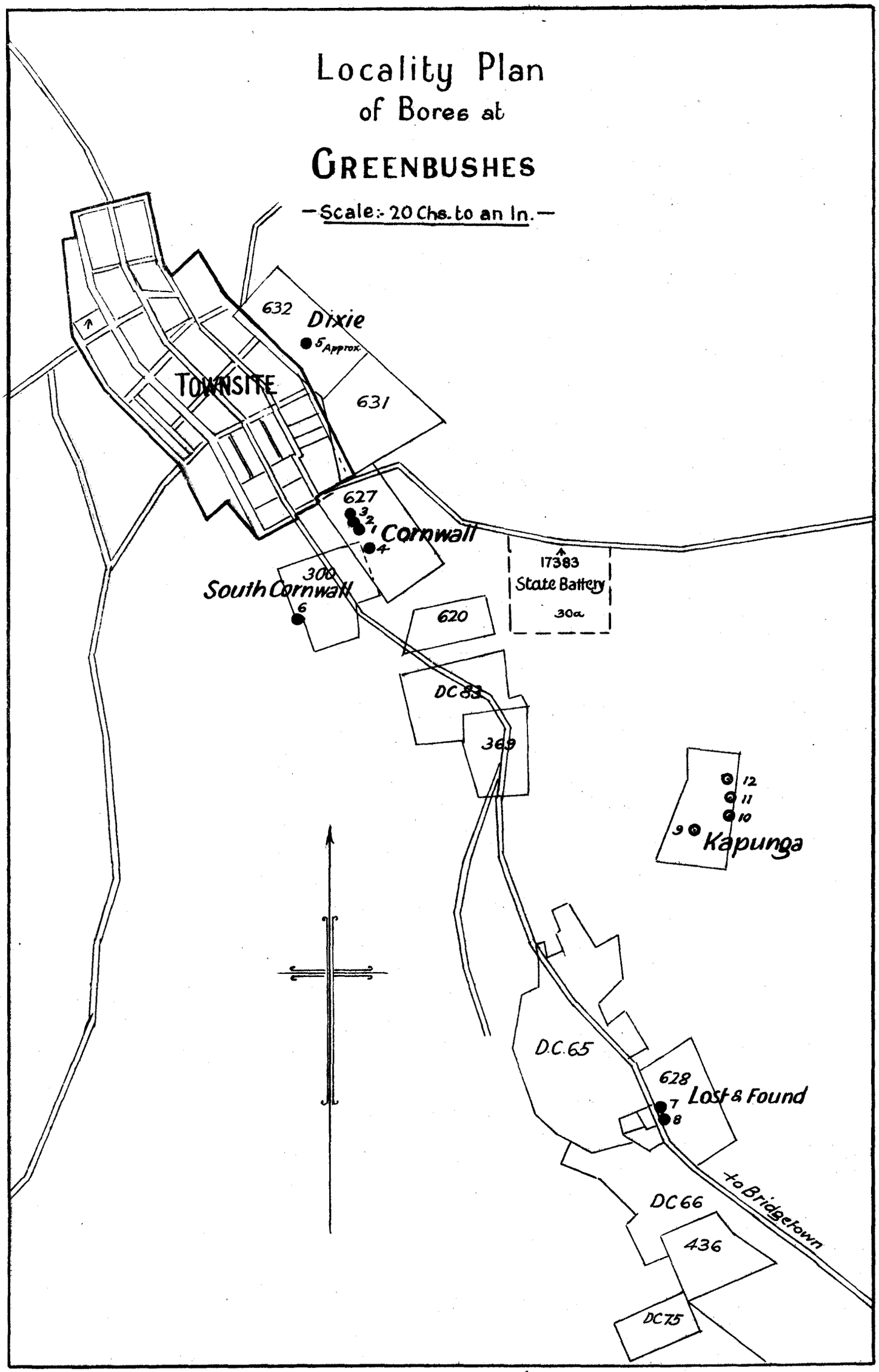
-Scale of Feet-



Figures in brackets indicate the length of core recovered from the corresponding section of boring.

Locality Plan
of Bores at
GREENBUSHES

—Scale:- 20 Chs. to an In.—



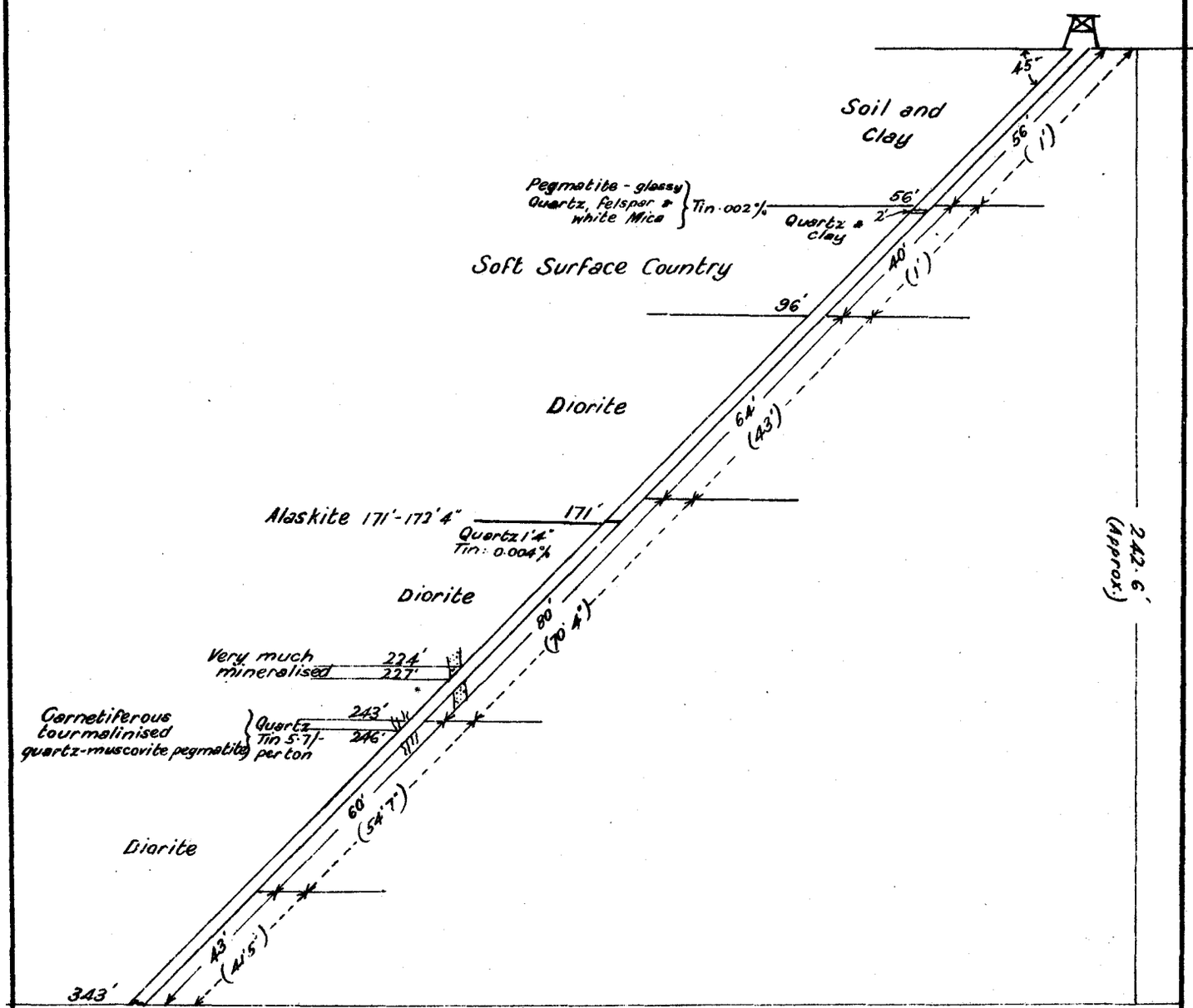
Section Nº 1 Bore

CORNWALL MINE

Greenbushes

40 0 40 80

Scale of Feet



Figures in brackets indicate the length of core recovered from the corresponding section of boring.

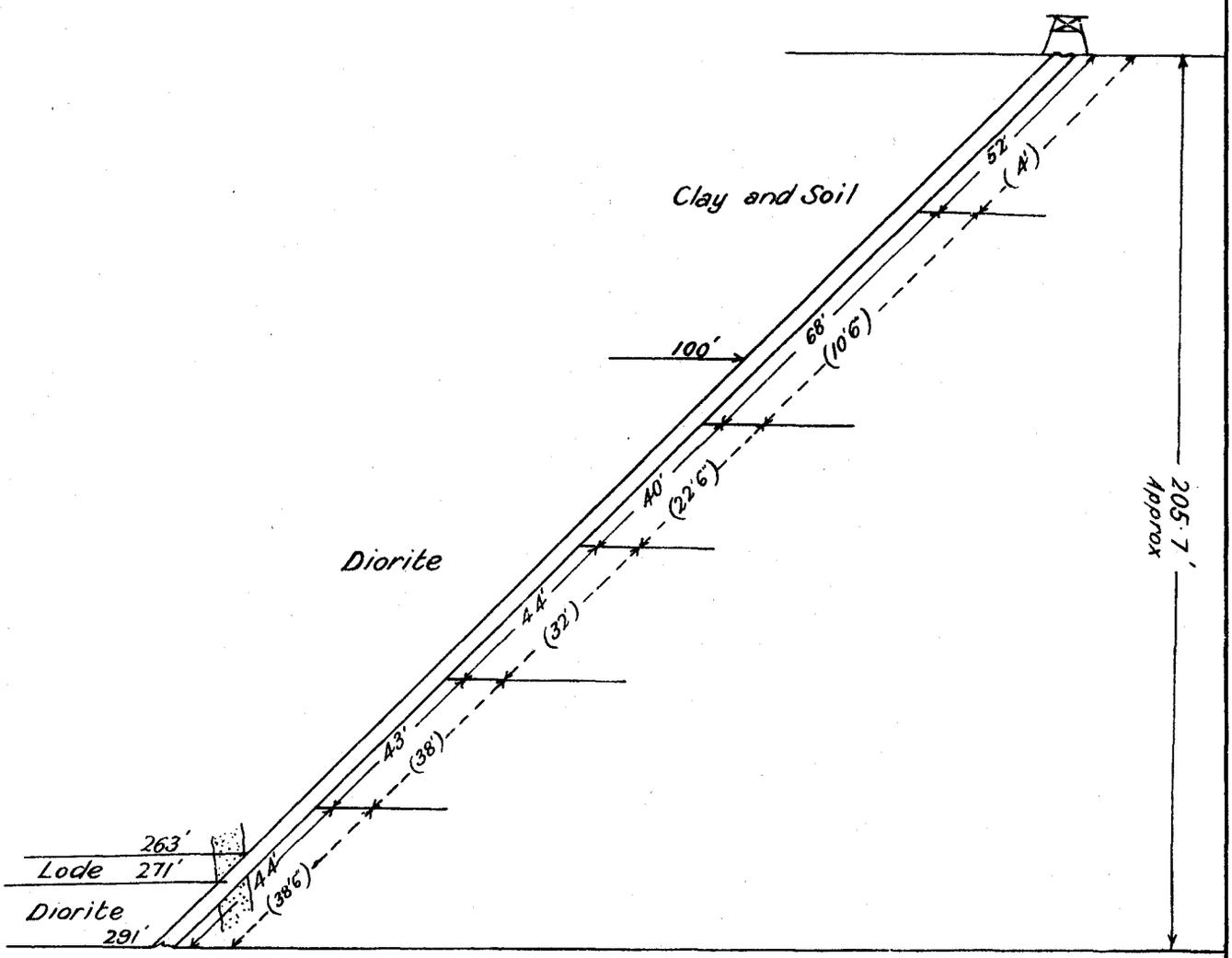
Section Nº 2 Bore

CORNWALL MINE

Greenbushes

40 0 40 80

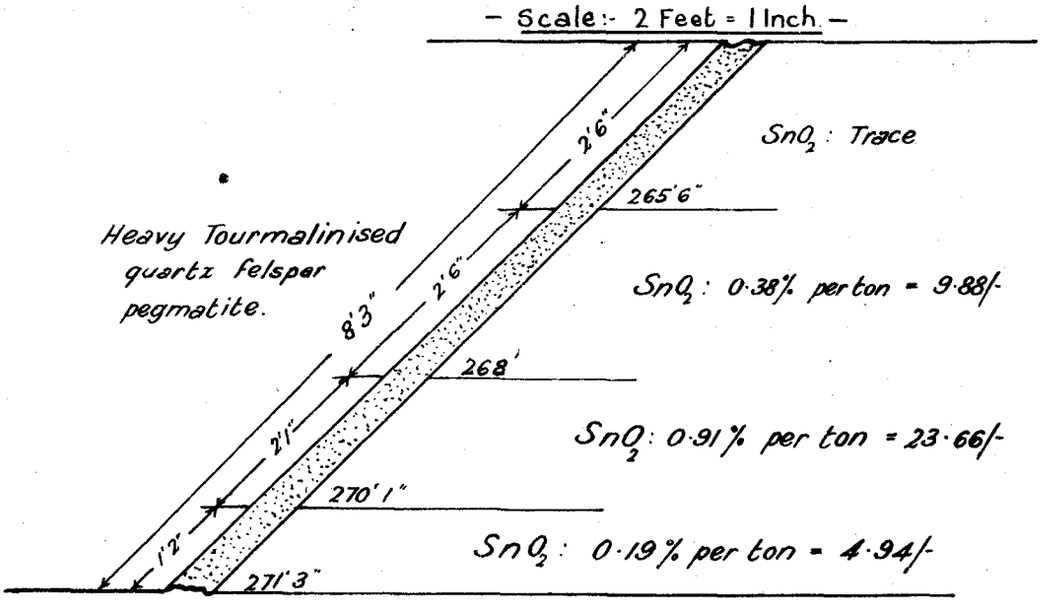
— Scale of Feet —



Figures in brackets indicate the length of core recovered from the corresponding section of boring.

Assay chart of values between 263 ft. & 271 ft 3 in.

— Scale:- 2 Feet = 1 Inch. —



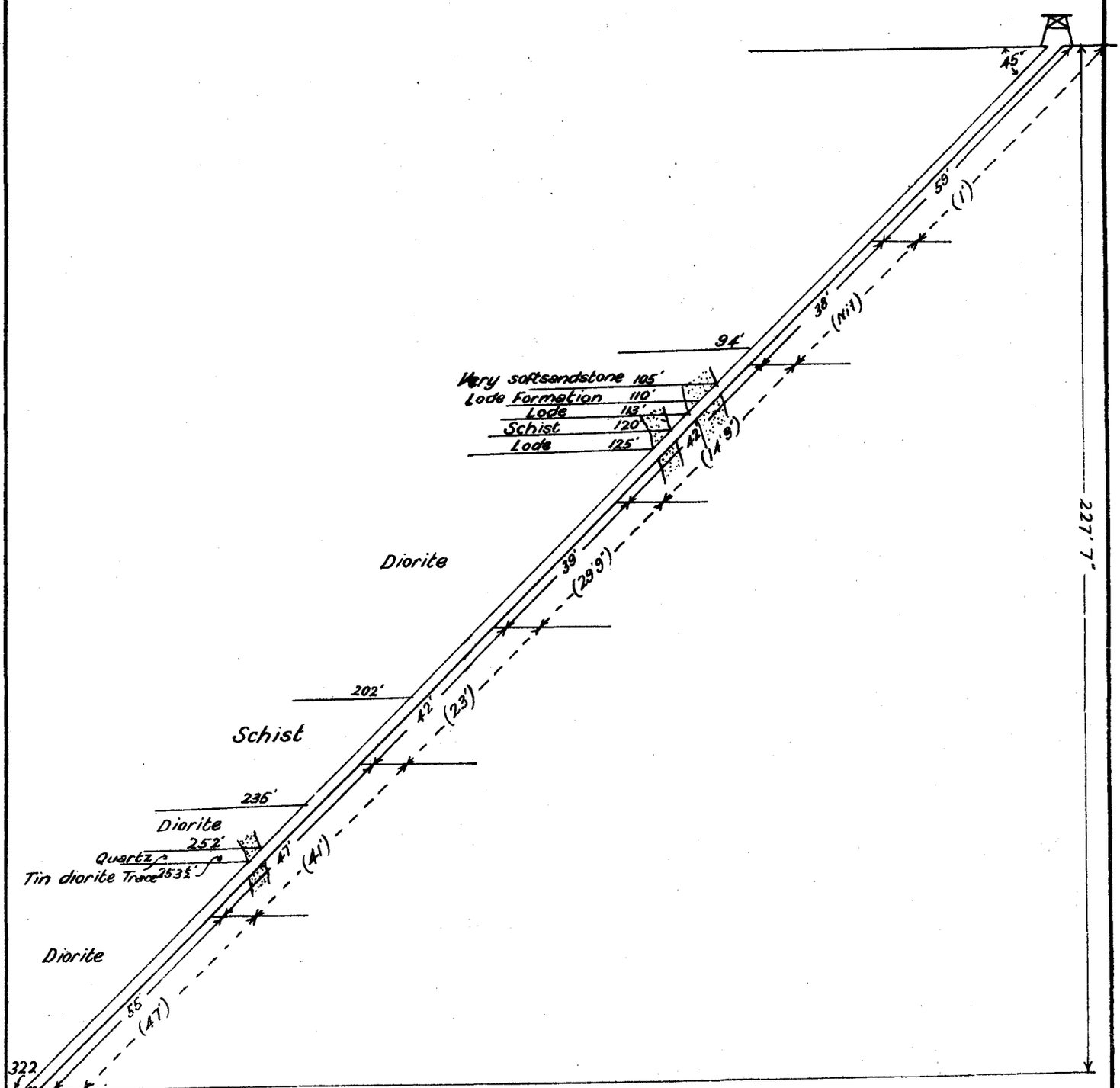
Tin at 26/- per unit.

Section Nº 3 Bore

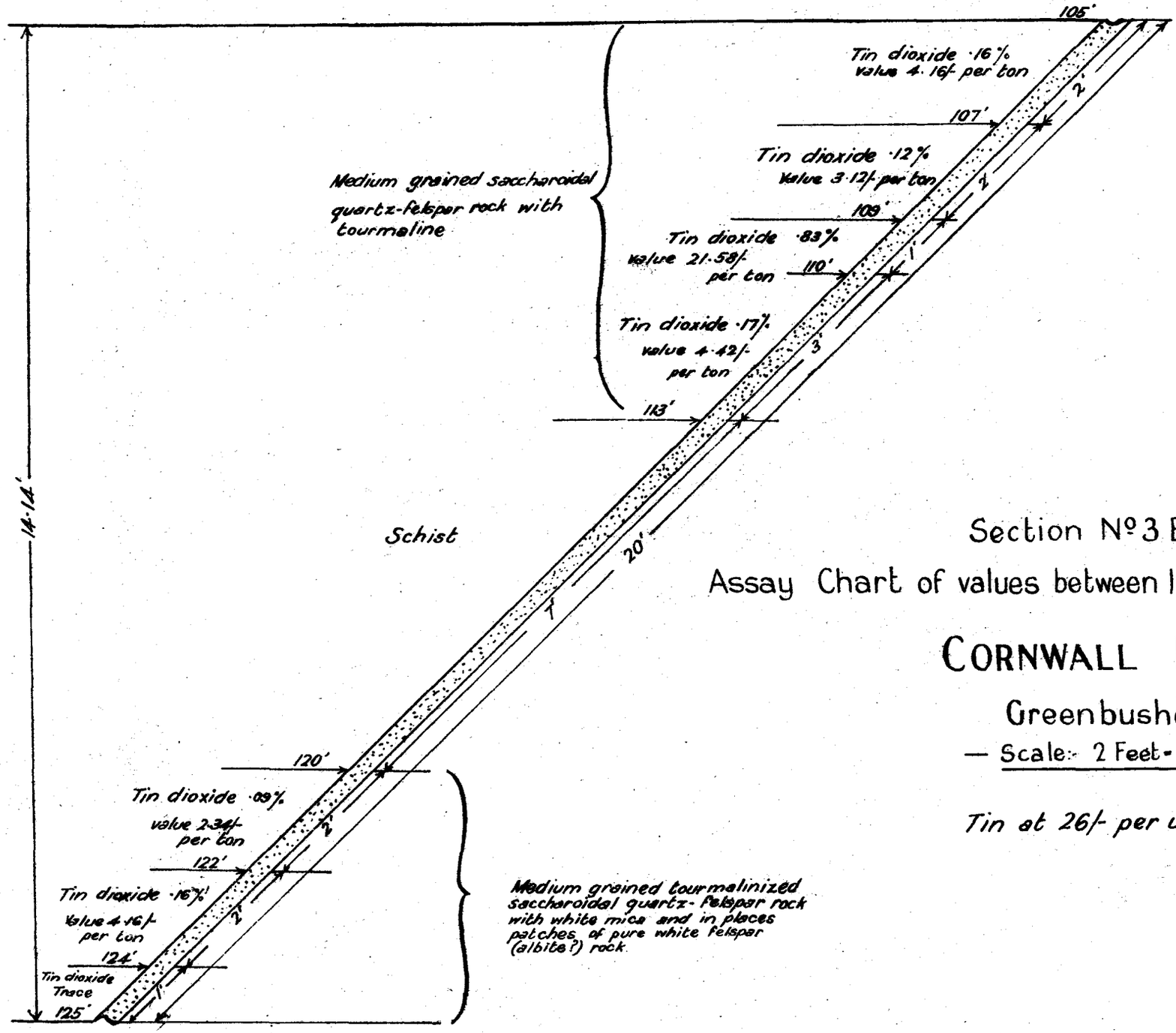
CORNWALL MINE

Greenbushes

– Scale:- 32 Feet - 1 Inch –



Figures in brackets indicate the length of core recovered from the corresponding section of boring.



Section Nº 3 Bore

Assay Chart of values between 105' & 113', & 120' & 125'

CORNWALL MINE

Greenbushes

— Scale:- 2 Feet-1 Inch —

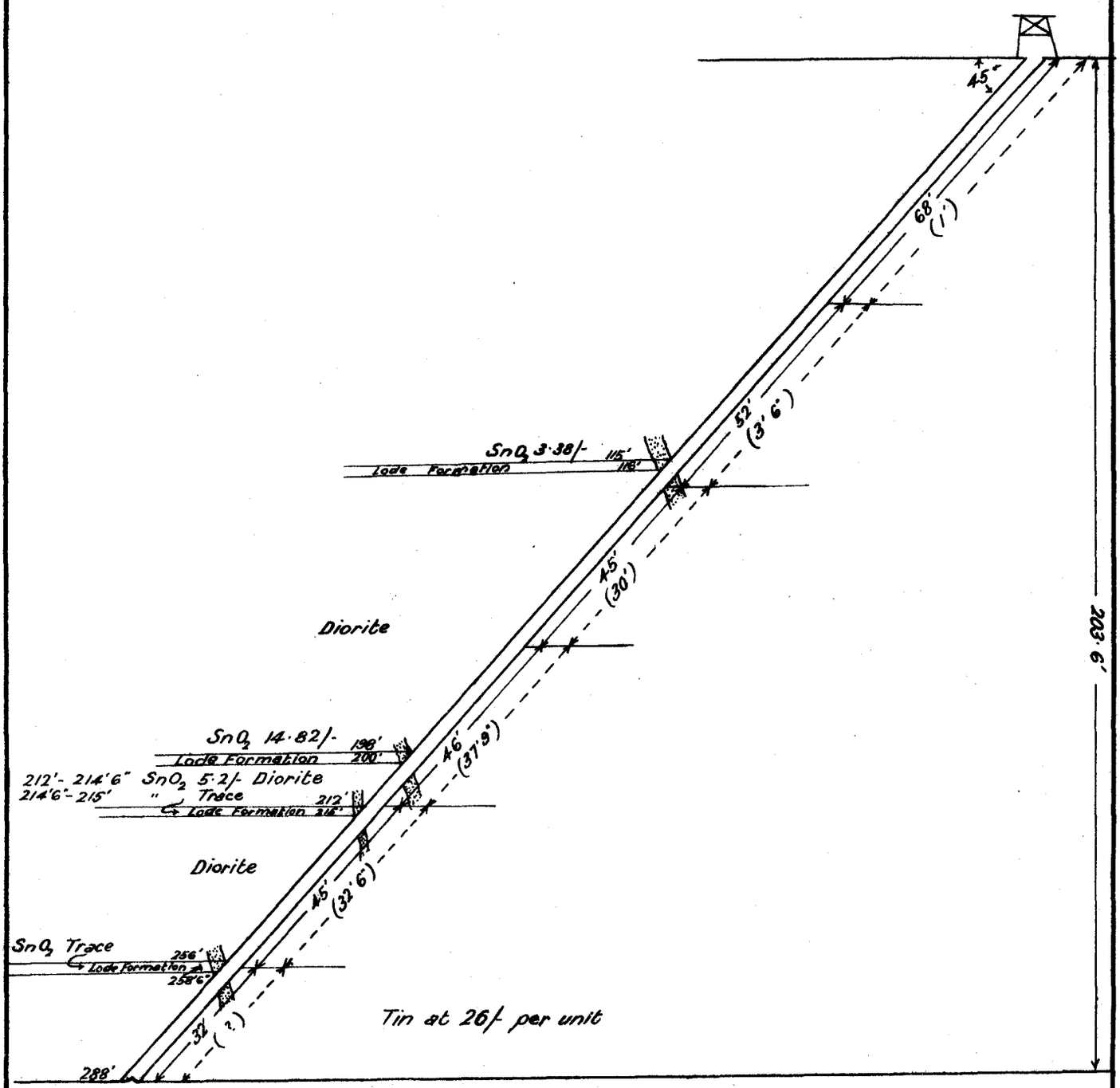
Tin at 26/- per unit.

Section Nº 4 Bore

CORNWALL MINE

Greenbushes

— Scale: 32 Feet - 1 Inch. —



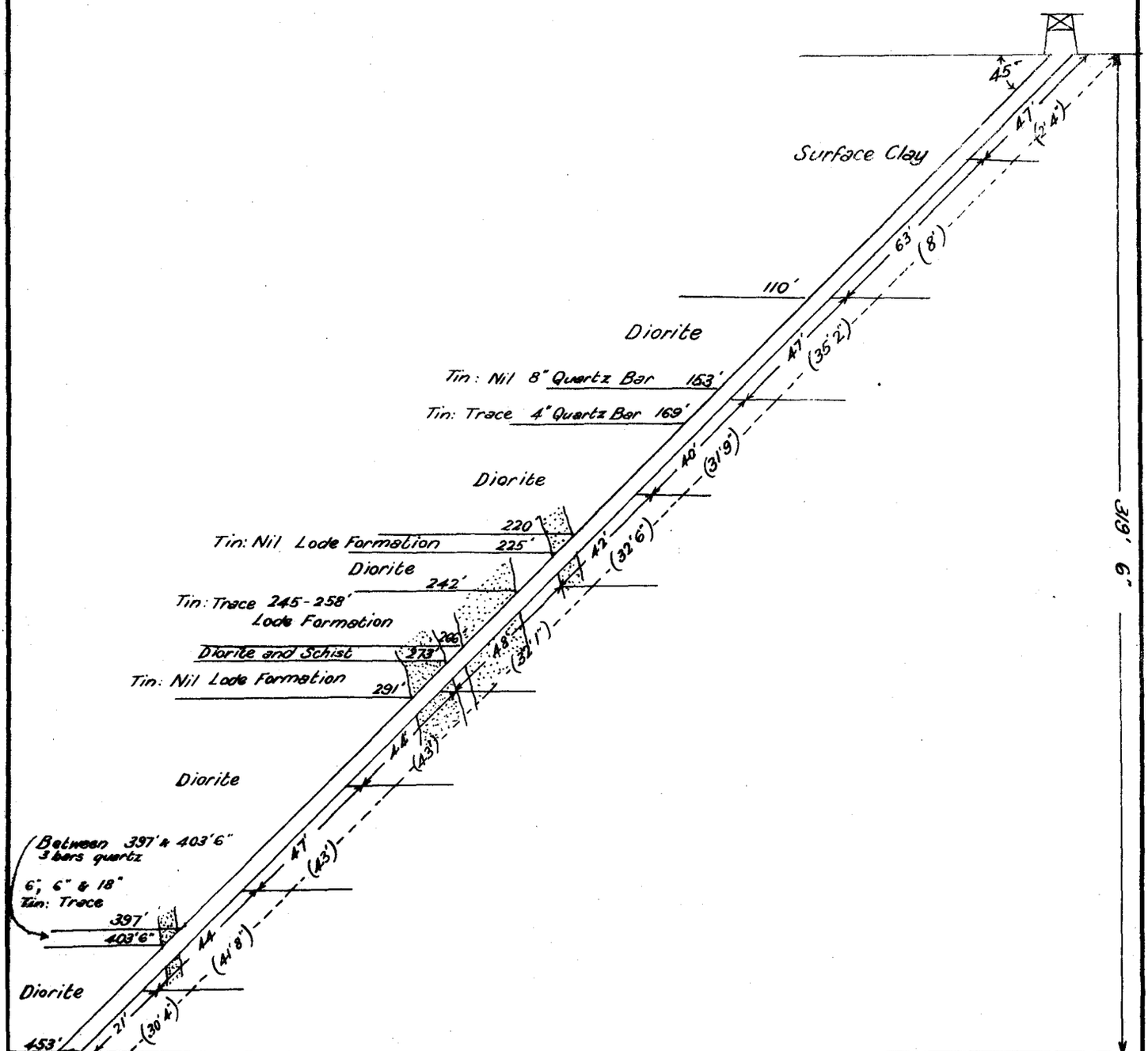
Figures in brackets indicate the length of core recovered from the corresponding section of boring.

Section Nº 5 Bore

DIXIE LEASE

Greenbushes

Scale:- 48 Feet = 1 Inch



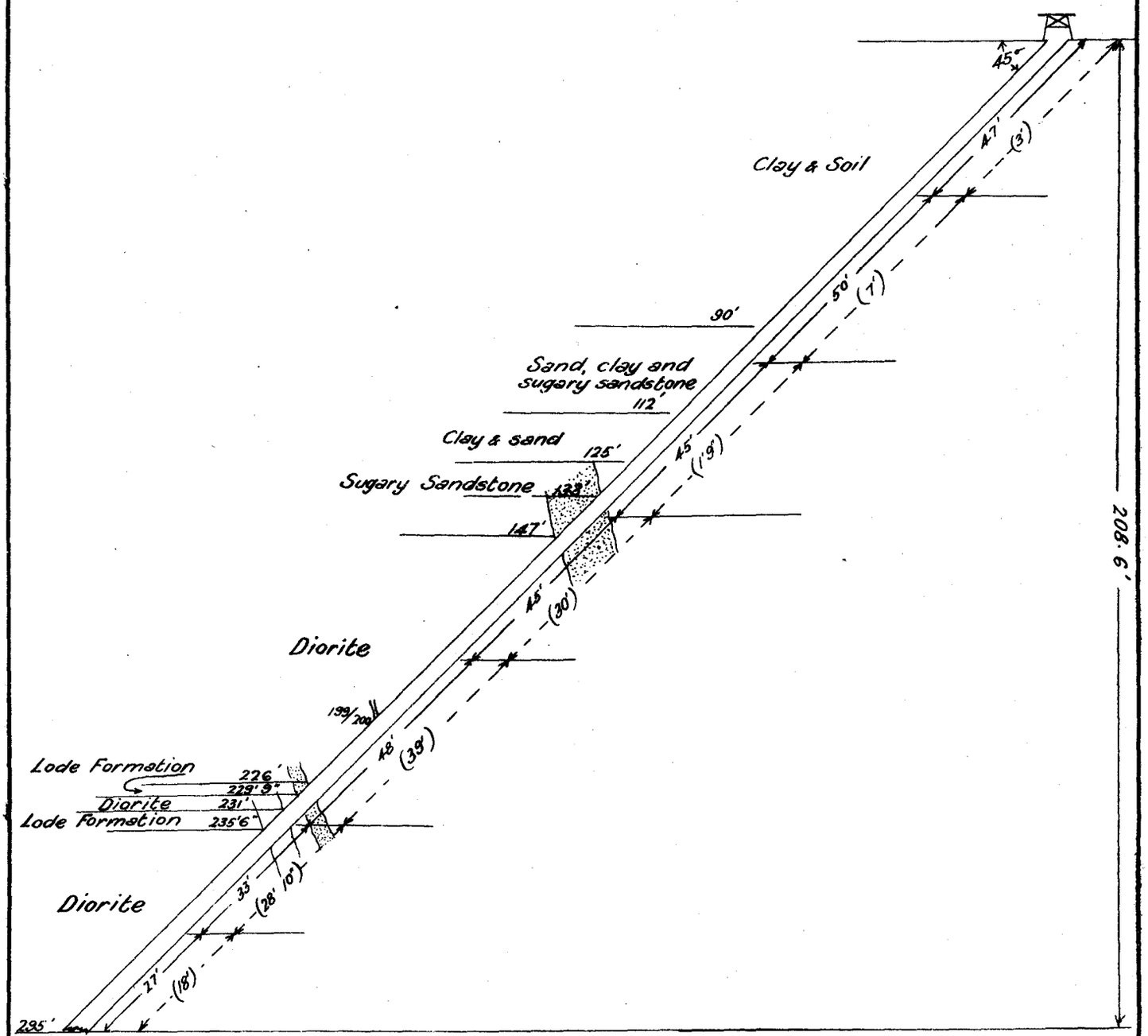
Figures in brackets indicate the length of core recovered from the corresponding section of boring.

Section Nº 6 Bore

SOUTH CORNWALL LEASE

Greenbushes

— Scale: 32 Feet = 1 Inch —



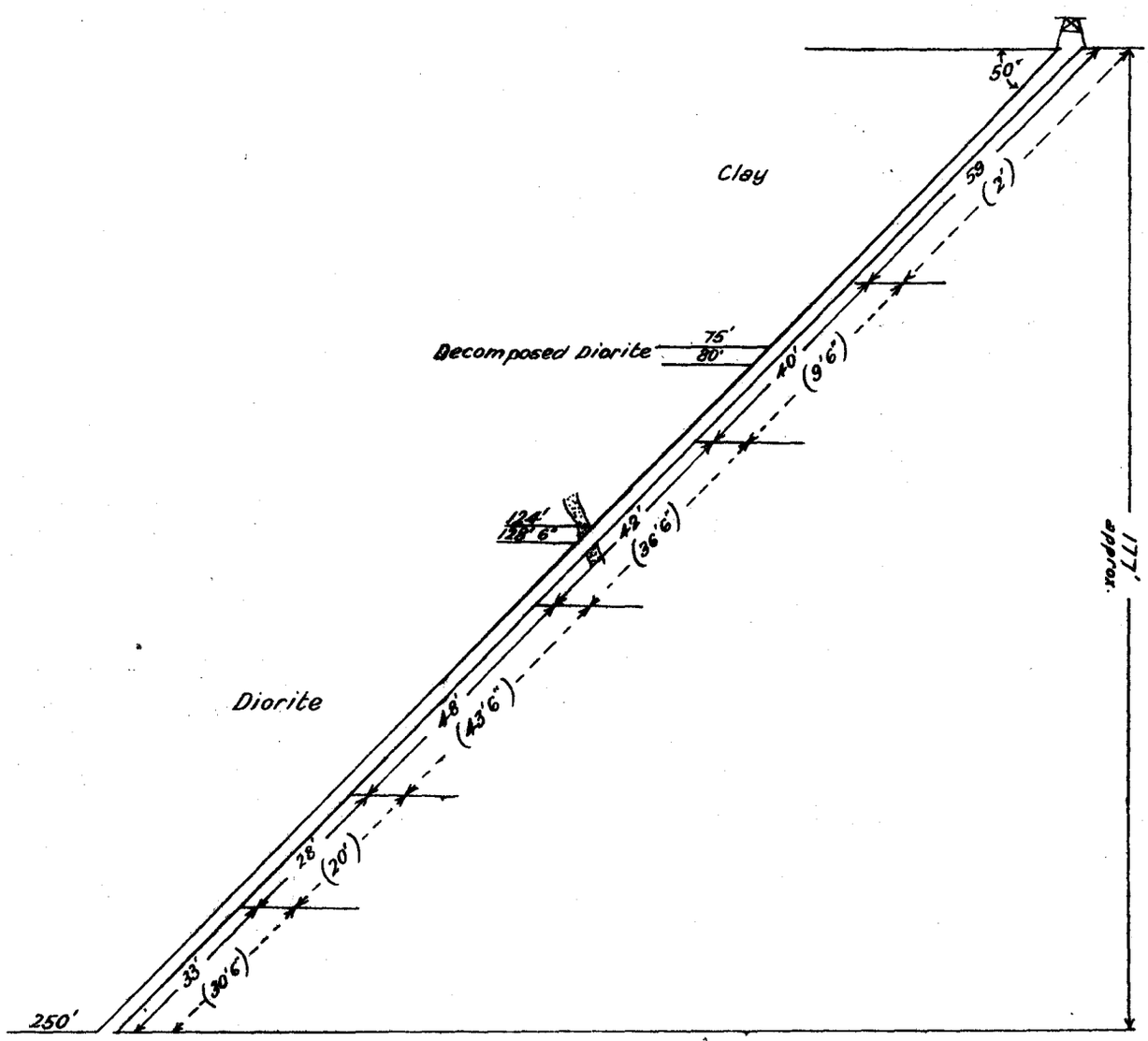
Figures in brackets indicate the length of core recovered from the corresponding section of boring.

Section Nº 7 Bore

LOST AND FOUND LEASE

Greenbushes

— Scale:- 32 Feet = 1 Inch —



The figures in brackets indicate the length of core recovered from the corresponding section of boring.

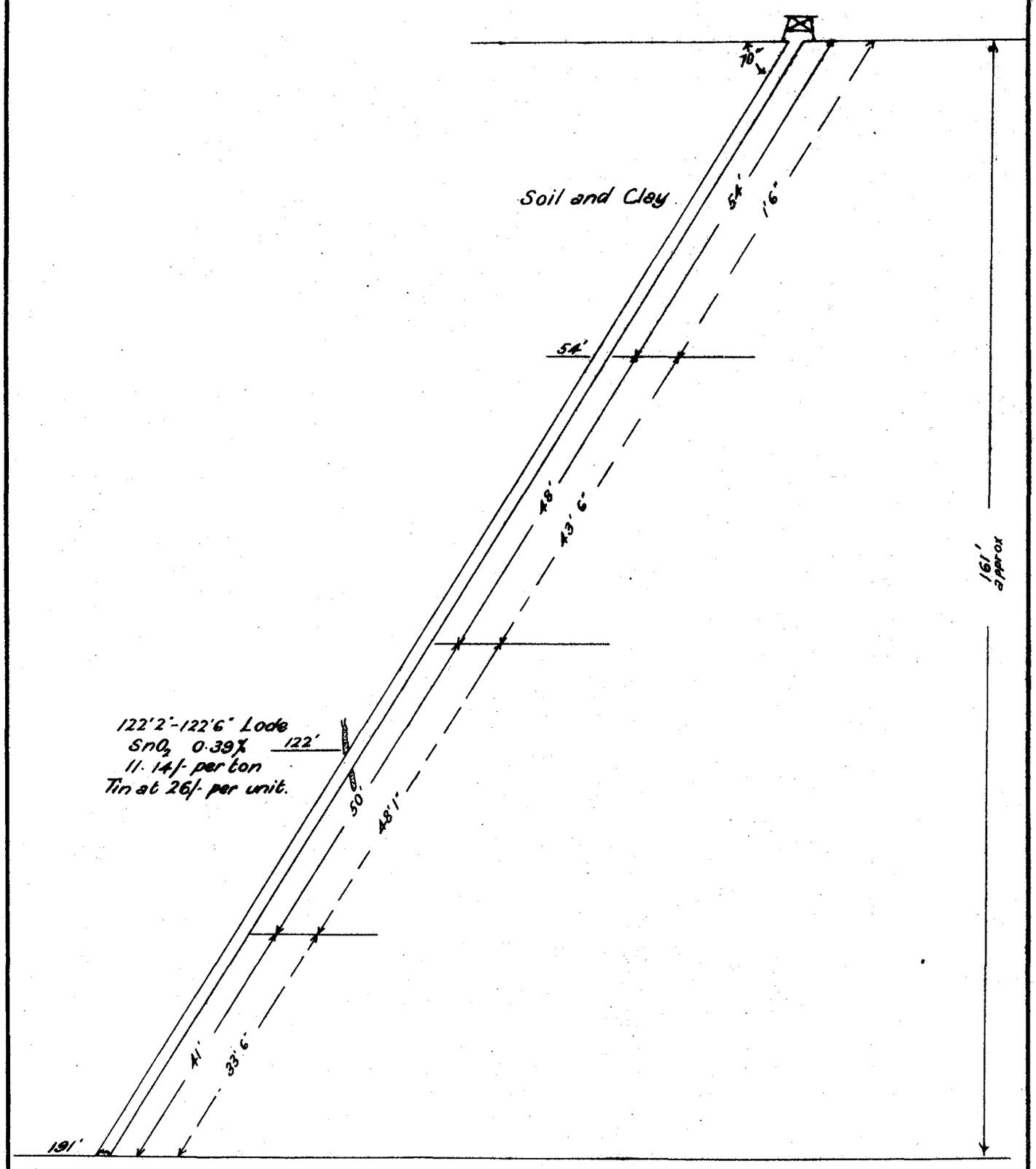
Section Nº 8 Bore

LOST AND FOUND LEASE

Greenbushes

20 0 20 40

— Scale of Feet —

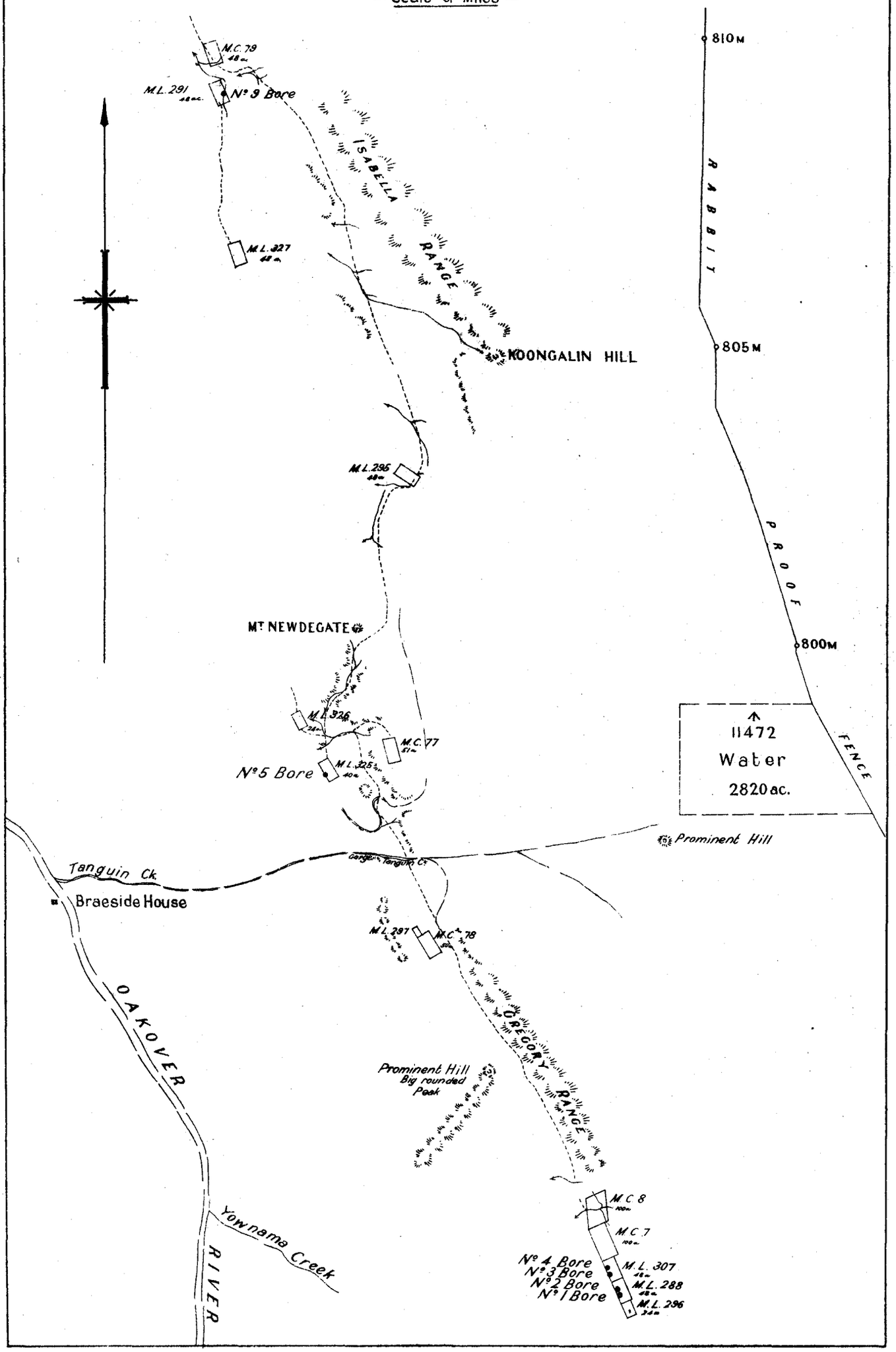


Figures in brackets indicate the length of core recovered from the corresponding section of boring.

Plan Shewing Bores at BRAESIDE

2 0 2 4

— Scale of Miles —



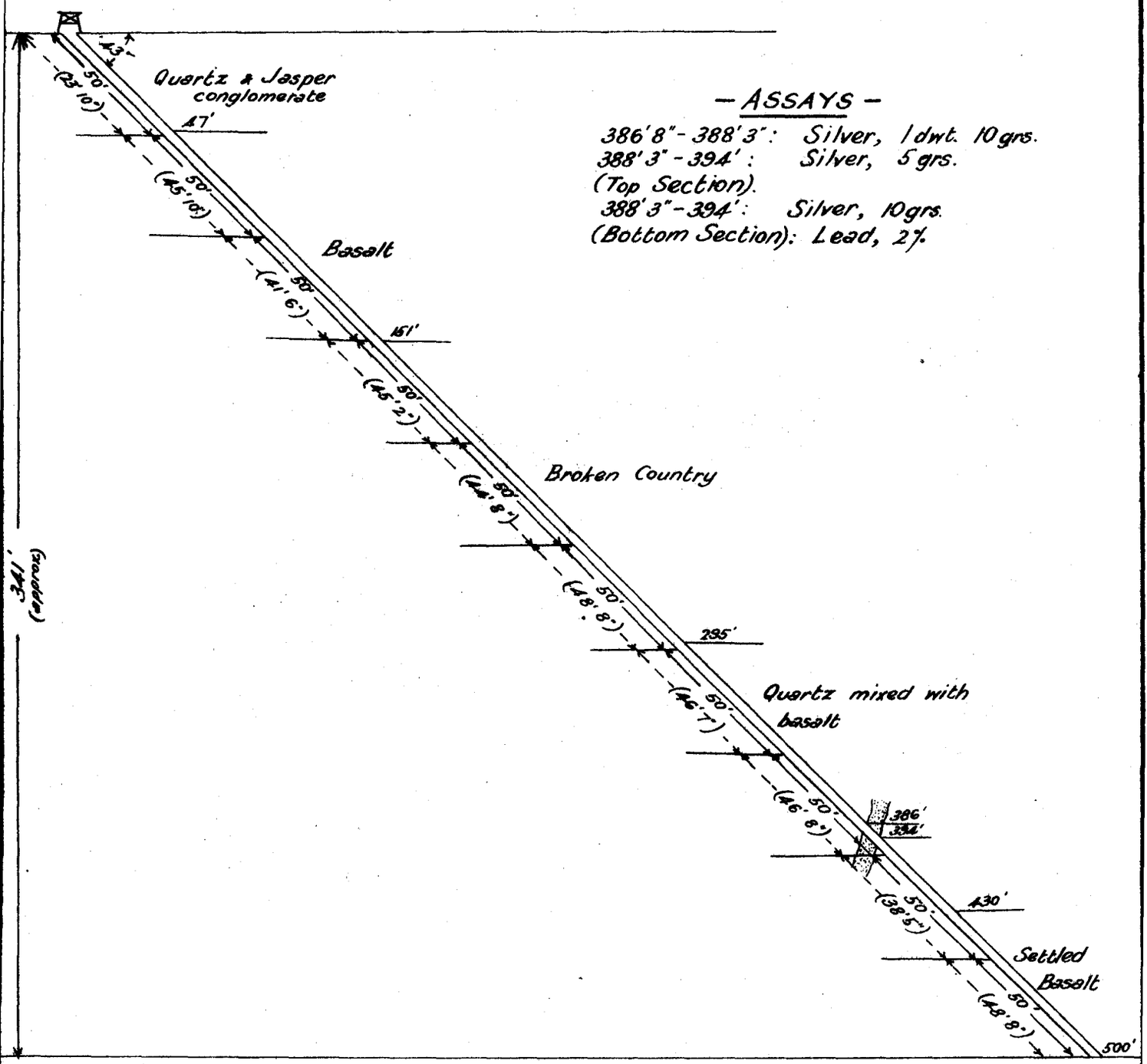
Section Nº 1 Bore

RAGGED HILL G.M.L.

Braeside

50 0 50 100

— Scale of Feet —



— ASSAYS —

386'8" - 388'3": Silver, 1 dwt. 10 grs.
388'3" - 394': Silver, 5 grs.
(Top Section).
388'3" - 394': Silver, 10 grs.
(Bottom Section): Lead, 2%.

Figures in brackets indicate the length of core recovered from the corresponding section of boring.

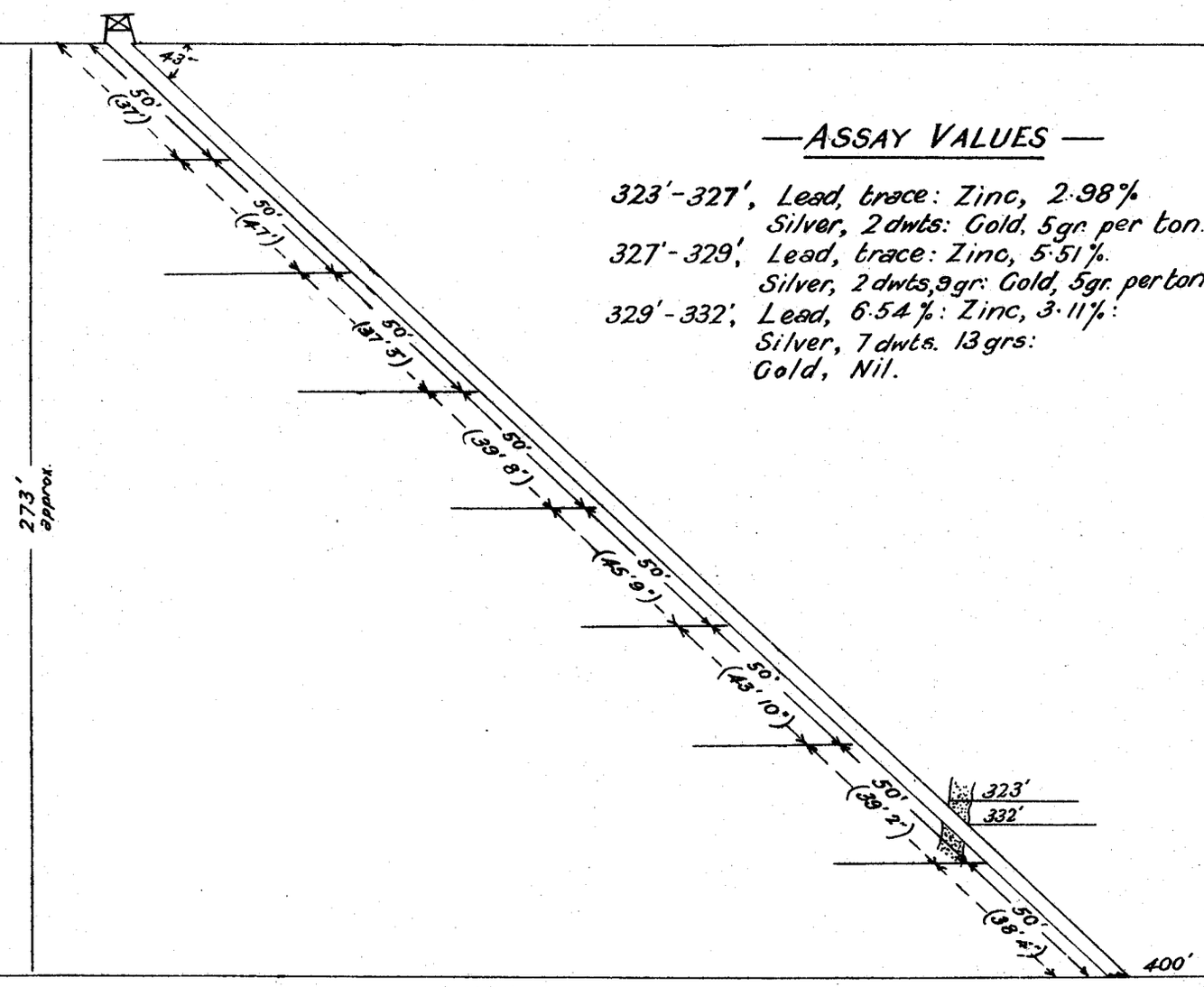
Section N°2 Bore

RAGGED HILL G.M.L

Braeside

50 0 50 100

— Scale of Feet —



—ASSAY VALUES—

323'-327', Lead, trace: Zinc, 2·98%
Silver, 2 dwts: Gold, 5gr. per ton.

327'-329', Lead, trace: Zinc, 5·51%.
Silver, 2 dwts, 9 gr: Gold, 5gr. per ton

329'-332', Lead, 6·54%: Zinc, 3·11%:
Silver, 7 dwts. 13 grs:
Gold, Nil.

Figures in brackets indicate the length of core recovered from the corresponding section of boring.

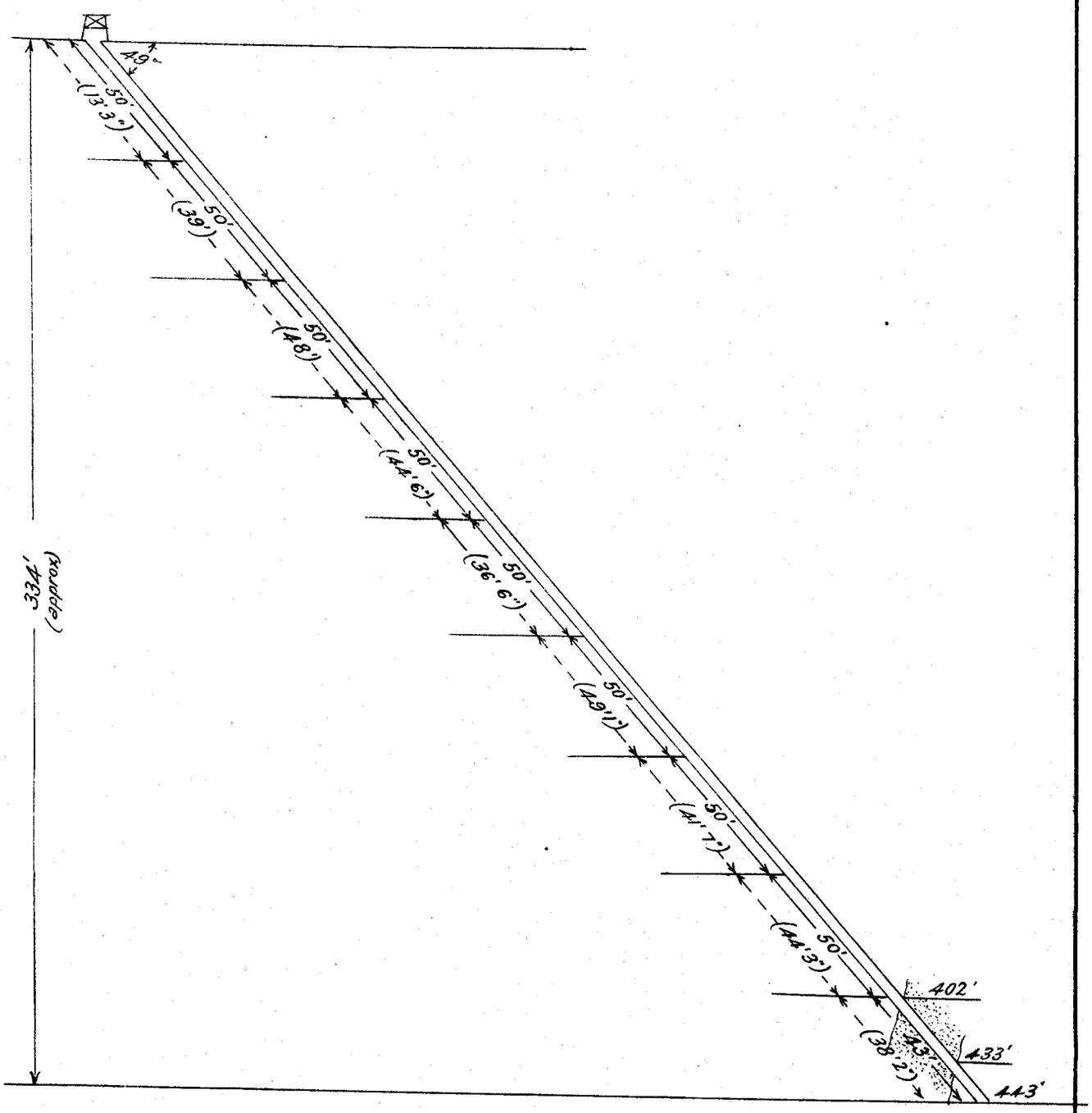
Section N° 3 Bore

RAGGED HILL G.M.L.

Braeside

50 0 50 100

– Scale of Feet –



Figures in brackets indicate the length of core recovered from the corresponding section of boring.

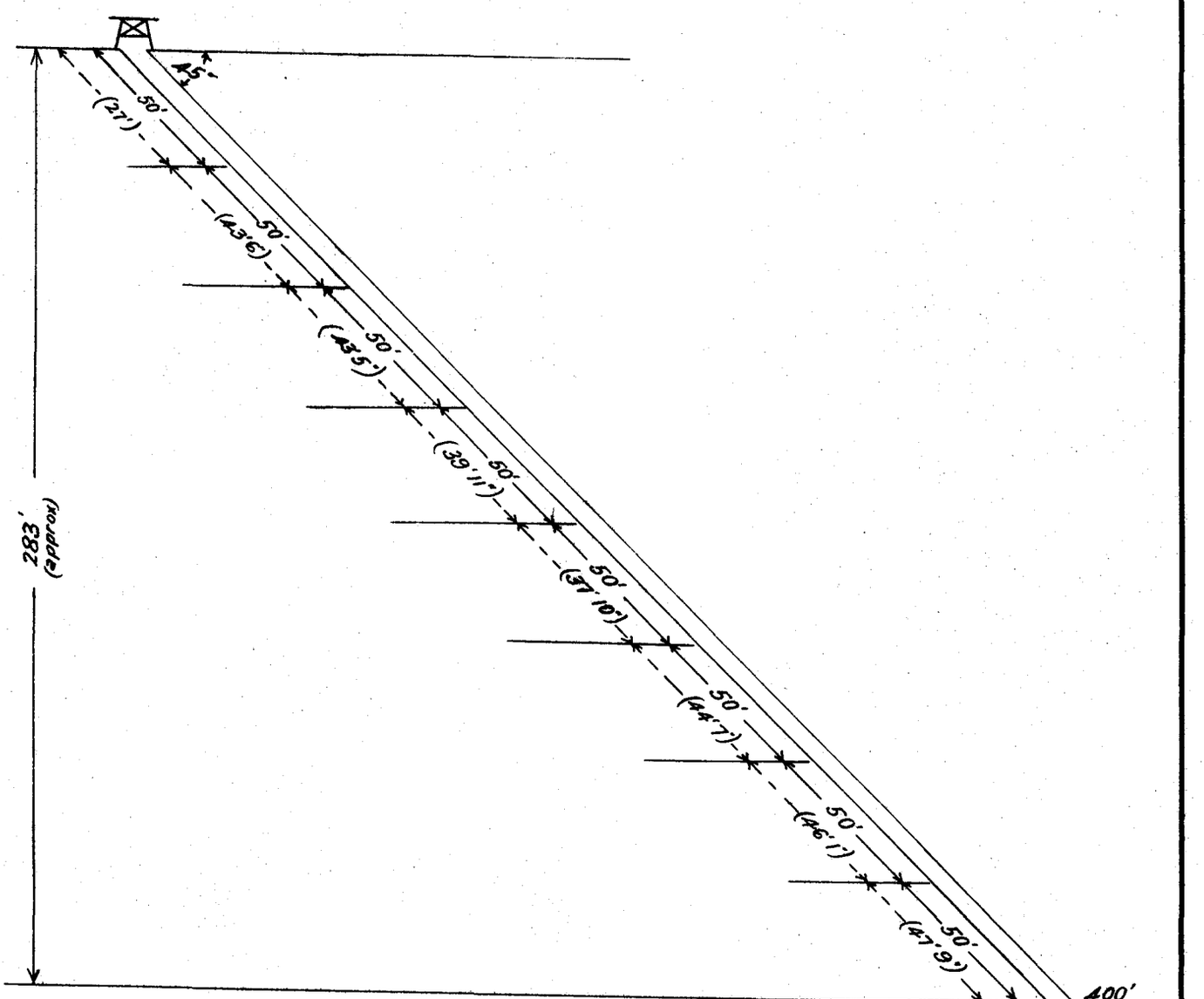
Section Nº 4 Bore

RAGGED HILL G.M.L.

Braeside

50 0 50 100

— Scale of Feet —



Figures in brackets indicate the length of core recovered from the corresponding section of boring.

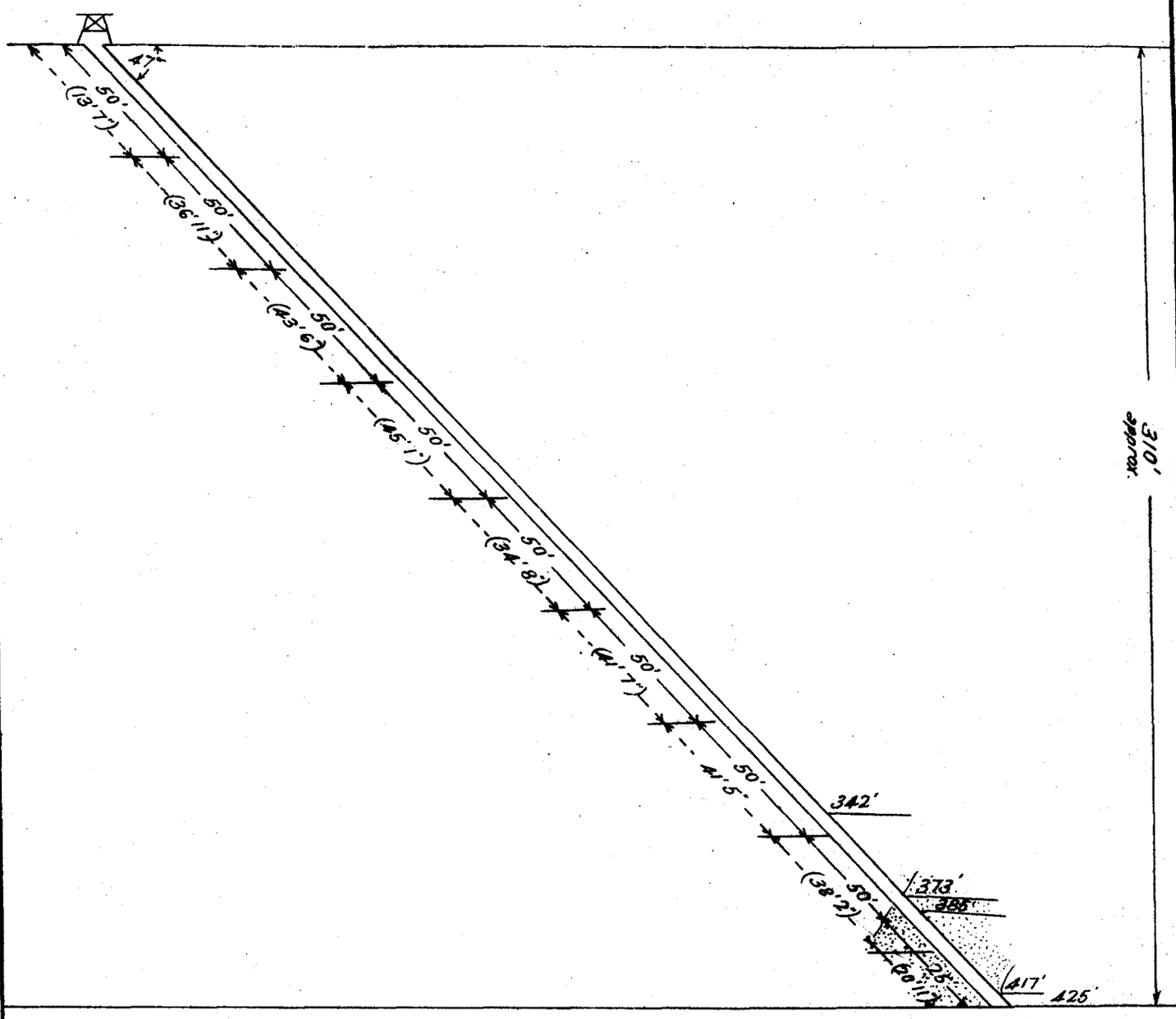
Section Nº 5 Bore

M.L. 325 (S.J. KENNEDY JR.)

Braeside

50 0 50 100

— Scale of Feet —



Figures in brackets indicate the length of core recovered from the corresponding section of boring.

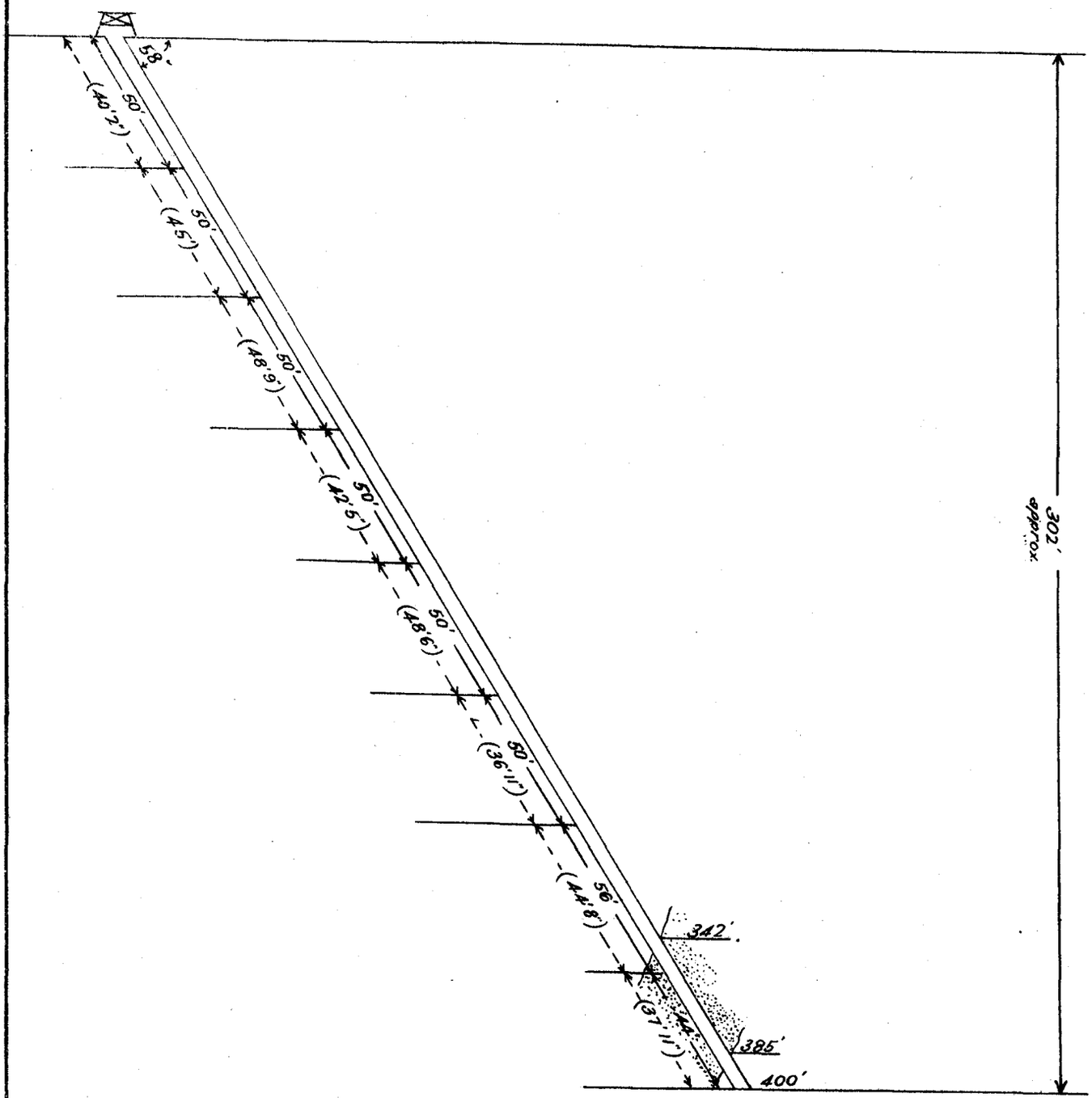
Section Nº 9 Bore (Nº 1 on this lease).

M.L. 291

Braeside

50 0 50 100

— Scale of Feet —



Figures in brackets indicate the length of core recovered from the corresponding section of boring.

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DIVISION V.

SCHOOL OF MINES OF WESTERN AUSTRALIA.

Perth,
January 26th, 1929.

The Under Secretary for Mines,
Mines Department, Perth.

I beg to forward, for the information of the Hon. the Minister, my report for the year 1928.

The average number of students in attendance was slightly less than during the previous year. There were fewer students in the drawing, engineering and fitting and turning classes, but the fact that the number in the preparatory classes was about the same as in 1927 may be taken as a hopeful sign that next year the enrolments in the senior classes will be maintained if not increased. The attendance at the School of Mines bears a relation to the population of the district and is influenced by the condition of the mining industry. During the year there were indications of the likelihood of renewed activity in various directions in and about the mines, which gave rise to an improved feeling as to the future prospects of mining. It is hoped that this will have a beneficial effect upon the School and bring about an increased enrolment of students.

The Kalgoorlie School of Mines has always maintained a good standard of classwork and has acquired a wide reputation because of the successes achieved by its students in the past. It is gratifying to record that at the beginning of the year two students who had recently completed the Associateship Course were offered, by prominent mining men in London, very good positions as mine managers and are giving satisfaction in the performance of their duties. The experience obtainable in the Kalgoorlie mines and treatment plants, and the theoretical and practical training at the School of Mines have enabled many old students to obtain lucrative positions. Knowledge of this should be an encouragement to the younger men of the district to undertake a systematic course of study at the School. The necessity for the adoption of more and more technical methods in mining practice and for the employment of officers competent to carry out these methods is becoming more apparent every day and calls for the retention of full facilities at the School in order that youths may be trained up to occupy responsible positions in mining.

To meet the requirements of those in attendance at the School, classes were held in all except one of the subjects of the Associateship Courses, and special facilities were afforded to students preparing for the Junior and Leaving Certificates and for the University Degree Examinations in Chemistry, Geology and Physics. The classwork in Mining and Surveying, Chemistry, Assaying and Metallurgy, Geology, Mechanical Engineering, Mathematics, Physics and Electrical Engineering, Gas Engine and Fitting and Turning proceeded along the lines of previous years. The preparatory classes in Mathematics, Chemistry and Physics were well attended, but in many of the senior classes which were kept in operation to enable students to proceed with the regular course of study for an Associateship, the enrolments were small. The students worked diligently and the examination results were satisfactory. Two candidates competed for the Junior and two for the Entrance Scholarship. There were no entries for the Senior Scholarship. A Junior Scholarship was awarded but the candidates for the Entrance Scholarship did not gain sufficient marks to qualify.

The Lecturer in Geology conducted a number of excursions underground as well as on the surface. The programme of field work was made comprehensive to meet the requirements of students who were taking the regular courses of the School as well as of several who were preparing for the University examinations in Geology.

The field work comprised:—

1. The preparation of plans and sections of steeply dipping beds at Hannan Street quarry.
2. The preparation of a geological section to show the field relationship of older sediments, older greenstones and newer greenstones at the North End.
3. A geological investigation of the boring at the Hidden Secret mine.
4. An examination of the acid eruptive at Binduli and of the Kurrawang conglomerate.
5. The preparation of a section from Hannan's Lake to Mount Hunt.
6. A traverse of the eastern side of the field and the plotting of the Croesus-Eclipse outcrop.
7. A study of lodes, quartz dolerite greenstone and keratophyre found underground.

The museum was open daily to the public. There were no special additions of rocks and minerals during 1928. The School possesses collections of rocks and minerals which are very useful for teaching purposes and are of considerable interest to prospectors and others directly connected with mining. Dr. Larcombe, besides carrying out his duties as Lecturer in Geology for the School of Mines, performed the duties of Acting Petrologist for the Geological Survey Department.

At the beginning of the year, Mr. W. G. Clarke commenced duty as Research Metallurgist and brought to the work a knowledge gained during a long and varied experience of battery and cyanide treatment, and also some experience of flotation gained while carrying out experimental work on Wiluna ore. He has proved a careful, energetic and painstaking officer, and he and Mr. B. H. Moore, the Lecturer in Metallurgy, who exercises control over the operations of the Experimental Plant, have performed excellent service in connection with the metallurgical problems of the district.

The Experimental Plant was kept busy throughout the year and investigations were conducted on ores from the following mines:—

Waterloo Gold Mine,
Tindal's Gold Mine (Diamond Drill Cores),
Brilliant Gold Mine (Concentrates),
Ives Reward Gold Mine (Concentrates),
Sunny South Gold Mine,
Sand Queen-Gladsome Gold Mine (Mill Tailings),
Mararoa Gold Mine (Oxidised ore and diamond drill sulphide cores),
Wiluna Gold Mines (Antimonial Ore),
Bromocyanidation of Kalgoorlie Ores.

In the case of the Wiluna Gold Mines investigation, which was undertaken at the request of Mr. H. E. Vail, a preliminary test was made on a sample of ore supplied by the mine, but as this was found to be not representative of the average antimonial ore of the mine, the work was discontinued pending the receipt of a representative sample. This came to hand and at the end of the year work was in progress upon the fresh sample to discover a method of flotation of the primary bulk concentrate by which the stibnite could be floated separately from the auriferous pyrite and arsenopyrite. The investigations into the bromocyanidation of Kalgoorlie ores was not carried far enough to enable definite conclusions to be reached as to the necessary working conditions and possibilities of the process.

A number of assays were made in connection with the investigations carried out in the Experimental Plant, namely:—

Assays for gold and silver	1,472
Copper, lead, arsenic, antimony and other chemical determinations ..	1,791
	3,263

The experimental work in the Plant has been the subject of favourable comment by several technical journals and the interest aroused is shown by the fact that requests for the published bulletins of the School have been received from all parts of the world. The Engineering and Mining Journal of New York, in an editorial, remarked that the "Kalgoorlie School of Mines is creating for itself a standard in the industry by its excellent work on flotation." In the past it has not been possible to carry out experimental work, and particularly flotation treatment, on a continuous scale, but it is hoped that in the near future equipment will be secured which will enable trials to be made with continuous treatment.

During the year the Lecturer in Metallurgy carried out assays and determinative work at the request of the gold-stealing staff of the Criminal Investigation Department and gave technical evidence in several criminal prosecutions.

By furnishing reports as to assay values and by indicating methods of treatment every effort has been made to give prospectors information likely to be of assistance to them. During 1928, 259 free assays and mineral determinations were made for prospectors of material from Crown lands not held under lease for mining purposes, as follows:—

Assays for gold	174
Assays for silver	27
Assays for copper	12
Water analyses	3
Mineral determinations	43
	259

Dr. Stilwell, who for the last 18 months has been accommodated with a room at the School in which to carry on work incidental to the survey he has been making, completed his local investigations at the end of the year and has left the district.

The statistics dealing with the enrolment of students, the examination results and a statement showing positions held by former students of the School are forwarded herewith.

F. B. ALLEN,
Director, School of Mines.

SCHOOL OF MINES OF WESTERN AUSTRALIA.

EXAMINERS.

The following Examiners conducted the Examination in November, 1928:—

Subject.	Examiners.
Preparatory Mathematics ..	F. B. Allen, M.A., B.Sc.; R. Davis, B.Sc., and E. Illidge, B.Sc.
Preparatory Chemistry ..	B. H. Moore, M.E., F.S.A.S.M.
Preparatory Physics and Electricity	D. McDougall, A.I.E.E.
Preparatory Geology ..	C. O. G. Larcombe, D.Sc., F.S.T.C., F.G.S.
Preparatory Mechanical Drawing	H. B. Newman.
Mathematics I.	E. H. Illidge, B.Sc., and R. Davis, B.Sc.
Mechanics—Theoretical ..	R. Davis, B.Sc., and E. H. Illidge, B.Sc.
Physics I.	R. Davis, B.Sc., and D. McDougall, A.I.E.E.
Chemistry I.	B. H. Moore, M.E., F.S.A.S.M., and R. R. Baxter, B.Sc.
Engineering Chemistry I. and II.	L. W. Phillips, B.Sc., and B. H. Moore, M.E., F.S.A.S.M.
Assaying I.	B. H. Moore, M.E., F.S.A.S.M., and G. S. Compton, B.Sc.
Assaying II.	
Metallurgy I. and II.	
Petrology	C. O. G. Larcombe, D.Sc., F.S.T.C., F.G.S., and G. S. Compton, B.Sc.
Mineralogy	
Geology	
Mining Geology	C. O. G. Larcombe, D.Sc., F.S.T.C., F.G.S.
Practical Mathematics ..	E. H. Illidge, B.Sc.
Mechanical Drawing I. & II.	J. H. Tate.
Applied Mechanics ..	B. H. Moore, M.E., F.S.A.S.M., and J. H. Tate.
Building Construction	
Mechanical Engineering I. and II.	J. H. Tate and T. Butement, A.O.U.S.M.
Machine Design ..	
Surveying I. and II. ..	T. Butement, A.O.U.S.M.
Mining I. and II. ..	
Electrical Engineering I. & II.	D. McDougall, A.I.E.E.
Fitting and Turning I. and II.	C. D. Slee.
Gas Engine	A. R. E. Bosustow.
Indicator	

JUNIOR SCHOLARSHIP.

Subject.	Examiners.
Physical Geography	C. O. G. Larcombe, D.Sc., F.S.T.C., F.G.S.
Mathematics	F. B. Allen, M.A., B.Sc.
English	

ATTENDANCES, 1928.

Subject.	Effective Enrolment.		
	1st Term.	2nd Term.	3rd Term.
Elementary Mathematics	8	7	6
Preparatory Mathematics	43	37	27
Preparatory Chemistry	31	25	16
Preparatory Physics	26	23	17
Preparatory Mechanical Drawing	27	26	20
Preparatory Geology	4	4	3
Mathematics—First Course	12	9	7
Theoretical Mechanics	4	4	2
Physics—First Course	13	10	10
Chemistry—First Course	8	8	8
Engineering Chemistry—First Course	3	2	1
Assaying—First Course	3	2	2
Assaying—Second Course	1	1	1
Metallurgy—First Course	...	2	2
Metallurgy—Second Course	1	2	2
Geology—First Course (University)	3	3	2
Mining and Economic Geology	2	3	3
Mineralogy	4	5	4
Petrology	4	4	3
Mining—First Course	1	1	1
Mining—Second Course (Mine Sampling)	1	1	...
Mining—Second Course (Ore Dressing)	2	5	5
Mining—Second Course (Accounts and Administration)	...	2	2
Surveying—First Course	2	2	2
Surveying—Second Course	4	5	4
Mechanical Drawing—First Course	11	12	9
Mechanical Drawing—Second Course	7	4	4
Applied Mechanics	2	2	2
Mechanical Engineering—First Course	2	2	2
Mechanical Engineering—Second Course	2	2	2
Building Construction	8	7	7
Electrical Engineering—First Course	2	3	2
Electrical Engineering—Second Course	2	2	2
Fitting and Turning—First Course	10	9	6
Fitting and Turning—Second Course	6	6	6
Machine Design	5	5	5
Practical Mathematics	4	3	2
Gas Engine and Indicator	10	8	7
Total Enrolments	278	258	206
Individual Students	108	101	84

	1927.			1928.		
	1st Term.	2nd Term.	3rd Term.	1st Term.	2nd Term.	3rd Term.
Total Enrolments	316	271	250	278	258	206
Individual Students	117	101	91	106	101	84

EXAMINATION RESULTS.

The following table shows the passes obtained by students of the Western Australian School of Mines, Kalgoorlie, at the Annual Examinations held in November, 1928, including the Supplementary Examinations held in February, 1928:—

Subject.	Class of Pass.		
	Credit.	Pass.	Totals.
Elementary Mathematics	...	1	1
Preparatory Chemistry	...	8	8
Preparatory Drawing	4	7	11
Preparatory Physics	...	5	5
Preparatory Geology	...	2	2
Preparatory Mathematics (Arithmetic)	...	8	8
Preparatory Mathematics (Algebra)	...	4	4
Preparatory Mathematics (Geometry)	...	7	7
Mathematics, First Course	...	1	1
Mathematics—First Course (Algebra)	...	1	1
Mathematics—First Course (Geometry)	...	1	1
Mathematics—First Course (Trigonometry)	...	1	1
Theoretical Mechanics	...	1	1
Physics I.	...	7	7
Chemistry—First Course	1	3	4
Engineering Chemistry—First Course	1	...	1
Assaying—First Course	1	1	2
Assaying—Second Course	1	...	1
Metallurgy—First Course	...	1	1
Geology	2	...	2
Mineralogy	1	3	4
Petrology	2	1	3
Mining and Economic Geology	...	4	4
Mining—First Course	1	...	1
Mining—Second Course (Mine Sampling)	2	1	3
Mining—Second Course (Accounts and Administration)	1	1	2
Mining—Second Course (Ore Dressing)	...	3	3
Surveying—First Course	...	2	2
Surveying—Second Course	2	2	4
Mechanical Drawing—First Course	5	4	9
Mechanical Drawing—Second Course	2	1	3
Applied Mechanics	1	1	2
Mechanical Engineering—First Course	...	1	1
Mechanical Engineering—First Course (Gas Engine)	3	2	5
Mechanical Engineering—First Course (Indicator)	3	1	4
Mechanical Engineering—Second Course	1	1	2
Building Construction	1	6	7
Electrical Engineering—First Course	...	2	2
Electrical Engineering—Second Course	...	2	2
Fitting and Turning—First Course	...	2	2
Fitting and Turning—Second Course	1	3	4
Mechine Design	2	3	5
Practical Mathematics	...	1	1
Totals	38	106	144

ASSAYER'S CERTIFICATES.

The following have gained Certificates:—

Adams, H.	P.T.S.	March, 1904.
Adams, P.	P.T.S.	February, 1905.
Beech, S. J.	K.S.M.	November, 1906.
Brown, T.	P.T.S.	November, 1906.
Brooking, J.	P.T.S.	November, 1906.
Hutchinson, D. M.	K.S.M.	November, 1906.
Banks, R.	K.S.M.	November, 1908.
Gabel, J.	K.S.M.	November, 1908.
Pike, R. W.	P.T.S.	November, 1908.
Woolf, M.	K.S.M.	November, 1908.
Baxter, R. R.	P.T.S.	November, 1909.
Bradley, W. S.	K.S.M.	November, 1909.
Burrows, M. F.	P.T.S.	November, 1909.
Compton, G. S.	P.T.S.	November, 1909.
Cook, H. J.	P.T.S.	November, 1909.
Klem, L. G.	P.T.S.	November, 1909.
Fraser, W.	K.S.M.	November, 1910.
Rowledge, H. P.	P.T.S.	November, 1910.
Benjamin, L. R.	P.T.S.	November, 1911.
Jackson, L. T. C.	P.T.S.	November, 1911.
Leevers, J C.	K.S.M.	November, 1911.
Lapsley, R. G.	P.T.S.	November, 1912.
Kurth, E. E.	K.S.M.	November, 1913.
Grace, J. N. A.	P.T.S.	November, 1916.
Noall, J. C.	K.S.M.	November, 1917.
Cecil, Clyde	K.S.M.	November, 1918.
Terrell, J. H.	K.S.M.	November, 1918.
Nairn, T. W.	K.S.M.	November, 1918.
Roberts, T. J.	K.S.M.	November, 1919.
Chapman, F. E.	P.T.S.	November, 1920.
Lethlean, H. V.	K.S.M.	November, 1921.
Carrigg, C. G.	K.S.M.	November, 1922.
Greer, J. H.	K.S.M.	November, 1922.
Mundle, E. B.	K.S.M.	November, 1922.
Esdaile, A. N.	K.S.M.	November, 1923.
Paterson, A. V.	K.S.M.	November, 1923.
Simons, H. H. J.	P.T.S.	November, 1924.
Brown, C. W.	K.S.M.	November, 1926.
Lynch, T.	K.S.M.	November, 1926.
Boyer, C.	P.T.S.	November, 1927.

INDUSTRIAL CHEMIST'S CERTIFICATES.

The following have gained Certificates:—

Cecil, C.	K.S.M.	November, 1921.
Chapman, F.	P.T.S.	November, 1922.
Carrigg, C. G.	K.S.M.	November, 1922.
Esdaile, A. N.	K.S.M.	November, 1922.
Paterson, A. V.	K.S.M.	November, 1924.
Lynch, T.	K.S.M.	November, 1927.

MINE SURVEYOR'S CERTIFICATES.

The following have gained certificates:—

Peat, J.	K.S.M.	November, 1909.
Adams, H.	K.S.M.	November, 1910.
Banks, R.	K.S.M.	November, 1911.
Gabel, J.	K.S.M.	November, 1911.
Pike, R. W.	K.S.M	November, 1912.
Godden, F. W. R.	K.S.M.	November, 1915.
Mundle, E. B.	K.S.M.	November, 1915.
Leevers, J. C.	K.S.M.	November, 1916.
Crutchett, I. A.	K.S.M.	November, 1920.
Powell, T	K.S.M.	November, 1921.
Agnew, R. J.	K.S.M.	November, 1922.
Crutchett, E. G.	K.S.M.	November, 1922.
Davies, I.	K.S.M.	November, 1922.
Eddy, J. T.	K.S.M.	November, 1922.
Rosenberg, J. M.	K.S.M.	November, 1923.
Gibbons, L. P. J.	K.S.M.	November, 1924.
Terrell, J H.	K.S.M.	November, 1924.
Manners, J. E.	K.S.M.	November, 1926.
Golding, H. D.	K.S.M.	November, 1927.
Jensen, H.	K.S.M.	November, 1927.

DRAUGHTSMAN'S CERTIFICATES.

The following have gained certificates:—

Galt, W.	K.S.M.	November, 1915.
Butement, J. C.	K.S.M.	November, 1915.
Edmondson, F. C.	K.S.M.	November, 1915.
Lang, J. H.	K.S.M.	November, 1915.
Davies, W.	K.S.M.	November, 1917.
Weselman, C.	K.S.M.	November, 1917.
Thompson, E. P.	K.S.M.	November, 1920.
Gill, L. J.	K.S.M.	November, 1921.
Macbeth, R. A.	K.S.M.	November, 1921.
Rosenberg, J. M.	K.S.M.	November, 1921.
Spalding, J.	K.S.M.	November, 1922.
Taylor, H.	K.S.M.	November, 1922.
Sinclair, R. J.	K.S.M.	November, 1925.
Thrupp, T. W.	K.S.M.	November, 1926.
Ehlers, C. R.	K.S.M.	November, 1927.
Johns, E. N.	K.S.M.	November, 1927.
Meredyth, C. C.	K.S.M.	November, 1927.
Bell, C. H.	K.S.M.	November, 1928.
Crocos, A. J.	K.S.M.	November, 1928.
Moody, C. O. V.	K.S.M.	November, 1928.
Newman, H. B.	K.S.M.	November, 1928.
Warman, C H.	K.S.M.	November, 1928.

ELECTRICIAN'S CERTIFICATES.

The following have gained certificates:—

Galt, W.	K.S.M.	November, 1915.
Butement, J. C.	K.S.M.	November, 1915.
Edmondson, C. F.	K.S.M.	November, 1915.
Lang, J. H.	K.S.M.	November, 1915.
Davies, W.	K.S.M.	November, 1917.
Weselman, C.	K.S.M.	November, 1917.
Thompson, E. P.	K.S.M.	November, 1920.
Gill, L. J.	K.S.M.	November, 1921.
Macbeth, R. A.	K.S.M.	November, 1921.
Rosenberg, J. M.	K.S.M.	November, 1921.
Spalding, J.	K.S.M.	November, 1923.
Taylor, Harry	K.S.M.	November, 1923.
Meredyth, C. C.	K.S.M.	November, 1925.
Sinclair, R. J.	K.S.M.	November, 1925.
Thrupp, T. W.	K.S.M.	November, 1926.
Johns, E. N.	K.S.M.	November, 1927.
Ehlers, C. R.	K.S.M.	November, 1927.
Glendinning, A. R.	K.S.M.	November, 1928.
Moody, C. O. V.	K.S.M.	November, 1928.

GEOLOGIST'S CERTIFICATES.

The following have gained certificates:—

Gabel, J.	K.S.M.	November, 1911.
Leevers, J. C.	K.S.M.	November, 1916.
Mundle, E. B.	K.S.M.	November, 1920.
Agnew, R. J.	K.S.M.	November, 1923.
Terrell, J. H.	K.S.M.	November, 1927.
Manners, J. E.	K.S.M.	November, 1927.

DIPLOMAS.

The following students have gained Diplomas:—

Beech, S. J. (K.S.M.), Diploma in Metallurgy, November, 1906.

Adams, P. (P. and M.), Diploma in Metallurgy, November, 1907.

Adams, H. (P. and K.), Diploma in Metallurgy, November, 1908.

Banks, R. (C. and K.), Diploma in Metallurgy, November, 1910.

Burrows, M. F. (P. and K.), Diploma in Metallurgy, 1910.

Compton, G. S. (P.T.S.), Diploma in Metallurgy, November, 1910.

Cook, H. J. (P.T.S.), Diploma in Metallurgy, November, 1910.
Gabel, J. (K.S.M.), Diploma in Metallurgy, November, 1910.
Gabel, J. (K.S.M.), Diploma in Mining, November, 1911.
Pike, R. W. (P. and K.), Diploma in Metallurgy, November, 1911.
Galt, W. (K.S.M.), Diploma in Mechanical and Electrical Engineering, November, 1915.
Butement, J. C. (K.S.M.), Diploma in Mechanical and Electrical Engineering, November, 1915.
Edmondson, F. C. (K.S.M.), Diploma in Mechanical and Electrical Engineering, November, 1915.
Lang, J. H. (K.S.M.), Diploma in Mechanical and Electrical Engineering, November, 1915.
Grace, J. N. A. (P.T.S.), Diploma in Metallurgy, November, 1915.
Bradley, W. S. (K.S.M.), Diploma in Metallurgy, November, 1915.
Kurth, E. E. (K.S.M.), Diploma in Metallurgy, November, 1916.
Getty, A. (K.S.M.), Diploma in Metallurgy, November, 1916.
Le Mesurier, C. R. (K.S.M.), Diploma in Metallurgy, November, 1916.
Leevers, J. C. (K.S.M.), Diploma in Mining, November, 1916.
Davies, Wateyn (K.S.M.), Diploma in Mechanical and Electrical Engineering, November, 1917.
Weselman, Carl (K.S.M.), Diploma in Mechanical and Electrical Engineering, November, 1917.
Nairn, T. W. (K.S.M.), Diploma in Metallurgy, November, 1919.
Mundle, E. B. (K.S.M.), Diploma in Mining, November, 1920.
Thompson, E. P. (K.S.M.), Diploma in Mechanical and Electrical Engineering, November, 1920.
Gill, L. J. (K.S.M.), Diploma in Mechanical and Electrical Engineering, November, 1921.
Macbeth, R. A. (K.S.M.), Diploma in Mechanical and Electrical Engineering, November, 1921.
Rosenberg, J. M. (K.S.M.), Diploma in Mechanical and Electrical Engineering, November, 1921.
Rowledge, H. P. (P. and K.), Diploma in Metallurgy, November, 1922.
Taylor, Harry (K.S.M.), Diploma in Mechanical and Electrical Engineering, November, 1923.
Agnew, R. J. (K.S.M.), Diploma in Mining, November, 1924.
Spalding, J. (K.S.M.), Diploma in Mechanical and Electrical Engineering, November, 1924.
Sinclair, R. J. (K.S.M.), Diploma in Mechanical and Electrical Engineering, November, 1925.
Cecil, Clyde (K.S.M.), Diploma in Metallurgy, November, 1926.
Thrupp, Thos. W. (K.S.M.), Diploma in Mechanical and Electrical Engineering, November, 1926.
Ehlers, C. R. (K.S.M.), Diploma in Mechanical and Electrical Engineering, November, 1927.
Johns, E. N. (K.S.M.), Diploma in Mechanical and Electrical Engineering, November, 1927.
Meredyth, C. C. (K.S.M.), Diploma in Mechanical and Electrical Engineering, November, 1927.
Manners, J. E. (K.S.M.), Diploma in Mining, November, 1927.
Terrell, J. H. (K.S.M.), Diploma in Mining, November, 1927.
Moody, C. O. V. (K.S.M.), Diploma in Mechanical and Electrical Engineering, November, 1928.

ENGINE-DRIVER'S CERTIFICATES.

The following students of the School of Mines have passed the examinations held by the Chief Inspector of Machinery during 1928 for various Engine-drivers' Certificates.

Name.	Certificate.
C. E. Baker	Internal Combustion Competency.
C. A. Dighton ..	Boiler Attendant's Competency.
S. M. J. Ferguson ..	Third Class Competency.
J. Wadeisha	First Class Competency.
C. A. Dighton ..	Third Class Competency.

SCHOLARSHIP EXAMINATIONS, 1928.

JUNIOR SCHOLARSHIP.

Candidate.	District.
D. H. George	Boulder.
E. A. Martin	Kalgoorlie.

E. A. Martin gains the Junior Scholarship.

ENTRANCE SCHOLARSHIP.

Candidate.	District.
A. Smith	Kalgoorlie.
W. E. Godenzi	Kalgoorlie.

Scholarship not awarded.

CHAMBER OF MINES SCHOLARSHIP IN MINING.

Candidate.	District.
Jensen, Harold	Kalgoorlie.

H. Jensen has been recommended for this Scholarship.

THE CRITCHLEY PARKER PRIZE.

The following have been recommended for the prizes offered by Critchley Parker, Esq., Melbourne:—
C. H. Warman; A. J. Crocos.

MECHANICS' INSTITUTE (KALGOORLIE) FREE MEMBERSHIP PRIZES.

The following have been recommended:—
G. T. Browne; W. E. Godenzi, A. M. Smith.

INSTITUTE OF MINE SURVEYORS OF W.A. INC. PRIZES (Books).

For these the following have been recommended:—
M. V. Weatherall; W. R. Bell; C. H. Warman.

ANNUAL EXAMINATIONS, 1928.

(T) Denotes Terminal Pass only.

PREPARATORY CHEMISTRY.

Pass—
McMahon, Alfred J.
Smith, Allan M.
Rinaldi, Gerard J.
Godenzi, William E.
Schoeffler, Thos. (T)
Miles, James A.
Clarke, Robert D.

PREPARATORY MECHANICAL DRAWING.

Credit—
Godenzi, William E.
Taggart, Joseph H. C. } equal.
Beames, Hurtle M. }
Thomas, Fred M.

Pass—
Smith, Allan M.
May, Allan W.
Taylor, George A.
Clarke, Robert D.
Taylor, Robert.
Miles, James A.
Rowe, Richard L.

PREPARATORY PHYSICS.

Pass—
Smith, Allan M.
Taggart, Joseph H. C.
Miles, James A.
Beames, Hurtle M.
Godenzi, William E.

PREPARATORY GEOLOGY.

Pass—
Godenzi, William E.
Smith, Allan M.

PREPARATORY MATHEMATICTS. (All Sections.)

Pass—
Terrell, Walter.
Smith, Allan M.

PREPARATORY MATHEMATICS.

(Arithmetic Section).

Pass—
Godenzi, William E.
Koetsveld, William A.
Clarke, Robert D.
Main, Eric W.
May, Allan W. M. } equal.
Taggart, Joseph H. C. }

Algebra Section.

Pass—
Evans, Basil P.
May, Allan W.

Geometry Section.

Pass—
Evans, Basil P.
Godenzi, William E.
Stubbs, Frank H. R.
Taggart, Joseph H. C.
Browne, George T.

ELEMENTARY MATHEMATICS.

Pass—
McGowan, Frederick J.

MATHEMATICS.

First Course.

(All Sections.)

Pass—
Weatherall, Martin V. (T)

Geometry Section.

Pass—
Brown, Charles W.

ANNUAL EXAMINATIONS, 1928—continued.

PHYSICS.
First Course.
Pass—
Gardner, Denis
Ryan, Mortimer
Weatherall, Martin V (T)
Eccles, Miss A. D.
Hogan, Jack
Nicholson, Arthur W. (T)
Provisional Pass—
Thomas, C. O. A.

CHEMISTRY.
First Course.
Credit—
Weatherall, Martin V.
Pass—
Birch, Reginald D.
Thomas, Fred. M.

ENGINEERING CHEMISTRY.
First Course.
Credit—
Illidge, Ernest H.

ASSAYING.
First Course.
Credit—
Jensen, Harold
Pass—
Golding, Hollis D.

ASSAYING.
Second Course.
Credit—
Illidge, Ernest H.

GEOLOGY.
First Course.
Credit—
Birch, Reginald D.
Browne, Gordon

METALLURGY.
First Course.
Pass—
Arnatt, Robert F.

MINERALOGY.
Credit—
Jensen, Harold
Pass—
Arnatt, Robert F.
Browne, Gordon
Birch, Reginald D.

PETROLOGY.
Credit—
Birch, Reginald D.
Jensen, Harold
Pass—
Browne, Gordon

ECONOMIC AND MINING GEOLOGY.
(Provisional pending Thesis.)
Pass—
Arnatt, Robert F.
Bell, William R.
Lynch, Thomas

MINING.
First Course.
Credit—
Finucane, Kevin J.

MINING.
Second Course.
(Ore Dressing.)
Pass—
Arnatt, Robert F.
Weatherall, Martin V.
Bell, William R.

(Mine Sampling.)
Credit—
Weatherall, Martin V.
Bell, William R.
Pass—
Arnatt, Robert F.

(Mine Accounts and Administration.)
Credit—
Arnatt, Robert F.
Pass—
Bell, William R.

SURVEYING.
First Course.
Pass—
Johns, Edward N.
Komaroff, Dimitri

SURVEYING.
Second Course.
(Provisional pending Plan.)
Credit—
Warman, Charles H.
Arnatt, Robert F.
Pass—
Weatherall, Martin V.
Bell, William R.

MECHANICAL DRAWING.
First Course.
Credit—
Glasson, Leslie J.
Wood, Abner D.
Terrell, Walter
Main, Eric W. S.
Komaroff, Dimitri
Pass—
Evans, Basil P.
Rinaldi, Gerard J.
Weatherall, Martin V.
Brown, Charles W.

MECHANICAL DRAWING.
Second Course.
Credit—
McNeill, James B.
Allan, Archibald T.
Pass—
Browne, George T.

APPLIED MECHANICS.
Credit—
Warman, Charles H.
Pass—
Crocos, August J.

MECHANICAL ENGINEERING.
First Course.
Pass—
Shaw, Edward R.

MECHANICAL ENGINEERING.
Second Course.
Credit—
Warman, Charles H.
Pass—
Crocos, August J.

MECHANICAL ENGINEERING.
First Course.
GAS ENGINE.
Credit—
Stubbs, Frederick H. R.
Crocos, August J.
Warman, Charles H.
Pass—
Wood, Abner D.
Griffiths, David

ANNUAL EXAMINATIONS, 1928—continued.

INDICATOR.
Credit—
Stubbs, Frederick H. R.
Crocos, August J.
Warman, Charles H.
Pass—
Griffiths, David

BUILDING CONSTRUCTION.
Credit—
Warman, Charles H.
Pass—
Oakley, Phillip R.
Parker, Peter J.
Crocos, August J.
Sargent, Richard A. S.
Golding, Hollis D.
Shaw, Edward R.

ELECTRICAL ENGINEERING.
First Course.
Pass—
Evans, John H.
Baker, Stanley

ELECTRICAL ENGINEERING.
Second Course.
(Provisional pending thesis.)
Pass—
Warman, Charles H.
Crocos, August J.

ELECTRICAL ENGINEERING.
Second Course.
Credit—
Moody, Chas. O. V.
Glendinning, Angus R.
Pass—
Nevile, Roy L.
(Written examination completed. Thesis now accepted).

FITTING AND TURNING.
First Course.
Pass—
Correy, John L. } equal.
Leahy, John }

FITTING AND TURNING.
Second Course.
Credit—
Stubbs, Frank H. R.
Pass—
Richards, Gilbert
Browne, George T.
Main, Eric W.

MACHINE DESIGN.
(Provisional pending Thesis.)
Credit—
Parker, Peter J.
Pass—
Shaw, Edward R.
Theses accepted.
Warman, Charles H.
Crocos, August J.
Sargent, Richard A. S.
(Written examination, 1928.)
Moody, Charles O. V.
(Written examination, 1924.)
Bell, Charles H.
(Written examination, 1926.)

PRACTICAL MATHEMATICS.
Pass—
Crocos, August J.

SUPPLEMENTARY EXAMINATIONS.
(Held in February, 1928).

PREPARATORY CHEMISTRY.
Pass—
Allan, Archibald T.

MATHEMATICS.
First Course.
Algebra Section.
Pass—
Lynch, Thomas
Trigonometry Section.
Pass—
Lynch, Thomas

CHEMISTRY.
First Course.
Pass—
Evans, Basil P.

THEORETICAL MECHANICS.
Pass—
Baker, Stanley

ECONOMIC AND MINING GEOLOGY.
Pass—
Golding, Hollis D.

YEAR'S FEE SCHOLARSHIPS.

Subject.	Holder.
Preparatory Drawing	Godenzi, W. E.
Chemistry I.	Weatherall, M. V.
Engineering Chemistry I.	Illidge, E. H.
Assaying I.	Jensen, H.
Assaying II.	Illidge, E. H.
Geology	Birch, R. D.
Petrology	Birch, R. D.
Mineralogy	Jensen, H.
Surveying II.	Warman, C. H.
Mining I.	Finucane, K. J.
Mine Sampling	Weatherall, M. V.
Mine Accounts and Administration	Arnatt, R. F.
Mechanical Drawing I.	Glasson, L. J.
Mechanical Drawing II.	McNeill, J. B.
Mechanical Engineering II.	Warman, C. H.
Building Construction	Warman, C. H.
Applied Mechanics	Warman, C. H.
Machine Design	Warman, C. H.
Gas Engine	Stubbs, F. H.
Indicator	Stubbs, F. H.
Fitting and Turning II.	Stubbs, F. H.

W. A. SCHOOL OF MINES.

1928.

Positions held by Students.

Agnew, R. J.—Asst. Manager, European Mines, Klagenfurt, Jugo-Slavia.

Arnatt, R. F.—Treatment Plant, Lake View and Star Mine.

Bell, C. H.—1927—Cadet in Midland Junction Workshops.
1928—Draftsman in P.W.D., Perth.

Bell, W. R.—Assistant to Surveyor, Perseverance Mine.

Butement, J. C.—Inspection Engineer with Millken Bros., Engineers, London.

Butement, T. G.—Engineer with Mechanical Supplies Ltd., Adelaide.

Crutchett, E.—Asst. Surveyor, Great Boulder Proprietary Ltd.

Crutchett, Ivan—With P.W.D., Perth.

Dingle, M. M.—In business on his own account as an Electrician, Adelaide.

Edmondson, F. C.—Engineer to Perth Electricity Supply.

Ehlers, C. R.—Assistant to above Engineer.

Esdaile, A. N.—In Laboratory, Zinc Corporation, Broken Hill.

Finucane, K. J.—Assistant Government Geologist, W. A.

Godden, F. W. R.—Consulting Engineer to English Mining Co., Reefton, N.Z.

Glendinning, A. R.—Electrical Engineer's Branch, G.P.O., Adelaide.

Griffiths, D. D.—Lecturer in Electrical Engineering at the Hawthorne Technical College, Melbourne.

Gibbons, L. P.—Lately Head Surveyor, Pahang Consolidated, F. M. States. Now holds a municipal position in Perth.

Grigg, J.—Managing a tin mine in the F. M. States.

Jensen. H.—In Survey Office, Lake View and Star Mine.

Kingdon, H.—A.R.S.M. Took surveying subjects at K.S.M. Holds position of surveyor, Sons of Gwalia Mine, Gwalia.

Lang, J. H.—Asst. Manager, Malloch Bros., Perth.

Manners, J. E..—Manager, Carabobo-Venezuela Gold Mines, Venezuela.

Meredyth, C. C.—Appointed 1928 to position of Engineer in Charge, Electric Light Station, Millicent, South Australia at present lecturer Perth Technical College.

Mundle, E.—Surveyor, South Kalgurli Consolidated.

Nevile, R. L.—Draughtsman and Assistant to the District Railway Engineer, Kalgoorlie.

Noal, J.—In F. M. States as Surveyor and Engineer. Assistant manager Sungei Besi Mine.

Nairn, T. W.—Technical Manager of Cresco Fertiliser Co., Bassendean.

Patterson, A. V.—In charge of water softening plants, etc., Trans-Australian Railway.

Powell, T.—In P.W.D., Perth.

Rosenberg, J. M.—With Messrs. Atkins & Co., Perth.

Rosenbrock, E. L.—With Roads and Bridges Dept., Perth.

Thrupp, T. W.—Lecturer at Swinbourne Technical College, Victoria and later at another College there.

Terrell, J. H.—Still Surveyor, Perseverance Gold Mine.

McDermott, C. J.—Assistant Surveyor, Lake View & Star Mine.

Cecil, Clyde.—Lecturer at Perth Technical College.

Brown, C. W.—Chemist, South Kalgurli G. M.

Davies, I.—With P.W.D., Perth

Davies, M.—In business in Perth as Indent Engineer, etc.

Fairley, T. C.—In charge of outside work for Kalgoorlie Electric Light Station.

Johns, E. N.—In Municipal Lighting Station, Boulder.

Midgley, F. M.—With Electric Light Station, Bunbury.

Sargent, R. A.—With Electric Light Station, Kalgoorlie.

DIVISION VI.

Report of the Chief Inspector of Machinery and Chairman of the Board of Examiners for Engine-Drivers for the Year, 1928.

9th April, 1929.

The Under Secretary for Mines, Perth.

Sir,

Herewith report of the Deputy Chief Inspector of Machinery on the operations of the Inspection of Machinery Branch for the year ended 31st December, 1928.

The total number of accidents reported showed an increase of seven over the accidents reported during 1927, the fatal accidents being three in number. Continuous endeavours are maintained by the inspectors to minimise accidents and, in view of the large amount of machinery in operation, the number of accidents is small.

In addition to the Deputy Chief Inspector of Machinery, there are at present only six inspectors, one of whom is stationed at Kalgoorlie. The number of groups of machinery is steadily increasing and it will be necessary to appoint an additional inspector in the near future.

The report contains particulars of the work done, and I wish to state that a high standard of efficiency has been maintained.

I have, etc.,

A. M. HOWE,
Chief Inspector of Machinery.

OPERATIONS UNDER "THE INSPECTION OF MACHINERY ACT, 1921."

Report of the Deputy Chief Inspector of Machinery and Senior Member of the Board of Examiners for Engine Drivers for the Year 1928.

Office of the Chief Inspector of Machinery,
Department of Mines,
Perth,
22nd March, 1929.

The Chief Inspector of Machinery.

Sir,

I have the honour to submit my report on the operations of the "Inspection of Machinery Act, 1921," for the year ended 31st December, 1928:—

(1) Inspection of Boilers.
(2) Explosions and Interesting Defects.
(3) Inspection of Machinery.
(4) Accidents to persons caused by boilers and machinery.
(5) Board of Examiners for Engine-drivers.
(6) General.

DIVISION 1.

Inspection of Boilers.

RETURN NO. 1.—SHOWING OPERATIONS IN PROCLAIMED DISTRICTS DURING YEAR ENDED 31ST DECEMBER, 1928.

(*Boilers only*).

	Districts worked from Perth.	Districts worked from Kalgoorlie.	Un-proclaimed Area.	Totals.	
				1928.	1927.
Total number of useful boilers registered ...	2,246	1,175	49	3,470	3,422
New boilers registered during year	76	6	...	82	156
Boilers re-instated	1	...	...	1	1
Conversions	...	...	...	...	12
Inspections for year—					
Thorough	1,281	245	...	1,526	1,569
Working	32	35	...	67	60
Boilers condemned during year—					
Temporarily	52	8	...	60	39
Permanently	31	2	...	33	56
Boilers sent to other States during year ...	1	...	...	1	8
Transferred to other Departments	5	...	...	5	1
Transferred from other Departments ...	4	...	...	4	1
Number of Notices for repairs issued during year	431	39	...	470	334
Number of Certificates issued, including those issued under Section 30, during year	1,264	248	...	1,512	1,557

There were 74 fewer new registrations during the year than in 1927, but that is explained by the fact that steam engines are being rapidly superseded by internal combustion engines and electric motors.

Locomotives and large high pressure water-tube boilers are holding their own, but all other types are only occasionally replaced when worn out. Although farming has increased so much, there was only one portable engine and boiler imported during the year; the work previously done by this implement being now almost entirely done by petrol and crude oil tractors, which do not come under the provisions of the Act.

Of the 82 new registrations, 20 were imported from the United Kingdom, 2 from Germany, 14 from the United States of America, 14 from the Eastern States, 10 from unknown sources, and 22 manufactured in this State.

Local manufactures included 3 locomotives, 8 air-receivers, 1 digester, 3 vulcanisers, 6 steam jacketed pans and 1 sterilizer. The falling off in air receivers is largely due to makers evading the Act by constructing them under five cubic feet capacity. The sterilizer made by a local firm was both in quality of workmanship and appearance quite equal to those previously imported from abroad.

The number of useful boilers on the Register shows an increase of 48 over last year's figures. Four boilers were transferred from other Departments, 1 reinstated, 6 transferred beyond the jurisdiction of the Act and 33 permanently condemned; roughly 2 per cent. of the inspections made.

The number of thorough and working inspections made during the year was 1,526 and 67 respectively. The former shows an decrease of 43 compared with last year's figures, but there was increased work in other directions to make up for it. There was a slight increase in the number of working inspections, and I hope that time can be found during the coming year to make very many more of this important form of inspection.

This portion of the work was well up to date at the end of the year, only six remaining to be done.

In this connection it must be noted that a large number of our boilers are reaching old age and require very careful examination and often extensive repairs to be kept fit to maintain the pressure required. As most of these have to be re-inspected and tested after repairs, the time occupied by the Inspector is greatly increased.

DIVISION II.

Explosions and Interesting Defects.

Fortunately there were no explosions during the year and no interesting defects worth recording.

DIVISION III.

Inspection of Machinery.

RETURN No. 2.—SHOWING CLASSIFICATION OF VARIOUS SOURCES OF POWER-DRIVEN MACHINERY IN USE OR LIKELY TO BE USED AGAIN, IN PROCLAIMED DISTRICTS FOR YEAR ENDED 31ST DECEMBER, 1928.

Classification.	Districts worked from Perth.	Districts worked from Kalgoorlie.	Totals.	
			1928.	1927.
Number of groups driven by steam engines	671	361	1,032	1,060
Number of groups driven by oil engines	1,092	82	1,174	1,116
Number of groups driven by gas engines	127	85	212	216
Number of groups driven by compressed air	8	26	34	32
Number of groups driven by electric motors	4,301	468	4,769	4,309
Number of groups driven by hydraulic pressure ...	3	...	3	3
Total	6,202	1,022	7,224	6,736

It will be seen that the total number of groups registered at the end of the year was 488 more than in 1927. Registration of 460 new electric motors accounts for most of the increase, and that is followed by an increase of 58 groups driven by oil engines. Hydraulic power groups remain the same, and steam and gas are falling off.

RETURN No. 3.—SHOWING OPERATIONS IN PROCLAIMED DISTRICTS DURING YEAR ENDED 31ST DECEMBER, 1928.

(*Machinery only.*)

	Districts worked from Perth.	Districts worked from Kalgoorlie.	Totals.	
			1928.	1927.
Total registrations useful machinery	6,202	1,022	7,224	6,736
Total inspections made	5,184	373	5,557	5,371
Certificates (bearing fees)	2,484	139	2,623	3,031
Certificates (steam, without fees)	322	26	348	356
Number of extension certificates issued under Section 42 of Act	...	...	...	...
Notices issued (Machinery dangerous)	239	9	248	246

One hundred and eighty-six more inspections were made this year than last; which offsets the fewer boiler inspections made. Only 20 groups remained to be inspected at the close of the year.

The number of registered lifts is now 200, an increase of 7 passenger and 6 devoted to goods and light service. All these were inspected and certificated.

DIVISION IV.

Accidents to persons caused by Machinery and Boilers.

RETURN No. 4.—SHOWING PERSONS KILLED OR INJURED BY MACHINERY ACCIDENTS IN PROCLAIMED DISTRICTS DURING YEAR ENDED 31ST DECEMBER, 1928.

Class of Machinery.	Districts worked from Perth.	Districts worked from Kalgoorlie.	Total.
Sheet Metal Working—			
Crimping Machine	1	...	1
Tin Press	1	...	1
Guttering Press	1	...	1
Double Seamer	1	...	1
Stamping Press	3	...	3
Grooving Machine	1	...	1
Metal Working—			
Hack Saw	...	1	1
Wood Working—			
Buzzer	6	...	6
Circular Saw	5 (1)	1	6 (1)
Spindle Moulder	2	...	2
Printing Machine			
Printing Machine	1	...	1
Paste Mixer	1	...	1
Saw Milling—			
Shafting	1 (1)	...	1 (1)
Paper Bag and Box Making—			
Stapling Machine	1	...	1
Goods Lift	2	...	2
Agricultural—			
Chaffcutter	1	...	1
Mining—			
Winding Engine	...	1	1
General—			
Belting	1	1	2
Crane	1	...	1
Hair Teasing Machine	2	...	2
Skiving Machine	1	...	1
Gear Wheels	2	...	2
Hydro Extractor	1	...	1
Emery Wheel	1	...	1
Tile Press	1	...	1
Meat Mincer	1 (1)	...	1 (1)
Fly Wheel	1	...	1
Bucket Elevator	...	1	1
Totals	40 (3)	5	45 (3)

( ) Numbers within brackets denote fatal accidents.

Of the 45 accidents reported three were fatal, and are described below. Of the remainder 30 were serious, incapacitating the person for more than fourteen days, and the rest of a trivial nature incidental to those working amongst machinery and caused by inattention or carelessness.

The first fatal accident reported occurred in March at a small sawmill, and was caused by the bar of a Capstan which was drawn suddenly in a reverse direction, by its rope getting foul of revolving shafting in the vicinity. The capstan was used for hauling and manipulating logs on to the saw-bench, and the rope was led through a snatch-block fixed just above a pulley on the mill shafting, and terminated in a hook. At the time of the accident three men were working, one at the capstan and two at the bench. A log had been hauled on to the truck and one cut put through. The hook was then attached and the log turned over when the hook became detached and allowed the slack rope to drop against the revolving shafting, where it became entangled by the set-pin of a collar and began to be wound round it. This caused the capstan to be pulled round and before the man there could get clear he was struck by the capstan bar and died subsequently from the injuries received. This plant had only been in operation a short time, was not registered, and consequently had not been inspected. Had it been, such an obviously dangerous practice would never have been permitted. No prosecution followed because the three men engaged at the time were brothers, and it was considered that the survivors had been punished enough.

The second accident resulting in death occurred at a mincing machine at a butcher's shop. A butcher, eighty years of age, was engaged putting fat through a mincing machine in the back room of a

butcher's shop, when by some mischance he got the tops of three fingers cut off by the machine. An operation was performed, but sepsis followed and he died nine days afterwards. There was no danger with the machine if it was properly used and a wooden ram was provided for pressing the meat in.

The third fatality happened at a large sawmill, when a man was struck by a piece of timber flung from a saw seventy feet from where he was standing. A benchman was cutting 1¼in. boards from 5in. x 4in. timber about 18 feet long. A board had just been cut when it broke about four feet from the far end between bench and truck. The longer piece became up-ended over edge of bench, the near end struck the back of the saw and the plank was hurled off. The saw was about 4 feet in diameter, and had been fitted with a splitter or riving knife, but that had been removed some days before because it was considered unsuitable for some sawing which was then being done. Had this knife, which is in the nature of a guard, been in position the accident might not have happened. The manager of the mill was subsequently fined at the instance of the Timber Industries Inspector for allowing the saw to be worked without a guard. The splitter or riving knife is only a partial guard for a circular saw, but certainly minimises the risk of accident, and should be used if possible. It is difficult to make old hands realise that, even if inconvenient at times, a guard serves a very important purpose and should not be removed.

The next most serious case happened at an itinerant chaffcutter. This plant was unregistered and had never been inspected. The operator who was injured was the son of the owner, and while cutting chaff got his fingers caught by the rollers, and lost most of his forearm before he could stop the machine. There was no guard to prevent his hand getting too close to the rollers, the foot-operated emergency gear was out of order and he could not reach the hand reverse until some of his forearm had been sliced off. No action was taken against the father for not having registered the machine or for working without a certificate, because it was considered he had been sufficiently punished by his son's serious injury.

There appears to be a large number of buzzer and tin-press accidents, but they were all more or less trivial and due to carelessness or momentary inattention on the part of the operatives. Square-headed buzzers are being superseded by the circular type, and these while not entirely safe are less likely to cause such serious mutilation as the square-headed ones. These should be prohibited for all new installations by Regulation.

DIVISION V.

Board of Examiners for Engine-drivers.

The Board was occupied for 42 days during the year in examining credentials of intending candidates, conducting examinations, travelling and holding enquiries. Four examinations were held in Perth, 2 in Kalgoorlie and 2 in Bunbury. No other centre could produce a sufficient number of candidates to justify the Board sitting there, and candidates were given the choice of attending at any of the places mentioned.

One hundred and eighty-nine applications were received and 158 certificates granted. Details are shown in Return below:—

RETURN No. 5.—SHOWING TOTAL NUMBER OF ENGINE-DRIVERS AND BOILER ATTENDANTS' CERTIFICATES (ALL CLASSES) GRANTED IN 1928 COMPARED WITH 1927.

Class of Certificate.	Number granted.	
	1928.	1927.
Winding Competency including Certificates issued under Regulation 40 and Section 60 of Act	2	4
First Class Competency including Certificates issued under Regulation 40 and 45 Section 60 and 63 of Act	6	9
Second Class Competency including Certificates issued under Regulation 40, and Section 60 of Act	29	13
Third Class Competency including Certificates issued under Regulation 45, and Section 60 and 63 of Act	26	32
Locomotive Competency	7	12
Traction Competency	1	3
Internal Combustion Competency	13	16
Crane and Hoist Competency	14	10
Boiler Attendant Competency	53	61
Interim	1	1
Copies	4	7
Transfers	2	6
Totals	158	174

There were only two Winding Engine-Drivers' Certificates isued during the year as against four the year before, and the Goldfields Inspector reports that the dearth of Winding Drivers is getting more pronounced every year.

With one commendable exception Mine Managers do not apparently encourage or grant facilities to young drivers to obtain the necessary practice to enable them to qualify for Winding Certificates. The older men are dropping out, and it is increasingly

difficult to fill their places. Should there be a revival in mining, which is not unlikely, the position would become serious, and it behoves all managers to exercise a little foresight in the matter. Aspirants should be carefully selected, because above all things a winding engine-driver must possess a suitable temperament. He must have a cool head, and be capable of acting promptly in case of emergency. He should have a sufficient knowledge of underground conditions to know what is happening at the skip or truck end of the rope, a natural deftness at manipulating the various controls and care in the use of machinery to get the best results without unduly straining engine or ropes.

The certification of drivers of electric winding engines will have to be seriously considered next year, because their use in being spoken of both at Wiluna and other centres, and the Act only provides for engines driven by steam, compressed air, or internal combustion engines. As pointed out in the previous paragraph, a winding engine-driver's work calls for much more than good health and knowledge of machinery.

Three mishaps in winding were enquired into by the Board, but only one was at all serious. This mishap occurred on a 18in. x 60 in. duplex winding engine which operates to a depth of 2,300 feet. It has friction clutches, post gravity brakes and steam reversing gear. Previous to the accident some timber men had been putting in new skids, and just before crib time two men got into a skip in single gear at the No. 12 level and rang to be lowered to No. 14 level. One man was standing in the skip and the other sitting on the top edge. The cage began to descend at an alarming rate, and then stopped with a jerk which precipitated the man sitting on top of the skip on the man below who sustained a fractured leg. The explanation was that the reversing lever was with the descending skip instead of being against it when the driver began to lower, and on realising his mistake he stopped the engine too suddenly.

Had one man not been perched above the other, nothing more than perhaps a severe shaking would have resulted.

Considering the number of winding engine-drivers employed and the exacting nature of the work on the large mines their record for efficiency is good.

No complaints of misbehaviour were reported during the year.

DIVISION VI.

General.

During the year a case occurred of a false testimonial of service being given to a candidate for an engine-driver's certificate. The regulations require that a candidate for any grade of certificate, in addition to having the requisite knowledge, must supply evidence of having had a certain amount of actual experience assisting to drive the class of engine which the certificate covers. Knowledge can be tested by examination, either written or oral or both, according to grade, but experience has to be vouched for by employers (or their managers) and the engine-driver under whom the candidate has been practising. This method provides a check, but in this case the manager was also the holder of an engine-driver's certificate, and provided both testimonials, one as manager and another as driver. In all good faith the candidate was allowed to sit, but during the oral portion of his examination suspicion was aroused, and subsequent enquiries elicited the fact that he had not the practical experience vouched for. Action was commenced against the granter of the false testimonial, but the case had not been heard by the end of this year.

The work of the inspectors has been very strenuous during the year owing to handicaps, such as the appointment of a new inspector in place of experienced one, staff adjustments, change of offices, etc., but at the close only twenty groups of machinery remained to be inspected out of nearly 5,600 in use.

This result is satisfactory as far as the collection of revenue goes, but I would like inspectors to be able to devote more time to working inspections of boilers under steam, and to return inspections of machinery after guarding instructions have been issued, because owners' and employers' assurance that our instructions have been complied with are not always satisfactory.

In view of the two accidents which occurred at unregistered machinery a few prosecutions will have to be made to remind owners of their obligations under the Act.

The two committees of the Australian Commonwealth Standards Association with which this branch is closely associated, viz.; "Steam Boilers, etc." and "Cranes and Hoists" held about twenty five meetings during the year, and have done good work. Meetings are held in the evenings and very little official time has been spent on the work beyond typing of minutes and reports to the main committee in Sydney. Towards the end of the year another committee was launched under my chairmanship to deal with Lifts, and a local committee will be formed early in the new year to work on it.

Revenue.

The total revenue from all sources during the year was £5,127 7s. 3d. against £5,451 17s. 1d. in 1927—a decrease of £324 9s. 10d.

RETURN No. 6.—SHOWING ANALYSIS OF REVENUE (ALL SOURCES) FOR YEAR ENDED 31st DECEMBER, 1928.

Sources.	Districts worked from Perth.	Districts worked from Kalgoorlie.	Totals.	
			1928.	1927.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Boilers	1,879 14 3	546 10 0	2,426 4 3	2,538 15 0
Machinery	2,116 5 3	252 9 6	2,368 14 9	2,542 0 3
Incidentals	115 5 9	11 9 0	126 14 9	145 0 10
Engine Drivers	...	...	205 13 6	226 1 0
Totals, 1928	4,111 5 3	810 8 6	5,127 7 3	...
Totals, 1927	4,330 17 7	894 18 6	...	5,451 17 1

Decrease £324 9s. 10d.

Expenditure.

The expenditure for the year, £5,474 18s. 11d. was £354 6s. 9d. less than that of 1927, but still shows a loss of £347.

RETURN No. 7.—EXPENDITURE FOR YEAR 1928 AS COMPARED WITH 1927.

——	1928.	1927.
	£ s. d.	£ s. d.
Salaries	4,688 4 2	4,713 10 2
Travelling Allowances and Fares ...	419 5 7	544 15 6
Motor Car costs	200 2 1	238 4 1
Hire of Conveyances	5 8 1	44 4 6
Sundries	110 8 5	215 10 6
Engine-drivers	51 10 7	73 0 11
Totals	5,474 18 11	5,829 5 8

Decrease—£354 6s. 9d.

Mileage.

The distance travelled by Inspectors during the year was 43,040 miles 7,675 by rail, 35,315 by road and 50 by water. This shows an increase of 2,943 miles over last year and works out at 6.01 miles per inspection, or an increased average of .43 miles per inspection.

Staff.

Early in the year Mr. P. H. Wright, Inspector of Machinery, obtained a better position in the Metropolitan Water Supply Department, the vacancy created was filled temporarily by Mr. D. R. MacGregor. At a later date steps were taken to fill the position permanently and the Board of Examiners decided that out the six applications received only four were qualified to sit for examination.

The examination consisted of two written papers, one on boilers and the other on engines and machinery, each of three hours duration and followed by verbal examination after the papers had been marked. The examination was held on 2nd October, but only two candidates attended out of the four expected. The Board finally recommended the appointment of Mr. D. R. MacGregor, which was approved by the Hon. the Minister, and he was appointed as from 1st November.

Towards the end of the year some important changes were made in the personnel of the staff of the Department, and certain adjustments had to be made within this branch. The writer was appointed Deputy Chief Inspector of Machinery, and Mr. Walter Churchill promoted Senior Inspector of Machinery.

Owing to the changes in the system of issuing certificates and collection of fees initiated last year, the clerical staff was reduced by one this year.

I desire to thank all members of the staff for their efficient and loyal service during the year.

I wish to extend my sincere thanks to officers attached to the Crown Law, Police and Postal Departments for courtesy and assistance in connection with the administration of the Act.

I have, etc.,

B. PRYNN JONES,
Deputy Chief Inspector of Machinery.

APPENDIX.

EXAMINATION OF CANDIDATES FOR THE POSITION OF INSPECTOR OF MACHINERY.

Morning Paper—10 *a.m. to* 1 *p.m., 2nd October,* 1928.

Questions may be answered in any order.
All workings must be shown.

1. (a) How many studs 1¼in. diameter are required for the cover of a cylinder 45in. diameter when the boiler pressure is 70lbs. per square inch and the stress per square inch is not to exceed 3,000lbs. per stud?

(b) If it takes 800lbs. at a leverage of 12in. to break a stud 1in. in diameter, what force would be necessary to break a ¾in. stud at a leverage of 18in.?

(c) A baffle pipe in a boiler is 12in. diameter with slots 6in. long and ¼in. wide; how many slots must there be to make an area equal to double the sectional area of the pipe? (15 marks.)

2. (a) State how you would apply an indicator not fitted with reducing gear to an engine which had not been provided with the usual fittings and appliances.

(b) Sketch a diagram you would expect to get from the L.P. Cylinder of a cross-compound condensing engine with ordinary D slide valve and having following defects:—

Restricted steam passages.
Excessive compression.
Late exhaust.

(c) Could you remedy any of the faults enumerated? (25 marks.)

3. (a) Describe in detail how you would erect shear legs to lift a piece of machinery weighing 5½ tons. Give number of sheaves in blocks, diameter of rope and how you would arrange the tackle.

(b) Calculate the pull on rope.

(c) If using a capstan with six bars and a man at each bar 12 feet from man opposite and barrel 18in. diameter, what pressure would each man have to exert to lift the load of machinery? (20 marks.)

4. (a) What is the difference between direct and alternating electrical current?

(b) For what purpose is each most suitable?

(c) What are the main essential parts of a dynamo, and what are their functions?

(d) How many foot lbs. per minute are equivalent to one electrical horse power? (15 marks.)

5. A double drum winding engine is hauling water at the rate of 500 feet per minute from a depth of 1,000 feet with a rest of two minutes per haul for filling and emptying. The baling tanks are 6ft. x 4ft. x 4ft. How many gallons are being raised every 24 hours, and what is the actual h.p. used during the day, allowing 20 per cent. for friction? The weight of ropes and tanks to be neglected. (10 marks.)

6. (a) What is "producer gas"? Describe the generator in which it is made, both for up-draught and down-draught types, trace the gas from fuel to engine and explain function of plant en route.

(b) What is the difference between a gas engine and Diesel oil engine? (15 marks.)

EXAMINATION OF CANDIDATES FOR THE POSITION OF INSPECTOR OF MACHINERY.

Afternoon Paper—2 *p.m. to* 5 *p.m., 2nd October,* 1928.

Questions may be answered in any order.
All workings must be shown.

1. Make a free hand longitudinal section sketch of either of the two boilers mentioned below. Plates in section may be shown by broad lines. Assume lengths and diameters of shells and then put in details to suit pressure required and prove by computation.

Cornish or semi-Cornish for 100lbs. per square inch.

Locomotive type for 80lbs. per square inch.

(30 marks.)

2. What do you understand by the following terms:—

(a) Conduction, convection, radiation, coefficient of expansion, water hammer, breathing space?

(b) Describe three methods of providing for expansion and contraction of steam pipes.

(c) What is likely to happen in a steam main for a nest of boilers if no provision be made for expansion? (15 marks.)

3. Describe briefly the relative merits of the following boilers:—Lancashire, watertube, underfired-multitubular and locomotive types. (20 marks.)

4. (a) How may the quality of boiler feed water be approximately ascertained when chemical analysis is not available and you have neither salinometer nor hydrometer?

(b) What is galvanic action? Where is its effect most noticeable in boilers, and how is it combated?

(c) Where does corrosion first manifest itself in watertube and underfired-multitubular types? (15 marks.)

5. (a) What is crude-oil fuel, and why is it coming into such general use for steaming purposes?

(b) Describe its application to raising steam in boilers and make a rough sketch of any modern system for its use. (10 marks.)

6. (a) If the water space stays of a locomotive boiler having a working pressure of 160lbs. per square inch were 1in. in diameter, what would you consider the working pressure allowable when they were reduced by corrosion to 13/16in. diameter?

(b) Describe briefly three different types of safety valves used on boilers. (10 marks.)

DIVISION VII.

Annual Report of the Chemical Branch, Mines Department, for the Year 1928.

The Under Secretary for Mines, Perth.

I have the honour to submit, for the information of the Hon. the Minister, my report on the work of this Branch during the year 1928.

Staff and Equipment.

The technical staff during most of the year comprised eighteen chemists, all having the qualifications of the Australian Chemical Institute. Two of these are temporarily employed.

The long needed special room for toxicological work has at last been completed and will afford the greatest possible protection to the staff against noxious fumes inseparable from such investigations.

Materials Examined.

During the year 4,331 samples were received, their origin and distribution among the different sections of the laboratory being indicated in the following table:—

Samples Received.

—	Food, Drugs, and Toxicological Section.	Mineral Section.	Agriculture W.S. & S. section.
Department of Agriculture	49	1	678
Department of Mines ...	129	1,208	56
Department of Health	234	...	3
Department of Public Works	7	...	31
Department of Crown Law	92	...	5
Department of Treasury, etc.	34	5	16
State Implement Works	...	1	...
Metropolitan W.S. & S.	5	42	932
State Sawmills ...	21	...	...
Public Pay	28	46	255
Public Free	37	358	58
	636	1,661	2,034
Grand Total ...	4,331		

The most numerous class of samples is as usual gold ores and residues, numbering 1,002 samples. Waters for the Metropolitan Water Supply totalled over 900, and for farmers and pastoralists 240. Of wheats (mainly for moisture content) 418 samples were handled. Minerals for determination amounted to 447, foods to 237, soils to 156, fertilisers to 98, explosives to 84, toxicological specimens to 80, and tin ores to 72. Other classes of samples each amounted to 50 or less.

Foods and Drugs.

Several meetings of the Foods Standards Advisory Committee were attended, and the uniform regulations drawn up by an Inter-State Conference in 1927 were recommended for adoption with a very few amendments. This was done and the new regulations come into force on 1st February, 1929. Consideration was given to the question of orange drinks and a regulation inserted in the new schedule which it is hoped will ensure the public being able to obtain healthful drinks composed of fresh orange juice.

Other matters which received close attention were the use of boric acid in concentrated milk, ammonium persulphate in flour, suitable preservatives for beer, and various resolutions of the Federal Viticultural Council of Australia regarding standards for Australian wines.

During the year under review the old regulations were in force and over 200 analyses were made under them, particularly of sausages, flour and baking-powder, soft drinks, milk, and soaps. A large proportion of the samples submitted failed to comply with the regulations, notably 36 out of 55 samples of sausages.

Metropolitan Water Supply.

The advisory committee on the quality of this supply continues to function and meetings were attended each month. Special attention was given to the brown discolouration of the water which is more or less marked every wet season. From 1st July, 1928, Mr. H. E. Hill, A.I.C., A.A.C.I., of this Branch was appointed as special investigating chemist to experiment and advise on this and other chemical aspects of the city supply. At his suggestion automatic liming machines have been installed at the principal sources of supply and the addition of milk of lime adjusted so as to alter the original pH. of the waters from 6.3-6.8 to 9.0-9.4. Largely as the result of the activities of the Committee and Mr. Hill there have been fewer complaints of the quality of the water this year than for many years previously.

In the past the lime supplied, like all that available in Perth, has been of very poor quality, but as the result of the advice given to contractors by Mr. Hill, and inducements offered in the way of higher prices per unit the average grade of lime supplied has risen in a few months from A, through B to C.

	Free lime.	Total lime.	Insoluble sand.
A	54.3	60.6	29.7
B	61.1	67.8	22.1
C	69.9	73.4	19.5

Tender Board.

Meetings of the Oils Committee of the Tender Board have been attended and a number of contractors' samples (chiefly lubricating oils) submitted at its request have been examined physically and chemically. Other Government supplies such as soaps have also been tested, either to determine their relative economy, or for comparison with deposited samples.

Bore Cores.

The report of the Mineral Section hereunder draws attention to the large number of cores submitted from bores put down by the Government or with a subsidy therefrom. The majority of these were from gold-mining leases which had yielded good returns down to water level but had in recent years been abandoned or neglected. In two cases, viz., the Big Bell lease at Coodardy and Tyndall's lease at Coolgardie, very encouraging values were struck in the bores.

Boring has also been going on at Greenbushes to test the primary tin deposits, which consist of albite pegmatites traversing hornblende schists or related rocks. So far the highest assay value obtained has only been 0.9 per cent. of tin oxide.

Some cores have also been submitted from the Braeside lead mining district.

Tantalite.

An unusual number of tantalum ores were received for assay, the result of the steady rise in value of such ores, and the fact that a concentrating plant is available at Wodgina. The valuable ores have been almost entirely manganotantalite (tantalate of manganese) which has been worked at Wodgina, McPhee's Range (Green's Well), Tabba and Strelley. Small quantities of high grade microlite (fluotantalate of calcium and sodium) have been found at McPhee's Range, Wodgina and Strelley, and some good tapiolite (tantalate of iron) at the last-named place.

Fungicide Experiments.

In conjunction with the staff at the Merredin State Farm Mr. B. L. Southern, A.A.C.I., has continued his work on bunticides, including experiments to determine which of several recommended copper salts is the most effective, and what influence is exerted by their fineness of division, relative solubility in water, etc. In this connection about 80 soil samples from Merredin were examined with a view to considering the possible effect of the soil moisture on the copper dusts.

Soils and Fertilisers.

In addition to those from Merredin, a number of soils were examined from one of the State pine plantations where stunted growth of seedlings was observed. This appeared to be correlated with an abnormal acidity of the soil. The number of soils analysed mechanically and chemically for farmers was quite small. In connection with a peculiar abnormality in young dairy stock at Denmark, a number of samples of soil, pasture, water and blood were analysed for the more important constituents including iodine.

The usual samples of fertilisers were examined for the Agricultural Department inspectors, and in the large majority of cases proved to be well up to guarantee. The few deficiencies were mainly in the class of bone dusts and blood and bone.

Cereals.

Mr. Lapsley's time continues to be mainly taken up with the examination of wheats, flour, bran and pollard. No less than 418 samples of wheat were registered, of which over fifty were milled and the milling products examined. The balance were mainly for moisture determination in connection with an investigation into the change in moisture content experienced during transit from Australia to Europe.

Farmers' Water Supplies.

The demand for partial analyses of farm waters, mainly from new drills and wells, increases with the spread of settlement into the more arid parts of the South-West. Well sinking is usually preceded by prospecting with hand drills, and when the latter strike water, it is only a matter of a few days before the farmer can be advised as to whether the water is suitable or not for any of his stock or for domestic purposes. He can then determine whether the expense of well sinking at that spot is justified.

Examination of Mineral Deposits.

The potential value of the Campion alunite deposits as a source of aluminium, alum and other potash salts, and renewed inquiries regarding the same, led to Mr. H. Bowley, A.A.C.I., spending three weeks at Campion re-sampling the known deposits and examining neighbouring salinas for similar ores. No extension of the deposits was observed beyond the two "lakes" already known.

In September I spent four days in the Coolgardie district examining the deposits of tantalum and lithium minerals at Londonderry, Gibraltar and Ubini. In the Appendix (p. 109) will be found a copy of my report on this examination.

Council for Scientific and Industrial Research.

Several meetings of the State Committee were attended in my capacity as an official member. One matter raised by myself was the growing misuse of the term "artificial wool" to describe a fibre having neither the composition nor quality of true wool. In view of the possible threat to our wool industry involved in this practice, it is satisfactory to note that the matter is receiving the attention of the Commonwealth and Home authorities.

Conclusion.

In conclusion I desire to express my appreciation of the loyalty and efficiency of the whole staff during an exceptionally strenuous year.

EDWARD S. SIMPSON, D.Sc., B.E., F.A.C.I.,
Government Mineralogist and Analyst.

SECTION I.—TOXICOLOGY, FOODS AND DRUGS SECTION.

By C. E. Stacy, A.A.C.I.

During the year a total of 636 samples have been examined, being an increase of 36 over the previous year. Some details are shown in the accompanying table (p. 103).

Foods.—248 samples have been foods, a notable increase over the figures for 1927. These have not all been received from the Health Department as a number have been obtained departmentally for the purpose of examining the value of the "Formol test" which will be discussed later. In the total have been included 23 samples of human milk and 21 samples of soap, the latter being standardised under the Food and Drug regulations. However, the increase is satisfactory and is due largely to the energies of the late Inspector R. Adam. I would here like to express my great regret at the passing away of this energetic and able officer.

Amongst other activities 20 samples of liquor and two dyes have been done for the Chief Inspector of Liquor, 31 for the Tender Board, 49 for the Department of Agriculture, 84 for the Explosives Branch, and 89 for the Police Department. No drugs or patent medicines have been examined during the year.

Sausages.—55 samples of sausages have been examined and 36 have failed to conform with the regulations, chiefly with regard to an excessive amount of preservative. A number of successful prosecutions have resulted.

Milk.—Nine samples of cows' milk and 23 samples of human milk have been examined. One sample of cow's milk had evidently been improperly sampled as the fats were 11 per cent. and solids not fat only 7.09. The human milks have been done free of charge for various clinics, child welfare centres and hospitals. It is very noticeable that of the 23 samples analysed only four have been equal in quality to that set down in the Health Act Regulations (for comparison with infants' foods prepared for use) as the average composition of human milk.

Fruit Juices, Cordials and Summer Drinks.—22 samples were examined and also a number of pure fruit juices expressed from fruit obtained departmentally. The "Formol test" was applied to these. This is a test for natural vegetable products all of which contain more or less protein. The test depends upon the action of formalin (a 40 per cent. solution of formaldehyde) in seizing on the alkaline or "amino" group of protein bodies and liberating the acidic group which can then be measured by volumetric alkali solution, using a suitable indicator. At present the test can only be employed qualitatively but has considerable value in unmasking purely synthetic foodstuffs, especially fruit juices and cordials. Tests were carried out on grapes, passion fruit, oranges, lemons, tomatoes, limes, apples, and a number of fruit juices and cordials upon the market.

Margarine.—Only one sample was examined, and this was remarkable for the reason that it gave no Reichert-Meissl figure whatever.

Butter.—Four samples were analysed but only for butter fat and moisture. From the first of February, 1929, a Reichert-Meissl figure of not less than 24 has been fixed as an essential qualification. It is to be hoped that some samples of our locally supplied butter will be taken at an early date to see whether they conform to this regulation.

Fish.—Nine samples of fish were examined, eight of which were tinned, and half of which contained more than two grains of tin per lb.

Self-raising Flour.—21 samples were analysed, 10 of which failed to comply with the Food and Drug Regulations.

Baking Powder.—12 samples were analysed, three of which failed to comply with the Food and Drug Regulations.

Cream of Tartar.—14 samples were analysed and four failed to comply with the Food and Drug Regulations.

As before mentioned a new set of regulations comes into force from the 1st February, 1929. This should mean a large increase of food samples for this year, and manufacturers and vendors should be at pains to see that their products are up to the new standard.

Miscellaneous Foods.—Nine samples of sauce were examined; other foods included jam, flour, coffee-essence, pepper, tripe, glucose, mustard, etc.

Spirits.—Only nine samples of spirits were taken by the inspectors during the year for the Liquor Inspection Branch, and these were all for added water. None were for false trade description. It is to be hoped from this that the practice of refilling with cheap bulk and other spirits bottles bearing well established brands has been wiped out. No samples of beer or stout were taken.

Wines.—16 samples of wine were examined during the year. A special inquiry into the products of the well reputed local wine manufacturers carried out for Mr. Johns, Government Viticulturist, went to prove that our local wines can hold their own with any of the Eastern States wines. The types examined side by side with our Eastern neighbours were claret, sherry, chablis and port.

On the other hand one manufacturer (not of British nationality) has been selling a noxious concoction to various retailers. This was an evil smelling and tasting white wine, quite unsound, and dyed a dark reddish purple colour with a mixture of at least two aniline dyes, neither of which are allowed under the Health Act Regulations. The same "wine" was sold in one case as a claret, in another sweetened and sold as port. Great harm must be done to our local wine trade by such practices, and it is hoped that measures will be taken to prevent such a thing occurring again.

Fungicides.—A regulation under the Plant Diseases Act provides that a fungicide or insecticide must be analysed before it can be registered by the Agricultural Department. Such substances as spraying oils and arsenates and arsenites of sodium are dealt with by this section, and this work is likely to increase in the future.

Toxicology.—Another heavy year was experienced with regard to toxicological samples, 80 having been submitted. The new toxicological room has now been practically completed and should go far towards remedying the almost intolerable conditions existing in the past when this work was carried out next door to the clerical office and Food and Drugs laboratory.

The poisons discovered in the specimens forwarded during the year included formalin, cyanide, lysol, alcohol, strychnine and arsenic, by far the larger number being lysol, and next in order cyanide.

A practice occasionally, though rarely, adopted by medical practitioners in forwarding samples for analysis is to dump them into one receptacle and leave the Toxicologist, who is in many cases not a medical man, to separate the various organs, and either guess the nature of them or call some medical man to his aid. Moreover, any poison present may be spread by the body fluids from one specimen to another and cause much error and confusion. A question which the toxicologist is invariably asked in the witness box is "Was a fatal dose present in the stomach?" The question of a fatal dose is only relevant when either the actual amount of the poison taken is known or when the poisonous substance may have been taken accidentally through foodstuffs liable to contain small quantities of poisons such as arsenic, copper, tin, lead, etc. Where, however, the poison is one quite foreign to the body, such as lysol, it must be remembered that the amount absorbed is apt to cause death, and the amount left in the stomach is residual. If, therefore, such a foreign body is found in small amounts, and the doctor's evidence is in accord, it may safely be assumed that death was caused by such a poison.

A number of cows, horses and pig's stomachs were sent in, and in nearly every case negative results as regards poison were obtained. Cattle die from natural causes and the farmer is very apt to jump to the conclusion that "an enemy hath done this." Many of these cases come from long distances, and are exceedingly unpleasant to handle. The analysis is a cause of considerable expense to the farmer, and is of little value as the finding of a poison, which rarely occurs, fails to fix the guilt on any person or persons. The cause may be poison plants, but the poisonous principles of these are so obscure and unstable that only recognition of leaves, berries, etc., in the stomach contents by the Government Botanist would give any indication.

Explosives.—84 samples were examined for the Chief Inspector of Explosives, an increase over the large number received last year.

Powellising.—An increase in the number of samples of powellised wood is shown, 20 as against 8 last year.

Ambergris.—People finding paraffin wax or resin, etc., near the sea-shore often jump to the conclusion that they are ambergris and go to a lot of trouble sending them for analysis when a simple test which they can apply themselves would guide them. Ambergris is very volatile, and when thrown on to boiling water is entirely dissipated into vapour; if such occurs then they would be justified in having further tests made.

Petroleum.—32 samples of various kinds of supposed petroliferous material were submitted during the year, but only one from the Freney Oil Co. operating in the Kimberley Division, which has been made the subject of a special report by Dr. Simpson, showed indisputable evidence of genuine mineral oil.

Cattle Dip.—29 samples have been examined for the Stock Department and the uniformity in arsenic content has been very satisfactory.

Sewer Gas.—It was intended to make an extended examination of gases in sewers to account for the death of a man, who was apparently overcome by fumes in one of the shafts, but up-to-date only two samples have been examined. Nothing in either of these would account for death, the samples being practically normal air. Further tests will be carried out later.

C. E. STACY,
Assistant Government Analyst and Toxicologist.

SECTION II.—MINERALOGY, MINERAL TECHNOLOGY AND GEOCHEMISTRY.

Somewhat fewer samples were received this year than last, the total number being 1,661. Details of their origin are given in the table on page 103. The whole staff was kept fully employed, however, as some elaborate investigations were needed of several of the samples. Gold assays were as usual an important part of the work, 1,002 samples being assayed for this metal. Of these over 400 were for the State Batteries and nearly 300 for the State Mining Engineer. The latter included a large number of cores from bores put down by the Government, or with a Government subsidy, to test at depth deposits which had proved payable near the surface in the boom years of gold mining. The leases tested were the Big Bell at Coodardy, from which very encouraging results have been obtained; the Harbour Lights at Leonora; the Mararoa at Reedys; several leases at Sandstone and Kalgoorlie; Tyndalls at Coolgardie, where again some good results were obtained; and the Emerald at Yalgoo.

Tin Boring, Greenbushes.—State boring to test the primary tin deposits at Greenbushes yielded about 54 samples of core which were assayed for tin, and examined for the determination of the associated minerals. The Greenbushes lodes prove to be albite-quartz pegmatites, often carrying a high proportion of black tourmaline. Apatite is an almost constant accessory in quantities up to 1.5 per cent., and small amounts of garnet and ilmenite are almost universal. Among the less common minerals noted were glaucophane on the South Cornwall Lease and an undetermined mineral resembling pyrochlore or polycrase on both the Cornwall and South Cornwall leases. The tin contents of the veins ranged from nothing up to 0.9 per cent. of SnO_2, all the metal being in the form of cassiterite.

Lead Boring, Braeside.—Some cores of vein stuff were submitted in connection with the tesing of the lead lodes at Braeside by boring. Results so far have been disappointing, the highest metallic con-

tents noted being lead, 2.0 per cent.; zinc, 5.5 per cent.; silver, 7½ dwts.; gold, 5 grains per ton.*

Coal.—Eighteen samples of coal and coaly shale have been analysed, of which nine came from the Government bores at Eradu in the Murchison Division.

Seven samples were taken by the Government Geologist from an 8ft. 6in. seam of brown coal at a shallow depth on the Fitzgerald River. This seam is notable for the many nodules of fossil resin embedded in it. The yield of oil on distillation averages about 11 gallons per ton. The proximate composition of the coal is:

Fixed carbon, 16.81; volatile matter, 31.12; ash, 14.90; moisture, 37.17 per cent.

Tantalum Ores.—The steady rise in the price of tantalum ores during the year was responsible for 47 samples being received for assay. These ranged from low grade columbites to high grade tantalites and included some microlite (fluotantalate of calcium and sodium) from the North-West. The chief centres from which ores were received were Wodgina, McPhee's Range (Greens Well, etc.), Tabba, and Strelley.

Mineral Analyses.—Complete chemical analyses and determinations of the chief physical properties (density, refractive indices, etc.) have been made of the following minerals: Almadine, Mt. Augustus; andradite, Melville and Weelhamby Lake; beryl, Wodgina; ferruginous efflorescence, Nabawah; grossularite, Mt. Francisco; manganocolumbite, Tabba; manganotantalite, McPhees Range (Greens Well); microcline, Londonderry; microlite, Strelley and Wodgina; tourmaline, Greenbushes and Wodgina; spessartite, Stannum; spodumene, Wodgina; vesuvianite, Tambourah; zoisite, Jimblebah.

As opportunity occurred further investigations, both analytical and optical, were made of the helvite from Mt. Francisco. This rare and peculiar mineral is a sulpho-silicate of beryllium, manganese, iron and zinc, not known to occur anywhere else in Australia.

Complete analyses were also made of seven Kalgoorlie rocks for Dr. Stillwell in connection with his examination of the rocks and ores of the field. A granite from Boya largely used as a building stone, and a grey slate from Armadale used in brickmaking, were also analysed.

Among miscellaneous analyses was one of a resmelted type metal for which a formula was supplied for bringing it back to normal composition, and one of a bronze which had given good wear in water meters.

Hydrometallurgy of Copper.—As there is a surface accumulation at Whim Creek of 80,000 tons of ore estimated to assay 4 per cent. copper, and deposits of similar grade ore elsewhere, none of which will pay to treat under present conditions, experiments have been made in the laboratory from time to time in regard to possible wet methods of treatment at the mines. This year Mr. Murray spent several months in working out the chemistry of the treatment of copper ores with ferrous sulphate solutions. Solutions were made both in pure water and in sea water, and many useful facts have been observed, which have not previously been recorded, but will be included in a report now being prepared by Mr. Murray.

Alunite, Campion.—The large deposits of sedimentary alunite at Campion present such attractive possibilities as a source of alum, potash and metallic aluminium, that Mr. Bowley spent three weeks during November in examining and sampling them. During part of the time the Government Geologist was associated with him in the work.

COMMONWEALTH ENGINEERING STANDARDS ASSOCIATION.

Assistance was rendered to this body in preparing and criticising standard specifications for various trade materials of mineral origin, notably cement, lime, pigments and road-making material.

* Since this was written a bore on M.L. 291 has penetrated 7 feet of lode averaging lead 48.6 per cent., zinc 5.5 per cent., silver 26 dwts. per ton.

SECTION III.—AGRICULTURE, WATER AND SEWERAGE.

(A. J. Hoare, A.A.C.I.).

The total number of samples entered for examination this year 2,034, being an increase of 758 over the previous year. Their sources are shown in the table on p. 103.

STAFF.

Mr. H. E. Hill, A.I.C., A.A.C.I., was appointed in July to make a special investigation into the cause and prevention of discoloration in the water supplied to the metropolitan area. Mr. F. A. Allsop, B.Sc., A.A.C.I., was transferred from this section to the Food and Drug Section and F. W. Steel, A.A.C.I., was appointed as a temporary chemist to take his place. Mr. R. G. Lapsley, B.Sc. (Agr.), A.A.C.I., acted as supervising chemist during my absence on long service leave from October to December.

SOILS.

There were 156 soils received this year, an increase of 103 over last year. About 80 of these were taken from the fungicide experiment plots at Merredin Experimental Farm, the balance being mostly routine soils received from the Agricultural Department.

FERTILISERS.

Thirty-one more samples were received this year than last, the total being 98. There seems to be a growing tendency in the case of bone dusts and blood and bone mixtures for the figures found by analysis to be below the guaranteed figures.

APPLES.

During the year 23 apples were received from the Botanical section of the Agricultural Department

in connection with an investigation that they are carrying out into the cause of Bitter Pit. The variety worked on was Cleopatra. Starting from the green to ripe stage, the fruit were examined for starch, sugars, and acidity. The starch figures decreased from about 3.60 per cent. to about 0.80 per cent. in under 6 weeks.

FUNGICIDES AND INSECTICIDES.

Only 4 samples were received, two being dusting powders, the analyses of which agreed with that supplied by the manufacturers.

FODDERS.

Of the fodders received the majority were pasture grasses. Two samples consisted of Tangier pea and one of the stem of the Baobab tree (Adansonia Gregorii). The nutritive value of the Baobab tree is low, being 11.66 units for a complete cross section and 14.98 for the bark alone; these figures are calculated from Guthrie's formula. The indigestible fibre is high in both, viz., 16.23 per cent. and 14.32 per cent. This sample comes from the Kimberley region where it is chaffed and used as an emergency cattle food.

GYPSUMS, LIMES AND LIMESTONES.

The majority of the limes tested were to be used in the lime treatment of the metropolitan waters, they were of a very poor quality for this work. I understand now that with a better system of grading the unburnt stone, a much better product is being supplied.

WATERS.

The water samples this year totalled 1,116, being an increase of 517 over last year, due principally to the number of samples taken by the water investigating chemist, especially for the determination of dissolved oxygen and hydrogen ion concentration. As in previous years a fair number are for stock and irrigation purposes. The quarterly hygienic and monthly complete mineral analyses of the water from the reservoirs and pipe head dams are still carried out for the Metropolitan Water Advisory Committee, also frequent tests are made of dissolved oxygen and the hydrogen ion concentration, by the colorimetric method, of the water from the mains and service taps. Samples are sent in frequently by the Department of Works and Labour of the water from Mundaring reservoir and Kalgoorlie reticulation. The quality of the water from the reservoirs and pipe head dams is consistently good. The balance of the samples are from country town supplies, artesian bores and mine waters.

SEWAGE.

No samples were received this year from private installations, all coming from the treatment works at Perth, Fremantle and Subiaco.

MINERAL DEFICIENCY DISEASES IN STOCK.

The officers of the Veterinary Branch of the Agricultural Department are carrying out a special research into the causes of a disease of young cattle at Denmark, and in consequence a fair amount of extra work has been passed on to this section, consisting of soils, waters, pasture grasses and bovine blood. Nine samples of blood have been received entailing a considerable amount of special micro analysis in the determination of the inorganic elements present, including iodine. This work is still being carried on.

CEREALS.

Flour.—All samples received were for examination as to baking qualities.

Bran and Pollard.—The majority of the samples received were official samples taken from various flour mills in the State. On the whole the figures for fibre and ash agree fairly well with those set down in the standards under the Fertiliser and Feeding Stuffs Act.

Wheats.—The investigation that has been in progress during the year as to the increase or decrease of the moisture content of wheat during transit to Great Britain was completed. Owing to pressure of other work time has not been found to go into the results properly.

One of the flour milling firms submitted three samples of grain for milling and analysis of the flour therefrom. The Agricultural Department submitted 11 for general milling test, some of these were from the State Experimental Farms.

Royal Agricultural Society Show Exhibits.—The total entries for wheat this year were 45, being 21 more than last year; of these 15 were rejected after a preliminary examination of the general appearance and bushel weight. The balance were milled in the experimental mill and prizes awarded according to points given for the different milling and baking characteristics. The Champion prize was awarded to a sample of Comeback from Three Springs followed closely by a Carrabin sample from Kellerberrin.

The milling investigations were carried out by Mr. R. G. Lapsly, B.Sc. (Agr.), A.A.C.I., who also acted as judge in conjunction with Mr. G. L. Sutton, Director of Agriculture, and Mr. E. W. Wilson, miller to the Peerless Flour Milling Co.

Tables of the results obtained may be seen at the Laboratory by any person interested in them.

A. J. HOARE, A.A.C.I.,
Supervising Chemist.
Agriculture, Water Supply and Sewerage.

APPENDIX I. TO REPORT OF GOVERNMENT MINERALOGIST AND ANALYST.

THE OCCURRENCE OF TANTALUM ORE IN THE COOLGARDIE DISTRICT.

Tantalum ores have been found in the Coolgardie District at Londonderry, at two points about 1½ miles distant from one another; at Gibraltar, at two points a mile apart; and at Ubini.

There are four common ores of tantalum, viz., (1) tantalite, (2) manganotantalite, (3) columbite, (4) manganocolumbite; and four rare ores, viz., (5) tapiolite, (6) ixiolite, (7) mossite, and (8) manganomossite. Of these (1), (2), (5) and (6) are rich in tantalum and poor in the related mineral niobium, whilst (3), (4), (7), and (8) are poor in tantalum and rich in niobium, and are hence of little commercial value at present. Saleable ores carry from 60 to 80 per cent. of tantalic oxide, Ta_2O_5. In (1), (3), (5) and (7) iron is the principal associated metal; in (2), (4), (6) and (8) it is manganese. All the tantalum minerals so far found in the Coolgardie district are of the manganiferous variety.

Londonderry.

The first discovery of tantalum ore in this place was made by Hugh Frazer in 1909. The scene of the discovery was probably what was later known as Frazer's Find, now included in M.L. 72,* "Marshal Haig," four miles S.S.W. of Londonderry townsite. Frazer also appears to have found what is now known as Mercer's Find, 1½ miles north of M.L. 72, and at one time held as M.L. 61. The two largest pieces of ore found by Frazer on M.L. 72 weighed 4 and 2 ozs., and were manganocolumbite with a specific gravity of 6.43, indicating a content of 48.5 per cent. of tantalic oxide (Ta_2O_5) and 33.5 per cent. of niobic oxide (Nb_2O_5). A much smaller associated fragment was manganotantalite, which had a specific gravity of 7.35, indicating 73.5 per cent. Ta_2O_5 and 11.0 per cent., Nb_2O_5. One fragment of cassiterite was present. All the specimens were detrital.

In 1909 C. G. Gibson (Asst. Geologist), visited both finds and reported on them rather from the point of view of their possibilities of yielding tin. His report was published in the Ann. Prog. Report of the Geological Survey for 1909 (p. 27). Samples collected by him were assayed by myself.

Frazer's Find.—Regarding this find, later known as M.L. 72, Marshal Haig, Gibson noted the large 15ft. pegmatite vein which traverses it, but said no ore had been found in the outcrop, but a few detrital pieces of "tantalite" had been picked up on the surface near it. Amongst them was the 4oz. piece of manganocolumbite mentioned above, and several of lesser specific gravity and therefore of lower tantalum content, the poorest assaying only 33.5 per cent Ta_2O_5. A few further fragments picked up by himself were assayed with the following average results:—

	%
Ta_2O_5	47·0
Nb_2O_5	32·3
Tin free	*nil*
Tin combined	2·8

The combined tin is that contained in the tantalum ore, and not occurring in separate pebbles as cassiterite. The range of specific gravity in Gibson's specimens was from 7.87 to 5.55, indicating a percentage of Ta_2O_5 ranging from 85.3 down to 16.0.

When this lease was visited in September of this year the pegmatite vein had been opened up in several places and some tons of sheet muscovite and felspar (microcline) taken from it. No sign of tin or tantalum ore could be seen in this vein, or in a second just east of it, and a diligent search of the surface, over several acres in their vicinity, yielded only a single piece of tantalum ore, weighing about one ounce and assaying 64.5 per cent. Ta_2O_5, and 19.1 per cent. Nb_2O_5.

There is plainly no prospect of obtaining commercial supplies of tantalum ore on this lease.

Mercer's Find.—C. G. Gibson reported also on this find in 1909. No digging had been done on M.L. 61, or on the ground immediately west of it, but several pieces of ore had been specked, and Gibson himself secured some more on the surface by searching the ground carefully near the outcrops of several pegmatite veins. Three samples of clean ore thus secured showed—

	Conigraves M.L.	Mercers M.L. West end.	Mercers M.L. East end.
Ta_2O_5% Range ...	56 to 44	74 to 46	52 to 12
Ta_2O_5% Average ...	51	56	37
Nb_2O_5	29	24	43
Tin, free	*nil*	*nil*	*nil*
Tin, combined ...	0·4	4·1	1·8

An incompletely concentrated sample from a dish of dirt had a total weight of one-fifth of an ounce, of which manganotantalite and manganocolumbite made up about one-fifth, ilmenite and garnet an equal amount, and cassiterite one per cent. Ixiolite appears to be present in some of this ore.

Nothing further was done about these deposits at the time as the price quoted for tantalum was not encouraging. The recent high price of tantalum led, however, to their being again taken up as prospecting areas by H. Hewitt and others. A small sample of concentrate submitted by Hewitt in June last assayed—

	%
Ta_2O_5	70·76
Nb_2O_5	1·13
SnO_2	13·16

The concentrate consisted of a mixture of manganotantalite and cassiterite.

* Later M.L. 80.

Two adjacent prospecting areas (2423 and 2424) were in force when I visited the locality this year, both being in a narrow east and west gap passing through the Londonderry Hills, about three miles W.S.W. of Londonderry railway siding. The hills consist of Archaean greenstones traversed by several pegmatite veins in which the chief minerals are quartz, albite, microcline and lepidolite. Very little work had been done anywhere. A small hole on a pegmatite vein on Hewitt's P.A. 2423 showed several small pieces of tantalite embedded in the vein. Over the gentle slope on the north side of this vein other similar but detrital pieces could be picked up. They ranged from one-eighth inch up to one inch in diameter, and within the space of an hour about 6 ozs. of such pebbles were picked up. Only odd shovelsful of the soil collected at random over the surface had been put through a dryblower, which was removed from the area on the day of our visit. No other work had been done. Subsequent examination of the pebbles of ore picked up showed that, with the exception of a few pieces of cassiterite, they consisted of high grade manganotantalite with a specific gravity ranging from 7.04 to 7.59 equal to Ta_2O_5 65.7 to 79.3 per cent. and Nb_2O_5 18.1 to 6.0 per cent.

This area is the only one I saw in the Coolgardie district which appeared worthy of systematic prospecting, which it is obvious it has never had up to the present.

On the second prospecting area (Dunstan's P.A. 2424) to the west of Hewitt's still less work had been done. Here again a small pothole had been made in the outcrop of a pegmatite vein, but neither in the vein nor on the surrounding surface could any tantalum ore be seen, though I was assured that a few ounces had been picked up by the owners.

Gibraltar.

The report which appeared in the local press that a rich find of tantalum ore had been made recently at Gibraltar was in error. The true facts are as follow:

In 1921 when Mr. F. R. Feldtmann, Field Geologist, was making a survey of this gold mining centre, his assistant Mr. C. R. Le Mesurier discovered some pebbles of tantalum ore on G.M.L. 5036 "Bendigo," the largest of which weighed as much as 3 lbs. This find was reported in Geological Survey Bulletin 91 published in 1925.

An analysis of a typical specimen of this ore gave the following results:—

Ta_2O_5	Nb_2O_5	TiO_2.	SnO_2.	SiO_2.	MnO.	FeO.	Fe_2O_3	H_2O.	Total.
27·28	51·17	1·75	·12	·39	10·16	7·87	1·70	·14	100·58

The analysis proved that the ore was a manganocolumbite very poor in tantalic oxide.

The place where the ore had been found in 1921 was easily located by myself from Feldtmann's description and proved to be on a very gentle slope on the south side of the outcrop of a siliceous pegmatite. Over an area of about an acre I was able to pick up a number of small pieces of ore, the largest of them only an ounce in weight, the total collection amounting to less than 8 ounces. The specific gravities ranged from 5.72 to 6.49 indicating Ta_2O_5 22.5 to 50.0 per cent. and Nb_2O_5 57.7 to 32.2 per cent. No ore could be seen in the pegmatite itself or on its northern slope.

At this place therefore there appears to be very little ore and that little of low grade.

It was rumoured that the small pegmatite veins on the Lloyd George G.M.L. 4580 carried a little tantalum ore. None could be found in the veins, but about six small pebbles of manganocolumbite were found on the surface near the south western boundary of the lease. These had specific gravities ranging from 5.48 to 6.00 indicating Ta_2O_5 13.0 to 33.5 and Nb_2O_5 66.5 to 47.5 per cent.

I was told that a little similar ore had been found on the south side of Morgan Hill, and as pegmatite veins are plentiful throughout the district, it probably exists in other places. So far as is known at present, however, the tantalum ore at Gibraltar is of low grade and very limited in quantity.*

Ubini.

About 3 miles north of Ubini siding an area has been taken up under mineral lease on several occasions, first for tin, then for amblygonite and later for felspar. The M.L. numbers are 62, 63, 64, 65. Detrital tin was first found here in 1909 and later a little was found in situ in an amblygonite bearing pegmatite. This discovery was inspected by the State Mining Engineer (A. Montgomery) in 1910 and described in an official pamphlet "Report on some parts of the Kunanalling and Broad Arrow Districts." Less than one hundredweight of tin ore appears to have been got altogether.

Whilst searching for tin in 1909 a few fragments of detrital tantalum ore were found. One of these was analysed with the following results:—

Ta_2O_5.	Nb_2O_5.	TiO_2.	SnO_2.	MnO.	FeO.	H_2O.	Total.
68·24	14·38	*nil*	·26	15·19	2·02	·28	100·37

This is a manganotantalite of good commercial quality.

Later in 1918 when further prospecting was done on the same area a few more pieces of ore were picked up, one, the largest, weighing 2 oz. This specimen had a density of 6.53 corresponding to 51.5 per cent. of Ta_2O_5 and 30.8 per cent. of Nb_2O_5.

During my recent visit a very thorough search was made for tantalum ores on the dumps of the open cuts on the amblygonite vein, and three other veins from which felspar has been quarried. The only ore seen was a few small specks in a large block of amblygonite. No detrital ore was observed, but time did not allow of a thorough search of the ground in the vicinity of the pegmatites.

It is evident that whilst the ore on this lease is of fair grade, it apparently exists only in very small quantities. A keen lookout for it should, however, be kept when breaking out felspar.

Summary.

No commercial supplies of tantalum ore have yet been disclosed in the Coolgardie district, but the alluvium and lode at Mercer's Find (Londonderry) are worthy of a systematic trial.

EDWARD S. SIMPSON, D.Sc., B.E., F.A.C.I.
Government Mineralogist and Analyst.

26th October, 1928.

* Some higher grade manganotantalite has since been found.

APPENDIX II.

THE SOLVENT ACTION OF FERROUS SULPHATE SOLUTION ON OXIDISED COPPER ORE.

By W. G. MURRAY, A.A.C.I., Mineralogist and Chemist.

The following experiments were carried out with a view to determining the solvent effect of solutions of ferrous sulphate in sea water on an oxidised copper ore from Whim Well Copper Mine, and any resultant changes in the composition of the leaching solution.

DESCRIPTION OF ORE.

The ore on which the tests were conducted was a kaolinised slate impregnated with copper minerals. An analysis gave the following composition:—

	%		%
SiO_2 ...	59·96	CuO ...	7·05
Al_2O_3 ...	12·40	Cu ...	·36
Fe_2O_3 ...	9·80	S ...	·09
FeO ...	*Nil*	SO_3 ...	1·26
CaO ...	·06	CO_2 ...	1·63
MgO ...	·67	$K_2O \cdot Na_2O$ ...	n.d.
MnO ...	·14	NaCl ...	·08
CoO ...	·71	H_2O+ ...	4·88
NiO ...	*Nil*	H_2O- ...	·78
PbO ...	·22		
ZnO ...	trace		
			100·09

Total Cu ... ... 5·99 per cent.
Total Ag ... ... 9 dwts. 3 grs. per ton.
Total Au ... ... *Nil.*

Minerals present: Kaolin, quartz, sericite, limonite, chrysocolla (hydrous silicate of copper), malachite (basic carbonate of copper), and cuprite (oxide of copper) with a very little chalcocite (sulphide of copper).

A water extract was acid in reaction and consequently contained a little copper in solution.

The ore for each test was crushed to pass a ten mesh screen.

LEACHING SOLUTION.

The requisite amount of commercial ferrous sulphate ($FeSO_4.7H_2O$) to form a five per cent. solution of the hydrous salt was dissolved in sea water, which originally had a slightly alkaline reaction owing to the small amount of calcium carbonate held in solution by it. A considerable amount of basic sulphate was almost immediately precipitated, the solution becoming acid. In consequence of this the supernatant liquor, when decanted off for treatment of the ore, was reduced to an approximate strength of 4.5 per cent. ferrous sulphate. As a fresh solution was made for each experiment this figure varied somewhat. A gradual separation of the basic salt continued to take place and the solutions were always in consequence distinctly acid throughout the treatment. The acidity figure of the original solution was determined in each case and includes a certain amount of free acid with which the commercial crystals were found to be contaminated.

METHOD OF LEACHING.

The ore was leached in inverted glass bell jars by simple percolation without agitation, the flow being adjusted to approximately one litre every four hours.

PARTICULARS OF TESTS APPLIED WITH TABULATION OF RESULTS OBTAINED.

The figures given in the table below are calculated from the analyses of the liquors, and represent in grammes the total amount of those constituents present in the solutions at various stages of the treatment. Owing to the slow rate of solution, tests Nos. 1, 2, and 3 were not carried out to finality, and do not give the total amount of extractable copper but only that extracted over an economical period of time.

CONTINUOUS LEACHING.

Test No. 1. The ore was leached continuously, the vat being covered, and air excluded as much as possible from contact with the charge. The resultant liquor, called the first filtrate, was assayed and again circulated through the ore without renewing its strength or precipitating the copper in solution This process was repeated several times, the filtrate in each case becoming the leaching solution in the next run. In treatments Nos. 5 and 6 the liquor was circulated through the charge four times before being assayed. The ore and solution would be left in contact overnight and during week ends. No water wash was applied but the charge was allowed to drain between each treatment.

Ore taken for treatment 1,000 grammes. Total copper content 59.9 gms. Total volume of original leaching solution 5,240cc. Assay of original solution and filtrates:—

—	Orig. Soln.	Filtrates.					
		1.	2.	3.	4.	5.	6.
	gms.	gms.	gms.	gms.	gms.	gms.	gms.
SO_4	91·18	75·11	72·84	72·79	70·70	68·33	66·85
Fe''	44·54	31·22	27·12	26·36	21·65	17·44	14·23
Fe'''	*Nil*	1·35	·07	*Nil*	2·42	2·14	4·64
Cu	*Nil*	6·91	10·63	14·17	16·20	19·27	22·41
Cu extracted at each treatment	...	6·91	3·72	3·54	2·03	3·07	3·14
Time (days) ...	...	5	1	1	3	8	7

Total Cu extracted 22.41 grammes = 37.4 per cent. Total time 25 days.

The acidity of the original solution was determined and found to be equivalent to 1.89 gms. H_2SO_4 in total bulk of solution. This is included in the SO_4 figure given.

INTERMITTENT LEACHING.

Test No. 2. An intermittent leach was conducted in an uncovered jar, the liquor being drained off completely between each application in order to aerate the charge. The quantity of solution added each time was about 200 cc. The ore was finally well washed with sea water.

Ore 1,000 gms. Copper content 59.9 gms.

Total volume of original solution 5,300 cc.

	Original Solution. gms.	Filtrate. gms.
SO_4	100·94	92·33
Fe″	48·91	34·42
Fe‴	1·05	6·22
Cu	*Nil*	9·81

Total copper extracted 16.38 per cent. Total time five days.

Acidity figure equivalent to 1.94 gms. H_2SO_4 in total bulk of original solution.

Comparing these results with those obtained from the first treatment in the above tests, it is evident that intermittent leaching, with free access of air to the charge, considerably increased the rate of solution of the copper. The first leach in Test No. 1 occupied five days, during which time 11.5 per cent. of the copper was extracted. Over the same period in Test No. 2 the amount of copper extracted was 16.38 per cent.

CONTINUOUS LEACHING WITH PRECIPITATION OF COPPER BY METALLIC IRON.

Test No. 3. This test comprised continuous leaching of the ore in an uncovered vessel, water washing, and precipitation of the dissolved copper by metallic iron. After the removal of the copper the liquor was again circulated through the charge without further renewing its strength. Three treatments were given.

Ore 1,000 gms. Copper content 59.9 gms.

Total volume of original solution 5,600 cc.

——	Original Solution.	1st Filtrate.	After pptn. of Cu.	2nd Filtrate.	After pptn. of Cu.	3rd Filtrate.
	gms.	gms.	gms.	gms.	gms.	gms.
SO_4	109·7	99·77	103·33	102·72	98·91	97·54
Fe″	52·9	39·45	46·71	39·77	40·73	36·10
Fe‴	1·12	4·36	1·25	4·15	·95	2·24
Cu	*Nil*	12·30	trace	7·67	1·87	8·00
Cu extracted at each treatment ...	...	12·30	...	7·67	...	6·13
Time (days) ...	...	3	...	2	...	4

Total copper extracted 26.10 grammes = 43.57 per cent.

Total time nine days. Acidity figure equivalent to 1.89 gms. H_2SO_4 in total bulk of original solution.

LIMIT OF EXTRACTION BY CONTINUOUS LEACHING.

Test No. 4. This experiment was carried out in order to determine the amount of copper it was possible to extract by leaching continuously with a solution of approximately the same strength as those used in the previous tests. The treatment was concluded when only traces of copper could be detected in the filtrate. Up to a certain point the solvent action may be said to have been comparatively rapid, but towards the finish was very slow, but not complete.

Ore 20 gms. Copper content 1.198 gms.

Solution 250 gms. commercial ferrous sulphate in five litres of water.

Percentage of copper extracted 56.17 per cent.

Based on this figure the amount of the extractable copper recovered in Test No. 1 was 66.6 per cent., and in Test No. 3 77.6 per cent. As was pointed out before, neither of these tests was carried out to finality.

LEACHING WITH NEUTRAL SOLUTIONS.

As the leaching solutions in the foregoing experiments were always acid in reaction, a further series of tests was conducted in order to compare the solvent effect of a neutral solution of ferrous sulphate in water upon the copper minerals in the ore. In each test the solution and ore were placed in a flask and shaken together at frequent intervals. The solutions were made up to about the same strength as those used in the preceding tests. The following results were obtained:

NEUTRALISATION WITH CALCITE IN ATMOSPHERE OF CO_2.

The solution of commercial ferrous sulphate was prepared with freshly boiled water in a vessel filled with CO_2 and containing fragments of calcite. It was then shaken with the ore and a fragment of calcite in a flask from which the air had been displaced by CO_2. The ore was boiled with water before treatment to remove any occluded air. After treatment the solution was assayed for copper.

Ore taken 10 grammes.

Commercial ferrous sulphate 5 gms. in 100 cc. water.

Time of treatment seven hours.

Copper extracted 0.05 per cent.

NEUTRALISATION WITH CALCITE IN AIR.

The ore and a solution of commercial ferrous sulphate without any preliminary treatment were shaken together in an uncovered flask under ordinary atmospheric conditions. A fragment of calcite was added to the charge.

Ore 10 gms.

Commercial ferrous sulphate 5 gms. in 100 cc. water.

Time 16 hours.

Copper extracted 0.96 per cent.

DIRECT TREATMENT WITHOUT NEUTRALISATION.

The charge of ore and commercial ferrous sulphate solution was agitated in an uncovered flask without the addition of calcite to either solution or ore.

Ore 10 gms.

Commercial ferrous sulphate 5 gms. in 100 cc. water.

Time 16 hours.

Copper extracted 5.03 per cent.

EXPERIMENTS WITH PURE FERROUS SULPHATE.

As the commercial ferrous sulphate crystals were found to contain free acid the following tests were made with a purer salt, the solvent effect of which in a neutral atmosphere was determined. Although freshly boiled water was used for solution of the ferrous sulphate and the ore was boiled with water before treatment, a slight oxidation of ferrous iron took place before the liquor was added to the ore.

TREATMENT WITH PURE SALT IN ATMOSPHERE OF CO_2.

This experiment was carried out in an atmosphere of CO_2 without any previous neutralisation of the liquor or addition of calcite to the charge.

Ore 10 gms.
Ferrous sulphate 5 gms. in 100 cc. water.
Time seven hours.
Copper extracted 2.37 per cent.

NEUTRALISATION WITH CALCITE IN ATMOSPHERE OF CO_2.

Two tests were conducted under similar conditions, a neutral atmosphere being maintained throughout the experiments. The solutions were shaken up with calcite before addition to the ore but no calcite was placed in the charge.

	1.	2.
Ore	10 gms.	10 gms.
Ferrous sulphate ..	5 gms.	5 gms.
Water	100 cc.	100 cc.
Time	7 hours.	7 hours.
Copper extracted ..	1.6 %	1.6 %

NEUTRALISATION WITH MAGNESIUM CARBONATE IN ATMOSPHERE OF CO_2.

As in no case up to this stage were any of the solutions definitely neutral after treatment with calcite, another test was carried out in which powdered magnesium carbonate was used. This had the desired effect of bringing the solution to neutrality.

The solution of the pure ferrous sulphate after neutralising with magnesium carbonate was agitated with the ore in an atmosphere of CO_2. No other neutralising agent was added to the charge.

Ore 10 gms.
Ferrous sulphate 5 gms. in 100 cc. water.
Time seven hours.
Copper extracted 0.36 per cent.

TREATMENT WITH 2E ACETIC ACID.

By leaching a sample of the minus 10 mesh ore with cold 2E acetic acid it was found that 98 per cent. of the copper present could be extracted.

SOLUBILITY OF COPPER MINERALS.

In Acetic Acid.—Coarsely crushed samples of malachite and chrysocolla were treated independently with cold 2E acetic acid. Both minerals proved to be soluble in acetic acid of this strength, the malachite more readily so than the chrysocolla.

*In Commercial Ferrous Sulphate Solution.**—The solvent action of a 5 per cent. solution of commercial ferrous sulphate on chrysocolla was found to be very slow. Malachite is attacked much more readily.

ACTION OF FERROUS SULPHATE ON CUPRIC SULPHATE.*

An experiment to determine the possibility of forming insoluble cuprous sulphate from a solution of cupric sulphate and ferrous sulphate was carried out. A solution of these two salts was allowed to stand in a closed flask for one week. The usual precipitation of basic ferric sulphate took place but the precipitate contained no copper. Cupric sulphate is known to form a stable double salt with ferrous sulphate which would account for no insoluble cuprous sulphate being found in the precipitate.

* Compare Winter & Moore Bulletin No. 1, School of Mines, W.A. p. 62.

COMPOSITION OF THE SALT PRECIPITATED BY AERATION OF SOLUTIONS OF FERROUS SULPHATE IN WATER.

After concluding the ore leaching experiments a further investigation was undertaken in order to establish the composition of the salt which separates out when a solution of hydrous ferrous sulphate in water is aerated. Several solutions of pure hydrous ferrous sulphate in water were prepared and allowed to stand for varying lengths of time at room temperature with free access of air. The precipitate formed was filtered off and after washing with water until no reaction for sulphate ion was obtained in the washings, was dissolved in hydrochloric acid and analysed.

Solutions.

	1.	2.	3.	4.	5.
Ferrous sulphate (grammes)	5	5	5	25	10
Water (c.c's.) ...	100	100	100	500	200
Time (hours) ...	24	24	24	96	48

Composition of Precipitates obtained.

	1.	2.	3.	4.	5.
Ferric oxide (Fe_2O_3) gms.	·0080	·0118	·0084	·0894	·0482
Sulphur trioxide (SO_3) gms. ...	·0016	·0024	·0018	·0174	·0088
Molecular ratio of ferric oxide to sulphur trioxide	2·50 : 1	2·47 : 1	2·31 : 1	2·55 : 1	2·73 : 1

The pH values of solutions Nos. 3, 4, and 5 were determined before and after precipitation of the basic salt.

	3.	4.	5.
Before precipitation (pH) ...	4·3	4·3	4·2
After precipitation (pH) ...	3·3	3·2	2·8

It was found by calculation that the change of pH from 4.2 to 2.8 as noted in experiment No. 5 would liberate .075 gm. H_2SO_4 per litre.

Up to a certain stage the rate of separation of the basic salt in the above experiment was fairly rapid, the bulk of the precipitate being thrown out of solution within 24 hours. After the removal of the precipitated salt by filtering it was found that any further precipitation took place very slowly, suggesting that the liberated free acid establishes a state of equilibrium which finally retards further precipitation. The figures obtained from the analysis of the precipitate show that the composition of the separated salt is approximately 5 molecules Fe_2O_3 to 2 molecules of SO_3, that is, a basic ferric sulphate is formed having the formula $5Fe_2O_3.2SO_3.xH_2O$.

In the presence of a mineral readily soluble in acid, such as malachite or cuprite, a partial neutralisation of the free acid takes place. Equilibrium is not reached and hydrolysis causes further precipitation of basic ferric sulphate with the liberation of more acid and the process is continuous until the iron content of the solution is exhausted.

CONCLUSIONS.

Commercial ferrous sulphate has been proved to carry occluded sulphuric acid.

When ferrous sulphate is dissolved in water (either fresh water or sea water) under ordinary atmospheric conditions oxidation of the ferrous salt takes place with the formation of ferric sulphate. By hydrolysis the ferric salt is converted into insoluble basic ferric sulphate and a corresponding amount of free acid is formed.

Of the copper present in this Whim Well ore 56.17 per cent. is fairly readily extracted by leaching with a 5 per cent. solution of commercial ferrous sulphate in sea water.

The solvent action is mainly due to the free acid in the solution, this acidity being maintained by the continual separation of the basic salt.

The amount of ferric sulphate in solution at any time is comparatively small.

The solution is not completely regenerated by the precipitation of the copper on metallic iron owing to loss of sulphate ion by precipitation of basic ferric sulphate. Further additions of fresh ferrous sulphate would be required in practice for this reason.

The presence of carbonate of lime and magnesia in the ore, by neutralising free acid, prevents to a large extent the solution of the copper even under atmospheric conditions.

In the absence of oxygen a neutral solution of ferrous sulphate has only a slight solvent effect on the copper minerals in this ore. Owing to the difficulty of preparing a neutral solution of ferrous sulphate and maintaining an atmosphere entirely free from oxygen the results obtained in the neutralisation experiments may be in excess of the true figures.

No separation of insoluble cuprous sulphate take place from a solution of ferrous and cupric sulphate on standing for some time.

Practically all the copper present in this ore can be extracted by leaching with 2E acetic acid.

The minerals chrysocolla and malachite are soluble in dilute acetic acid.

Malachite is much more readily soluble in an aqueous solution of commercial ferrous sulphate than chrysocolla.

DIVISION VIII.

Report of the Chief Inspector of Explosives for the Year 1928.

The Under Secretary for Mines.

I have the honour to submit for the information of the Hon. the Minister for Mines, in compliance with Section 45 of "The Explosives Act, 1895," a report on the working of the Department during the year 1928.

The following table shows the quantity of Ex plosives imported into the State during the year:—

TABLE I.

Importations of Explosives into Western Australia during 1928.

	Quantity lbs.
Gelignite	640,000
Gelatine Dynamite	487,500
Blasting Gelatine	127,500
Permitted Explosives	57,000
Blasting Powder	102,250
Pellet Powder	50,000
Fuse (coils)	202,500
Detonators (Number)	1,480,000

Particulars are given in Table No. 2 with regard to the quantities of the different classes of Explosives imported during the past five years.

TABLE II.

Comparison of Explosives imported into Western Australia during the past five years.

	1924.	1925.	1926.	1927.	1928.
	lbs.	lbs.	lbs.	lbs.	lbs.
Gelignite	1,439,000	893,650	586,000	663,000	640 000
Gelatine Dynamite	282,000	234,500	380,000	428,000	487,500
Blasting Gelatine	91,250	84,350	103,000	85,000	127,500
Permitted Explosives	50,000	7,500	35,000	40,000	57,000
Powder, Blasting	148,750	730,000	92,500	221,250	152,250
Powder, Sporting	...	...	...	...	...
Fues (Coils)	365,400	335,880	204,000	247,280	202,500
Detonators (No.)	3,000,000	2,756,000	2,360,000	2,269,000	1,480,000

The importations at Fremantle in four shipments. On being subjected to tests on arrival, all these explosives, with the exception of one consignment of Viking Powder, passed the prescribed tests and were liberated for consumption.

The consignment of Viking Powder arrived during the latter part of the year, and on being inspected it was found that a number of the cartridges were very hard, probably due to absorption of moisture and afterwards drying. This consignment was overhauled and all the cartridges found to be hard were detained for future observation.

A table has again been prepared showing the consumption of Explosives of the Nitro Compound Class in the different Industries where Explosives are used.

TABLE III.

Distribution and Consumption of Explosives during 1928.

	lbs.	Percentage of total.
Gold Mining	781,450	72·16
Agriculture and Land Clearing	198,600	18·34
Government Departments including Railways, Public Works, and Water Supplies	49,700	4·55
Quarrying	50,250	4·73
Lead Mining	...	...
Copper Mining	...	...
Coal Mining	800	·05
Tin Mining	1,900	·17

Table No. IV. gives the comparison of consumption for the years 1927 and 1928.

TABLE IV.

Distribution and Consumption of Explosives.

	1927.		1928.	
	lbs.	Percentage of total.	lbs.	Percentage of total.
Gold Mining	740,750	62·29	781,450	72·16
Agricultural and Land Clearing	286,300	24·00	198,600	18·34
Government Departments, including Railways, Public Works and Water Supplies	72,550	6·10	49,700	4·55
Quarrying	55,650	4·60	50,250	4·73
Lead Mining	2,300	·19	...	...
Copper Mining	...	...	...	...
Coal Mining	29,150	2·45	800	·05
Tin Mining	2,550	·21	1,900	·17

The following licenses have been issued during the year for the storage and sale of explosives:—

TABLE V.

Licenses issued during 1928.

For Magazines on Government Reserves ..	46
For Magazines used by Government Departments	21
For Magazines erected on Private Property	59
Store Licenses for the sale of Explosives—	
Mode (A)	100
Mode (B)	4
For sale of Fireworks only	283
License for the preparation and use of Explosives of Class IV.—	
Chlorate Mixture	1
Licenses for the importation of Explosives into the State of Western Australia	2

Inspections have been made where opportunity afforded of all Magazines and other licensed premises throughout the State, the number of inspections being 148. The following places have been visited:— Perth and Fremantle, including all the Metropolitan Area, Northam, York, Beverley, Narrogin, Pingelly, Katanning, Wickepin, Corrigin, Bruce Rock, Mt. Barker, Albany, Denmark, Kellerberrin, Westonia, Southern Cross, Bullfinch, Coolgardie, Kalgoorlie, Donnybrook, Bridgetown, Greenbushes, Manjimup, Pemberton, Busselton, Capel, Margaret River, and a large number of the group settlements.

Owing to pressure of other work it was impossible to make an inspection of licensed premises in the northern portion of the Goldfields and the Murchison. As an outcome of these inspections it was found necessary to destroy the following quantity of Explosives:—

TABLE VI.

Destruction of Explosives during 1928.

Date.	Place.	Kind and Quantity.	Remarks.
1928.			
January 21st ...	Denmark	2lbs. gelignite	Chemical deterioration owing to having
January 26th ...	do.	200lbs. ,, ...	been damaged by water.
January 26th ...	do.	400 No. 6 detonators ...	Owing to wet.
,, 26th ...	do.	3lbs. gelignite	Chemical deterioration.
,, 27th ...	do.	2lbs. do.	do. do.
,, 31st ...	do.	103lbs. do.	do. do.
February 6th ...	Gnowangerup	10lbs. do.	Owing to exudation.
,, 7th ...	Dumbleyung	3lbs. do.	do. do.
,, 10th ...	Katanning	15lbs. do.	Chemical deterioration.
,, 24th ...	Fremantle	80lbs. do.	Owing to exudation and low heat test.
,, 24th ...	Perth	1lb. do.	Chemical deterioration.
,, 28th ...	Boyup Brook	4lbs. do.	Exudation.
March 3rd ...	Northcliffe	700 detonators	Owing to having absorbed moisture.
,, 12th ...	Manjimup	3,100 detonators	do. do. do.
,, 15th ...	Balingup	3lbs. gelignite	Owing to exudation.
July 11th ...	Toodyay	5lbs. do.	Chemical deterioration.
August 27th ...	Perth	50lbs. fireworks	Damaged by water.

It was not found necessary to take proceedings against any persons for breaches of the Act.

The following number of tests were made with a view of ascertaining whether the explosives imported into and stored in the State comply with the requirements of the Act:—

Heat tests	53
Complete Analysis	84
Fuse tests	125
Velocity of detonation	54
A.D.C. tests	20
Miscellaneous tests	142

No applications were received for the authorisation of any new explosives during the year.

There were no new reserves for explosives declared during the year, therefore the number remains the same as last year, *i.e.*, 59, with a total area of 3,294 acres.

I again desire to acknowledge the courtesy of the Commissioner of Police and his officers for the assistance they have rendered the department during the year.

T. N. KIRTON,

Chief Inspector of Explosives.

7th March, 1929.

By Authority: FRED. WM. SIMPSON, Government Printer, Perth.

WESTERN AUSTRALIA.

DEPARTMENT OF MINES.

MINING STATISTICS, 1928.

w 881/29.

MINING STATISTICS TO 31st DECEMBER, 1928.

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4. Ashburton Goldfield	15
5. Gascoyne Goldfield	15
6. Peak Hill Goldfield	16
7. East Murchison Goldfield	17
8. Murchison Goldfield	22
9. Yalgoo Goldfield	27
10. Mount Margaret Goldfield	29
11. North Coolgardie Goldfield	33
12. Broad Arrow Goldfield	36
13. North-East Coolgardie Goldfield	37
14. East Coolgardie Goldfield	39
15. Coolgardie Goldfield	44
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EXPLANATIONS OF SIGNS AND ABBREVIATIONS.

Gf. Goldfield.
Mf. Mineral field.
D. District.
G.M.L. Gold Mining Lease.
M.L. Mineral Lease.
Loc. Location.
L.C. Lode Claim.
Q.C. Quartz Claim.
R.C. Reward Claim.
M.C. Mineral Claim.
M.R.C. Mineral Reward Claim.
M.A. Machinery Area.
Mach. L. Machinery Lease.
P.A. Prospecting Area.
T.A. Tailings Area.
T.L. Tailings Lease.
W.R. Water Right.
S.L. Special License.
N.E.I. Not elsewhere included.

SUMMARY OF MINERAL PRODUCTION.

GOLD AND OTHER MINERALS PRODUCED DURING 1928, AND THE ESTIMATED VALUE THEREOF, TOGETHER WITH A COMPARISON FOR PREVIOUS YEARS, AND THE TOTAL PRODUCTION TO DATE.

	Description of Mineral.	1928.		1927.		1926.		1925.		Previously to 1925.		Total to date.	
		Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value	Quantity.	Value.
			£		£		£		£		£		£
1.	Antimony ... ... (Exported) statute tons	...	...	...	...	4½	85	...	...	89	1,743	93	1,828
2.	Arsenical Ore ... ... (Exported) do.	*	401	*	819	*	347	*	1,045	...	10,813	*	13,425
3.	Asbestos ... ... (Reported) do.	12	782	11	304	105	2,728	51	1,641	858	37,902	1,036	43,357
4.	Bismuth ... ... (Exported) do.	...	...	...	...	...	...	...	...	11	844	11	844
5.	Coal ... ... (Reported) do.	528,420	420,145	501,505	407,967	474,819	394,400	437,461	363,203	6,821,518	4,195,133	8,763,722	5,780,848
6.	Copper { Ore ... ... (Exported) do.	100	765	...	...	...	...	1,201	18,200	78,923	968,819	80,224	987,784
	{ Ingot and Matte (Exported) do.	...	...	2	101	1	84	...	...	13,414	817,979	13,417	818,164
7.	Emeralds ... ... (Reported) carats	*	910	200	421	...	...	...	...	...	...	*	1,331
8.	Gadolinite ... ... (Reported) statute tons	...	...	...	...	...	...	...	...	1	112	1	112
9.	Gold ... (Exported and Minted) fine ounces	393,408	1,671,093	408,353	1,734,571	437,343	1,857,716	441,252	1,874,320	35,829,914	152,195,803	37,510,271	159,333,503
10.	Graphite ... ... (Exported) statute tons	...	...	...	...	...	...	...	...	65	696	*	696
11.	Gypsum ... ... (Reported) do.	4,214	5,425	6,675	9,818	3,918	5,618	3,060	4,118	4,965	5,916	22,831	30,895
12.	Ironstone ... ... (Reported) do.	...	...	...	...	...	...	...	...	57,830	36,695	57,830	36,695
13.	Lead (Ore and Concentrates) (Exported) do.	...	...	...	...	...	...	...	...	44,032	508,748	44,032	508,748
14.	Lead and Silver Lead (Ore and Concentrates) (Exported) do.	248	4,198	1,413	24,592	4,162	76,741	4,664	103,300	16,256	277,732	26,743	486,563
15.	Lead (Pig) ... ... (Exported) do.	...	...	...	...	...	...	...	...	23,052	628,956	23,052	628,956
16.	Limestone ... ... (Reported) do.	...	...	...	...	...	...	...	...	93,706	18,290	93,706	18,290
17.	Magnesite ... ... (Exported) do.	...	...	...	...	...	...	...	...	806	1,526	806	1,526
18.	Manganese ... ... (Exported) do.	...	...	30	303	82	503	...	...	60	512	172	1,318
19.	Mica ... ... (Exported) do.	...	...	4	536	4	† 8,328	...	...	...	1,357	*	10,221
20.	Molybdenite ... ... (Exported) do.	...	...	...	...	...	...	...	...	78	865	78	865
21.	Pyritic Ore ... ... (Reported) do.	...	...	...	...	...	...	...	...	74,048	45,496	74,048	45,496
22.	Silver ... ... (Exported) fine ounces	55,554	6,638	49 895	5,829	68,413	8,863	81,226	11,661	4,322,394	599,684	4,577,482	632,675
23.	Tantalite ... ... (Exported) statute tons	11	2,749	17	3,746	24	5,751	5	1,010	...	18,780	*	32,036
24.	Tin Ore ... ... (Exported) do.	85	15,002	77	13,316	67	10,450	108	15,392	15,652	1,522,074	15,989	1,576,234
25.	Tungsten Ore { Scheelite ... (Exported) do.	...	...	...	...	...	...	...	...	21	2,507	21	2,507
	{ Wolfram ... (Exported) do.	...	...	...	...	...	...	...	...	15	1,441	15	1,441
26.	Zinc ... ... (Exported) do.	...	...	...	...	...	...	...	...	184	5,437	184	5,437
	Unenumerated ... ... (Exported)	...	71	...	114	8	250	...	...	...	7,091	...	7,526
	TOTAL VALUES	...	2,128,179	...	2,202,437	...	2,371,864	...	2,393,890	...	161,912,951	...	171,009,321

* Weight not stated. † The value stated for Mica is that declared by the exporter at the time of shipment, but later information indicates that it is overstated.

The value of gold is calculated at the fixed price of £4·24773 per fine oz. Sales of gold by the Gold Producers' Association averaged £5·825 per fine oz. for the year 1920, £5·314 for the year 1921, £4·693 for the year 1922, £4·4244 for the year 1923, and £4·65107 for the year 1924. The amounts of £974,504, £590,428, £239,487, £89,158, and £195,629, should therefore be added to make up the actual total value of such gold.

TABLE I.

AUSTRALASIAN MINERAL PRODUCTION.

COMPARATIVE TABLE SHOWING THE OUTPUT OF ALL MINERAL PRODUCTS FROM THE SEVERAL STATES OF AUSTRALIA AND THE DOMINION OF NEW ZEALAND DURING 1928.

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
		£		£		£		£		£		£		£
Alunite ... ... Statute tons	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Antimony (Metal and Ore) do.	...	...	47	3,697	...	...	2	20	...	...	...	...	...	...
Arsenical Ore ... do.	*	401	93	1,380	...	...	...	...	...	...	...	...	...	...
Asbestos ... ... do.	12	782	...	...	...	...	...	...	...	...	...	...	...	...
Bismuth (Metal and Ore) do.	...	...	6	371	1	71	...	...	...	...	...	...	...	...
Coal ... ... do.	528,420	420,145	9,448,197	8,263,729	1,076,340	971,690	658,323	731,015	128,500	106,558	...	...	2,436,753	2,436,753
Copper (Ingot and Matte) do.	...	...	55	3,497	2,786	177,043	...	...	6,421	444,802	191	13,321	...	...
Copper Ore ... ... do.	100	765	...	...	...	...	...	...	...	...	...	...	...	...
Gold ... ... Fine ounces	393,408	1,671,093	12,831	54,503	13,275	56,387	33,917	144,068	3,603	15,306	532	2,258	117,362	498,523
Gypsum ... ... Statute tons	4,214	5,425	12,559	7,012	...	...	10,559	5,245	...	...	91,535	80,093	...	...
Iron ... . do.	...	...	56,776	312,268	...	...	...	...	...	...	618,316	711,063	6,362	31,802
Iron Oxide ... ... do.	...	...	4,658	2,660	...	...	...	...	...	...	...	...	...	...
Ironstone ... ... do.	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Lead and Silver Lead do.	248	4,198	247,847	2,491,153	42	873	5	100	4,787	101,616	...	...	...	...
Limestone ... ... do.	...	...	79,846	29,942	72,771	30,900	289,266	780,755	98,654	79,050	80,968	30,363	...	...
Magnesite ... ... do.	...	...	10,669	14,041	...	...	72	237	...	...	45	90	...	...
Manganese Ore ... do.	...	...	167	568	...	...	...	...	...	...	...	...	...	...
Molybdenite ... ... do.	...	...	2	390	...	...	...	...	...	...	...	...	...	...
Mica ... ... do.	...	...	...	...	...	...	...	...	...	...	2	12	...	...
Platinum ... ... Fine ounces	...	...	354	4,544	...	...	...	...	...	...	...	...	35	263
Precious Stones	*	910	...	13,919	...	4,730	...	...	...	...	...	11,540	...	...
Tungsten Ores } Scheelite Statute tons	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Tungsten Ores } Wolfram do.	...	...	...	...	27	949	...	...	176	12,094	...	...	6	432
Silver ... ... Fine ounces	55,554	6,638	8,573	936	22,034	2,514	1,454	175	669,326	78,901	...	...	415,552	50,037
Tantalite ... Statute tons	11	2,749	...	...	...	...	...	...	...	...	...	...	...	...
Tin (Ore and Ingot) ... do.	85	15,002	1,020	231,843	1,015	134,727	85	12,954	1,140	258,676	...	...	...	...
Zinc (Spelter and Conc.) do.	...	...	314,864	1,118,541	...	...	...	...	7,112	188,691	...	...	...	...
Other	...	71	...	2,782,164	...	7,024	...	204,877	...	308,134	...	184,212	...	481,062
Total Value ...	...	2,128,179	...	15,337,158	...	1,386,908	...	1,879,446	...	1,593,828	...	1,032,952	...	3,498,872

* Weight not stated.

In comparing the total value of the mineral output of the several States it should be noted that Lime, Limestone, Cement, Shell, Pottery Clay, Ochre, Salt and Pigments, although produced in Western Australia, are not included in the figures for that State, but are taken into account in the other States.

PART I.—GOLD.

TABLE II.

TOTAL YEARLY PRODUCTION OF GOLD, IN FINE OUNCES, AS REPORTED TO THE MINES DEPARTMENT, TO 31ST DECEMBER, 1928.

GOLDFIELD.	DISTRICT.	1928.		1927.		1926.		1925.		1924.		1923.	
		District.	Goldfield.	District.	Goldfield	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.
		ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.
Kimberley	... ...	...	40·38	...	193·89	...	64·61	...	29·43	...	12·77	...	30·55
Pilbara	Marble Bar ...	1,878·09		1,601·40		1,950·46		2,404·98		1,858·12		2,388·05	
Do.	Nullagine ...	67·89	1,945·98	421·43	2,022·83	425·78	2,376·24	97·12	2,502·10	276·26	2,134·38	155·57	2,543·62
West Pilbara ...	... ...	...	14·35	...	52·84	...	29·19	...	34·95	...	76·45	...	64·22
Ashburton	... ...	...	36·30	...	15·41	...	10·26	...	10·63	...	3·18	...	9·24
Gascoyne	... ...	...	60·27	...	78·63	...	85·21	...	3·37	...	2·46	...	...
Peak Hill	... ...	...	1,034·28	...	1,689·22	...	2,139·60	...	1,635·65	...	2,113·13	...	1,699·82
East Murchison ...	Lawlers	579·51		193·76		450·74		1,254·51		2,453·98		4,302·94	
Do.	Wiluna	1,802·94	4,757·99	4,266·87	6,025·33	3,141·63	5,335·56	2,137·66	5,398·50	1,083·97	4,896·94	3,697·11	11,016·41
Do.	Black Range ...	2,375·54		1,564·70		1,743·19		2,006·33		1,358·99		3,016·36	
Murchison	Cue	2,437·70		2,936·60		4,180·73		2,338·71		1,912·68		4,155·09	
Do.	Meekatharra ...	17,536·86		19,017·04		23,465·84	33,486·74	22,369·37	29,439·22	19,225·14	24,425·20	20,355·91	27,037·53
Do.	Day Dawn ...	495·58	23,636·04	1,473·59	27,886·30	1,505·33		638·68		775·94		850·79	
Do.	Mt. Magnet ...	3,165·90		4,459·07		4,334·84		4,092·46		2,511·44		1,675·74	
Yalgoo	... ...	...	6,205·94	...	2,394·40	...	6,382·18	...	2,828·36	...	5,611·23	...	7,713·45
Mt. Margaret ...	Mt. Morgans ...	2,977·94		3,718·89		4,984·07		4,804·69		5,552·43		5,556·38	
Do.	Mt. Malcolm ...	31,043·33	35,223·89	31,563·34	36,698·45	36,826·35	43,628·15	35,445·39	41,849·88	35,839·35	43,704·83	20,301·14	26,876·42
Do.	Mt. Margaret ...	1,202·62		1,416·22		1,817·73		1,599·80		2,313·05		1,018·90	
North Coolgardie ...	Menzies	4,542·26		1,436·20		2,139·74		4,211·90		8,252·74		11,278·60	
Do.	Ularring ...	1,036·25		451·00		110·99		...		210·98		219·18	
Do.	Niagara	194·22	5,774·00	14·91	2,054·58	39·08	2,471·94	188·83	4,549·66	197·30	9,509·19	269·14	12,212·93
Do.	Yerilla	1·27		152·47		182·13		148·93		848·17		446·01	
Broad Arrow ...	... ...	...	1,189·74	...	7,569·81	...	1,460·49	...	8,242·38	...	2,660·61	...	2,740·98
N.E. Coolgardie ...	Kanowna ...	894·89		2,243·94		5,976·20		5,747·31		4,525·97		4,592·90	
Do.	Kurnalpi ...	404·05	1,298·94	242·81	2,486·75	222·57	6,198·77	150·44	5,897·75	164·54	4,690·51	121·61	4,714·51
East Coolgardie ...	East Coolgardie...	294,785·07		298,858·80		303,933·40		304,891·85		335,480·59		369,859·84	
Do.	Bulong	169·34	294,954·41	397·09	299,255·89	103·57	304,036·97	877·26	305,769·11	618·04	336,098·63	810·02	370,669·86
Coolgardie	Coolgardie ...	4,279·66		4,278·72		3,507·44		7,459·75		7,100·35		9,929·81	
Do.	Kunanalling ...	1,824·35	6,104·01	1,507·26	5,785·98	2,490·22	5,997·66	2,848·69	10,308·44	3,142·44	10,242·79	3,147·00	13,076·81
Yilgarn	... ...		5,337·95	...	9,226·77	...	11,792·22	...	13,296·97	...	8,451·00	...	8,375·97
Dundas	... ...	...	4,340·59	...	2,739·06	...	2,681·68	...	2,601·30	...	3,429·14	...	6,357·85
Phillips River ...	... ...	...	113·31	...	283·98	...	19·33	...	27·20	...	145·44	...	374·58
* Donnybrook ...	... ...	...	...	...	...	...	...	...	...	...	...	...	...
State generally ...	...	...	10·20	...	10·20	...	133·39	...	108·33	...	...	...	157·74
TOTAL — Fine Ounces ...		...	392,078·57	...	406,470·32	...	428,330·19	...	434,533·23	...	458,207·88	...	495,672·49
TOTAL — Sterling Value		£1,665,444		£1,726,575		£1,819,431		£1,845,780		£1,946,343		£2,105,483	

* Abolished 4th March, 1908.

TABLE II.—*Total Yearly Production of Gold, in Fine Ounces, etc.*—continued.

GOLDFIELD.	DISTRICT.	1922.		1921.		1920.		1919.		Previous to 1919.		Total to December 31st, 1928.	
		District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.
		ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.
Kimberley	... ...	...	5·01	...	49·35	...	...	...	150·73	...	17,869·62	...	18,446·34
Pilbara	Marble Bar ...	2,779·45	3,100·16	2,556·95	2,626·57	3,164·15	4,052·49	2,960·51	3,421·39	122,767·59	201,268·60	146,309·75	227·994·36
Do.	Nullagine ...	320·71		69·62		888·34		460·88		78,501·01		81,684·61	
West Pilbara ...	... ...	...	94·33	...	67·10	...	133·91	...	95·26	...	27,586·83	...	28,249·43
Ashburton	... ...	...	13·57	...	22·31	...	...	...	...	...	8,883·24	...	9,004·14
Gascoyne	... ...	...	1·52	...	7·46	...	...	...	...	...	676·54	...	915·46
Peak Hill	... ...	...	2,159·89	...	1,078·53	...	1,655·71	...	2,255·38	...	251,727·20	...	269,188·41
East Murchison ...	Lawlers	4,650·83		3,008·81		2,693·15		4,951·82		902,423·66		926,963·71	
Do.	Wiluna	5,385·30	13,050·62	4,092·30	18,762·26	5,478·99	19,600·25	7,035·72	27,413·39	82,905·94	1,723,039·40	121,028·43	1,839,297·15
Do.	Black Range ...	3,014·49		11,661·15		11,428·11		15,426·35		737,709·80		791,305·01	
Murchison	Cue	4,840·68		7,186·83		9,642·63		9,020·49		357,820·24		406,472·38	
Do.	Meekatharra ...	26,953·23	36,304·33	30,046·77	41,256·53	28,163·45	46,604·07	35,436·80	50,569·85	852,498·73	2,906,268·23	1,095,069·14	3,246,914·04
Do.	Day Dawn ...	1,114·58		726·80		4,671·54		2,383·58		1,302,139·28		1,316,775·69	
Do.	Mt. Magnet ...	3,395·84		3,296·13		4,126·45		3,728·98		393,809·98		428,596·83	
Yalgoo	... ...	...	18,132·49	...	3,579·20	...	2,965·43	...	4,788·38	...	116,787·10	...	177,388·16
Mt. Margaret ...	Mt. Morgans ...	7,768·38		7,612·89		5,560·87		5,302·34		503,970·81		557,809·69	
Do.	Mt. Malcolm ...	16,811·82	27,649·19	8,364·49	20,803·51	42,800·83	77,335·84	49,506·74	88,151·93	1,553,680·86	2,820,642·30	1,862,183·64	3,262,564·39
Do.	Mt. Margaret ...	3,068·99		4,826·13		28,974·14		33,342·85		762,990·63		842,571·06	
North Coolgardie ...	Menzies	11,650·21		8,034·25		11,468·50		20,859·22		956,481·73		1,040,355·35	
Do.	Ularring	1,401·44	13,624·14	1,605·06	10,640·08	57·53	12,024·18	931·66	23,019·41	287,022·79	1,942,630·96	293,046·88	2,038,511·07
Do.	Niagara	197·17		345·17		223·26		746·51		500,923·03		503,338·62	
Do.	Yerilla	375·32		655·60		274·89		482·02		198,203·41		201,770·22	
Broad Arrow ...	... ...	...	3,628·56	...	8,875·01	...	7,445·23	...	11,728·57	...	467,854·97	...	523,396·35
N.E. Coolgardie ...	Kanowna ...	3,882·13	4,545·10	3,378·29	4,147·98	1,248·14	1,738·80	5,250·96	5,472·08	684,757·03	713,767·79	722,497·76	754,958·98
Do.	Kurnalpi ...	662·97		769·69		490·66		221·12		29,010·76		32,461·22	
East Coolgardie ...	East Coolgardie	375,757·25	376,388·69	378,344·62	378,429·92	401,417·01	401,495·91	396,995·28	397,054·89	16,939,001·89	17,100,148·39	20,399,325·60	20,564,302·67
Do.	Bulong	631·44		85·30		78·90		59·61		161,146·50		164,977·07	
Coolgardie	Coolgardie ...	9,662·68	16,170·54	4,629·54	9,547·74	3,482·79	5,986·43	4,222·21	5,814·30	968,031·92	1,175,959·59	1,026,584·87	1,264,994·29
Do.	Kunanalling ...	6,507·86		4,918·20		2,503·64		1,592·09		207,927·67		238,409·42	
Yilgarn	... ...	...	12,793·95	...	19,241·50	...	37,636·51	...	54,002·74	...	906,977·07	...	1,087,132·65
Dundas	... ...	...	8,043·99	...	5,455·77	...	6,541·18	...	12,529·61	...	594,823·10	...	649,543·27
Phillips River ...	... ...	...	688·75	...	865·75	...	1,422·76	...	1,700·12	...	83,941·87	...	89,583·09
*Donnybrook ...	... ...	...	...	...	...	...	...	...	...	...	841·76	...	841·76
State generally ...	... ...	...	144·45	...	99·85	...	20·67	...	46·41	...	7,660·70	...	8,391·94
TOTAL	Fine Ounces ...	...	536,539·28	...	525,556·42	...	626,659·37	...	688,214·94	...	31,069,355·26	...	36,061,617·95
	Sterling Value ...	£2,279,074		£2,232,422		£2,661,880		£2,923,351		£131,974,232		£153,180,016	

* Abolished 4th March, 1908.

TABLE III.

GENERAL RETURN.

RETURN SHOWING, FOR THE RESPECTIVE GOLDFIELDS AND DISTRICTS, THE AREA IN SQUARE MILES, LEASES IN FORCE, PARTICULARS OF PLANT, MEN EMPLOYED AND DIGGERS, ALLUVIAL DOLLIED, AND SPECIMEN GOLD AND ORE TREATED, WITH GOLD AND SILVER YIELD, IN FINE OUNCES, AS REPORTED TO THE MINES DEPARTMENT FOR THE YEAR 1928.

Goldfield.	District.	Date of Proclamation of Goldfield.				Area in Square Miles.		Leases in force, 31-12-1928.		Particulars of Plant.					Average Number of Men engaged in Gold Mining.		
										Milling.		Cyaniding.			Men employed.		Diggers.
		Proclamation gazetted.	To take effect from.	Latest Amendment of Boundaries gazetted.	To take effect from.	Goldfield.	District.	No.	Area in Acres.	Stamps.	Other Mills.	Leaching Vats.	Agitating Vats.	Vacuum Filters and Presses.	Above Ground.	Under Ground.	
Kimberley	...	20-5-86	20-5-86	31-10-02	1-11-02	33,833	...	...	...	...	...	...	...	...	...	...	4
West Kimberley	...	19-3-20	1-3-20	...	...	98,600	...	...	...	...	...	...	...	...	...	...	...
Pilbara	Marble Bar	1-10-88	1-10-88	2-9-27	2-9-27	52,809	25,809	11	88	45	4	10	...	...	8	14	7
	Nullagine						27,000	4	66	18	...	7	...	...	4	2	1
West Pilbara	...	20-9-95	1-11-95	1-3-07	1-3-07	10,843	...	2	30	...	...	...	...	...	...	...	2
Ashburton	...	11-12-90	11-12-90	18-10-01	14-10-01	14,230	...	...	...	...	...	...	...	...	...	...	2
Gascoyne	...	25-6-97	15-4-97	...	...	5,313	...	...	...	...	...	...	...	...	1	1	2
Peak Hill	...	19-3-97	1-4-97	13-11-14	1-12-14	23,650	...	6	39	10	1	9	...	...	12	10	5
East Murchison	Lawlers	28-6-95	28-6-95	2-1-20	1-1-20	26,058	6,691	3	13	25	2	16	...	...	17	2	6
	Wiluna						10,496	59	1,211	23	1	10	...	...	93	72	...
	Black Range						8,871	3	56	15	...	11	...	...	29	26	1
Murchison	Cue	24-9-91	24-9-91	28-11-13	1-1-14	25,474	8,593	12	192	20	1	17	...	...	66	20	...
	Meekatharra						12,250	22	323	60	9	9	...	...	57	130	9
	Day Dawn						896	6	64	3	...	6	...	...	17	10	...
	Mt. Magnet						3,735	14	141	20	6	16	...	...	44	44	2
Yalgoo	...	8-2-95	23-1-95	30-7-15	9-8-15	23,230	...	10	142	30	5	15	...	...	44	56	...
Mt. Margaret	Mt. Morgans	12-3-97	1-4-97	2-1-20	1-1-20	59,918	14,007	5	87	25	6	12	6	1	24	3	...
	Mt. Malcolm						6,018	28	625	65	6	6	4	1	122	214	...
	Mt. Margaret						39,893	7	150	30	6	16	1	...	28	7	...
North Coolgardie	Menzies	28-6-95	28-6-95	7-9-17	17-9-17	13,746	6,805	9	83	25	5	8	...	...	30	34	...
	Ularring						3,093	3	60	20	2	6	...	...	10	6	...
	Niagara						688	8	90	10	...	...	...	...	9	6	...
	Yerilla						3,160	2	27	20	1	8	...	...	4	...	...
Broad Arrow	...	17-11-96	20-11-96	8-6-06	1-7-06	1,038	...	12	189	30	20	5	7	3	54	46	9
North-East Coolgardie	Kanowna	20-3-96	15-4-96	27-3-08	1-4-08	20,604	1,094	4	32	5	3	4	...	...	15	15	2
	Kurnalpi						19,510	...	...	5	1	...	...	...	10	6	1
East Coolgardie	East Coolgardie	21-9-94	1-10-94	27-3-08	1-4-08	1,800	810	83	1,240	215	194	53	116	57	853	1,067	29
	Bulong						990	3	57	5	...	3	...	...	18	13	1
Coolgardie	Coolgardie	6-4-94	6-4-94	1-3-07	1-3-07	11,702	9,384	18	304	45	5	27	...	...	71	54	12
	Kunanalling						2,318	2	28	25	2	8	...	...	14	17	...
Yilgarn	...	1-10-88	1-10-88	4-2-21	4-2-21	17,200	...	32	547	65	2	25	...	...	69	67	1
Dundas	...	31-8-93	31-8-93	1-3-07	1-3-07	11,430	...	11	158	25	1	17	...	...	35	38	...
Phillips River	...	21-9-00	14-9-00	28-1-16	1-2-16	5,078	...	2	36	30	...	4	...	...	17	7	1
State generally	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	1	...
	Total	...	...	...	...	**456,556**	...	**381**	**6,078**	**914**	**283**	**328**	**134**	**62**	**1,778**	**1,988**	**97**

TABLE III.—*Return showing for the respective Goldfields and Districts, etc.*—continued.

Goldfield.	District.	1928 GOLD AND SILVER YIELD—DISTRICTS.						1928 GOLD AND SILVER YIELD—GOLDFIELDS.					
		Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Total Gold.	Silver.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Total Gold.	Silver.
		Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.
Kimberley ...	...	...	...	...	...	...	...	40·38	...	...	...	40·38	...
Pilbara	Marble Bar ...	20·72	...	837·50	1,857·37	1,878·09	...	46·81	...	837·50	1,899·17	1,945·98	...
Do.	Nullagine ...	26·09	...	...	41·80	67·89	...						
West Pilbara ...	...	...	...	...	...	...	...	14·35	...	...	...	14·35	...
Ashburton ...	...	...	...	...	...	...	...	36·30	...	...	...	36·30	...
Gascoyne	...	...	...	...	...	...	...	47·46	12·81	...	...	60·27	...
Peak Hill ...	...	...	...	...	...	...	...	53·97	10·99	1,569·00	969·32	1,034·28	...
East Murchison ...	Lawlers ...	...	345·54	...	233·97	579·51	...	6·20	472·34	2,007·00	4,279·45	4,757·99	...
Do.	Wiluna ...	2·60	5·16	787·00	1,795·18	1,802·94	...						
Do.	Black Range ...	3·60	121·64	1,220·00	2,250·30	2,375·54	...						
Murchison ...	Cue	29·60	10·97	4,377·75	2,397·13	2,437·70	...	59·53	78·41	49,988·75	23,498·10	23,636·04	...
Do.	Meekatharra ...	21·90	34·70	39,490·00	17,480·26	17,536·86	...						
Do.	D y Dawn ...	1·79	2·16	1,150·75	491·63	495·58	...						
Do.	Mt. Magnet ...	6·24	30·58	4,970·25	3,129·08	3,165·90	...						
Yalgoo	...	...	...	...	...	...	...	...	9·69	11,204·30	6,196·25	6,205·94	169·80
Mt. Margaret ...	Mt. Morgans ...	30·73	105·42	2,996·00	2,841·79	2,977·94	...	65·74	139·99	111,835·00	35,018·16	35,223·89	2,182·63
Do.	Mt. Malcolm ...	30·31	14·35	108,201·50	30,998·67	31,043·33	2,182·63						
Do.	Mt. Margaret...	4·70	20·22	637·50	1,177·70	1,202·62	...						
North Coolgardie...	Menzies ...	15·85	148·57	7,480·00	4,377·84	4,542·26	...	21·93	148·57	9,162·13	5,603·50	5,774·00	...
Do.	Ularring ...	...	...	1,572·00	1,036·25	1,036·25	...						
Do.	Niagara ...	4·81	...	110·13	189·41	194·22	...						
Do.	Yerilla ...	1·27	...	...	...	1·27	...						
Broad Arrow ...	...	...	...	...	...	...	...	55·98	30·88	1,020·75	1,102·88	1,189·74	...
N.E. Coolgardie ...	Kanowna ...	23·73	68·00	876·75	803·16	894·89	...	71·41	74·31	1,717·75	1,153·22	1,298·94	...
Do.	Kurnalpi ...	47·68	6·31	841·00	350·06	404·05	...						
East Coolgardie ...	East Coolgardie	438·15	27·27	441,511·43	294,319·65	294,785·07	34,689·85	444·12	111·71	441,551·68	294,398·58	294,954·41	34,689·85
Do.	Bulong ...	5·97	84·44	40·25	78·93	169·34	...						
Coolgardie ...	Coolgardie ...	107·97	931·01	1,904·05	3,240·68	4,279·66	...	127·31	979·56	4,283·20	4,997·14	6,104·01	...
Do.	Kunanalling ...	19·34	48·55	2,379·15	1,756·46	1,824·35	...						
Yilgarn	...	...	...	...	...	...	...	3·71	32·20	3,685·00	5,302·04	5,337·95	...
Dundas	...	...	...	...	...	...	...	·04	8·34	6,530·00	4,332·21	4,340·59	...
Phillips River ...	...	...	...	...	...	...	...	...	...	81·00	113·31	113·31	...
State generally		...	...	...	...	...	...	...	...	9·00	10·20	10·20	...
Total for 1928 ...		...	...	...	...	...	...	1,095·24	2,109·80	645,482·06	388,873·53	392,078·57	37,042·28

TABLE III.—*Return showing for the respective Goldfields and Districts, etc.*—continued.

Goldfield.	District.	Total Gold and Silver Yield—Districts.						Total Gold and Silver Yield—Goldfields.					
		Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Total Gold.	* Silver.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Total Gold.	* Silver.
		Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.
Kimberley	...	...	...	...	...	...	...	4,319·09	...	17,597·50	14,127·25	18,446·34	...
Pilbara	Marble Bar ...	12,558·51	3,727·97	86,047·53	130,023·27	146,309·75	613·91	} 19,378·20	4,262·54	128,350·77	204,353·62	227,994·36	642·58
Do.	Nullagine ...	6,819·69	534·57	42,303·24	74,330·35	81,684·61	28·67						
West Pilbara ...	...	...	...	...	...	...	...	5,862·07	275·00	19,322·71	22,112·36	28,249·43	1,331·07
Ashburton	...	...	...	...	...	...	...	8,688·50	315·64	...	...	9,004·14	7,787·69
Gascoyne	...	...	...	...	...	...	...	542·94	34·69	356·70	337·83	915·46	...
Peak Hill	...	...	...	...	...	...	...	2,455·04	4,255·63	529,080·01	262,477·74	269,188·41	2,287·63
East Murchison ...	Lawlers ...	5,614·49	7,597·96	2,040,097·91	913,751·26	926,963·71	25,997·48	} 7,232·77	24,424·06	3,463,335·05	1,807,640·32	1,839,297·15	42,735·05
Do.	Wiluna ...	102·06	277·46	223,592·00	120,648·91	121,028·43	237·00						
Do.	Black Range ...	1,516·22	16,548·64	1,199,645·14	773,240·15	791,305·01	16,500·57						
Murchison	Cue	1,343·40	5,851·00	494,554·47	399,277·98	406,472·38	513·68						
Do.	Meekatharra ...	11,866·22	13,507·46	1,640,436·24	1,069,695·46	1,095,069·14	5,028·90	} 17,579·54	45,325·44	4,676,088·17	3,184,009·06	3,246,914·04	175,927·20
Do.	Day Dawn ...	2,472·95	9,905·53	1,976,197·58	1,304,397·21	1,316,775·69	169,210·44						
Do.	Mt. Magnet ...	1,896·97	16,061·45	564,899·88	410,638·41	428,596·83	1,174·18						
Yalgoo	...	...	...	...	...	...	...	1,612·49	1,888·24	246,860·10	173,887·43	177,388·16	1,192·41
Mt. Margaret ...	Mt. Morgans ...	1,846·64	3,920·12	1,033,053·00	552,042·93	557,809·69	5,775·05	} 8,138·46	19,679·94	6,401,819·06	3,234,745·99	3,262,564·39	158,576·39
Do.	Mt. Malcolm ...	2,831·45	7,649·84	3,737,623·36	1,851,702·35	1,862,183·64	95,953·47						
Do.	Mt. Margaret...	3,460·37	8,109·98	1,631,142·70	831,000·71	842,571·06	56,847·87						
North Coolgardie ...	Menzies ...	1,164·80	4,151·98	1,246,670·18	1,035,038·57	1,040,355·35	19,224·48						
Do.	Ularring ...	22·17	1,162·61	300,140·88	291,862·10	293,046·88	5,973·05	} 3,966·04	14,505·35	2,665,812·84	2,020,039·68	2,038,511·07	30,863·99
Do.	Niagara ...	1,530·59	1,618·39	889,437·49	500,189·64	563,338·60	5,603·42						
Do.	Yerilla ...	1,248·48	7,572·37	219,564·29	192,949·37	201,770·22	63·04						
Broad Arrow ...	...	...	...	...	...	...	...	19,646·10	16,198·68	880,716·06	487,551·57	523,396·35	2,184·96
N.E. Coolgardie ...	Kanowna ...	104,628·07	11,719·31	971,859·45	606,150·38	722,497·76	2,522·12	} 116,854·94	17,861·27	979,272·86	620,242·77	754,958·98	2,533·34
Do.	Kurnalpi ...	12,226·87	6,141·96	7,413·41	14,092·39	32,461·22	11·22						
East Coolgardie ...	East Coolgardie	28,814·28	35,021·36	32,384,481·39	20,335,489·96	20,399,325·60	2,179,013·35						
Do.	Bulong ...	26,776·42	15,325·29	156,065·28	122,875·36	164,977·07	12·92	} 55,590·70	50,346·65	32,540,546·67	20,458,365·32	20,564,302·67	2,179,026·27
Coolgardie	Coolgardie ...	9,721·71	12,245·18	1,591,823·20	1,004,617·98	1,026,584·87	891·44						
Do.	Kunanalling ...	1,070·15	6,596·08	292,370·24	230,743·19	238,409·42	48·67	} 10,791·86	18,841·26	1,884,193·44	1,235,361·17	1,264,994·29	940·11
Yilgarn	...	...	...	...	...	...	...	99·40	1,546·17	2,364,997·11	1,085,487·08	1,087,132·65	32,288·71
Dundas	...	...	...	...	...	...	...	2,053·39	14,052·01	922,235·86	633,437·87	649,543·27	36,392·90
Phillips River ...	...	...	...	...	...	...	...	483·77	783·42	92,810·20	88,315·90	89,583·09	15,688·17
Donnybrook † ...	...	...	...	...	...	...	...	23·24	...	1,653·30	818·52	841·76	...
State generally		...	...	...	...	...	...	154·45	362·00	36·00	7,875·49	8,391·94	30,876·54
Total to 31st December, 1928 ...		...	...	...	...	...	...	**285,472·99**	**234,957·99**	**57,815,084·41**	**35,541,186·97**	**36,061,617·95**	**2,721,275·01**

* By-product in the treatment of auriferous ore except Ashburton and State generally. † Abolished 4th March, 1908.

TABLE IV.

PRODUCTION OF GOLD AND SILVER FROM ALL SOURCES, SHOWING IN FINE OUNCES THE OUTPUT AS REPORTED TO THE MINES DEPARTMENT DURING 1928, AND THE TOTAL PRODUCTION TO DATE.

Kimberley Goldfield.

Mining Centre.	Number of Lease.	Registered Name of Company or Lease.	Total for 1928					Total Production.				
			Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.
			Fine ozs.	Fine ozs	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.
Hall's Creek...	...	Voided leases	...	...	...	...	...	...	...	423·00	477·76	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	...	94·55	62·68	...
Mt. Dockerell	...	Voided leases	...	...	...	...	...	...	...	44·00	435·93	...
Ruby Creek	...	Voided leases	...	...	...	...	...	...	...	12,633·50	9,435·13	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	...	151·00	127·28	...
The Brockman	...	Voided leases	...	...	...	...	...	...	...	1,352·75	1,404·40	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	...	2,462·00	1,820·33	...
The Mary ...	...	Voided leases	...	...	...	...	...	...	...	399·00	210·03	...
The Panton	...	Voided leases	...	...	...	...	...	...	...	34·70	138·70	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	...	3·00	15·01	...
	From Goldfields generally :— Reported by Banks and Gold Dealers		40·38	...	...	...	...	4,319·09	...	...	...	...
		Total	**40·38**	...	...	...	...	**4,319·09**	...	**17,597·50**	**14,127·25**	...

Pilbara Goldfield.

MARBLE BAR DISTRICT.

Bamboo Creek	850	Federation	...	...	...	...	...	...	...	76·50	383·13	...
Do. ...	819	Forest Abbey	...	...	...	...	...	...	...	178·00	188·83	...
Do. ...	707	Kitchener	...	...	270·00	465·13	...	...	...	4,482·00	8,777·33	...
Do. ...	740	(Mount Prophecy) ...	...	...	...	...	...	...	1·11	1,040·50	1,898·07	...
Do. ...	740, 794	Mount Prophecy leases ...	...	...	150·00	233·14	...	...	...	2,195·00	3,237·49	...
Do. ...	794	(Perseverance)	...	...	...	...	...	...	...	290·50	584·21	...
Do. ...	817	Prince Charlie	...	...	82·00	147·34	...	...	...	481·25	1,427·33	...
Do. ...	...	Voided leases	...	...	...	...	...	...	508·66	15,328·60	23,515·49	...
Do. ...	...	Sundry claims	...	...	12·00	8·34	...	...	307·83	1,261·85	1,542·50	...

Boodalyerrie...		...	Voided leases	...	...	...	...	...	...	292·07	120·25	587·86	...
Do. ...		...	Sundry claims	...	...	...	...	...	...	7·16	...	...	...
Breen's Find		...	Voided leases	...	...	...	...	...	...	...	14·00	66·82	...
Elsie ...		...	Voided leases	...	...	...	...	...	...	...	178·00	352·06	...
Do. ...		...	Sundry claims	...	...	...	...	...	...	...	10·25	58·01	...
Lalla Rookh		...	Voided leases	...	...	...	...	...	...	4·78	3,283·50	4,170·81	574·01
Do. ...		...	Sundry claims	...	...	...	...	...	...	...	6,992·00	6,892·82	...
Marble Bar ...	844	... ...	Anglo French	...	...	118·50	252·48	...	...	...	467·00	706·25	...
Do. ...	854	... ...	Coongan Star	...	...	69·50	248·26	...	...	...	80·00	283·51	...
Do. ...	852	... ...	Great Oversight	...	...	...	...	...	...	...	30·50	61·35	...
Do. ...	845	... ...	Outward Bound	...	...	126·50	255·18	...	...	...	947·50	1,177·87	...
Do. ...	851	... ...	Viking	...	...	...	...	...	...	...	34·50	45·52	...
Do. ...		...	Voided leases	...	...	...	...	...	...	181·87	22,362·45	28,352·06	...
Do. ...		...	Sundry claims	...	...	9·00	30·45	...	38·68	149·23	5,313·14	5,941·57	...
North Pole		...	Voided leases	...	...	...	...	...	...	...	474·00	340·75	...
Do. ...		...	Sundry claims	...	...	...	...	...	...	...	50·50	69·56	...
North Shaw...		...	Voided leases	...	...	...	...	...	7·53	...	762·45	861·28	...
Do. ...		...	Sundry claims	...	...	...	...	...	...	567·06	...	...	...
Sharks ...		...	Sundry claims	...	...	...	...	...	145·08	19·37	24·50	93·14	...
Shaw River		...	Voided leases	...	...	...	...	...	...	...	101·00	49·63	...
Talga Talga		...	Voided leases	...	...	...	...	...	...	83·83	574·50	975·98	...
Do. ...		...	Sundry claims	...	...	...	...	...	50·26	68·99	204·65	520·25	...
Tambourah ...		...	Voided leases	...	...	...	...	...	...	73·90	1,438·50	1,739·44	...
Do. ...		...	Sundry claims	...	...	...	...	...	...	171·69	639·25	797·44	...
Warrawoona		...	Voided leases	...	...	...	...	...	...	16·99	10,072·80	18,136·84	...
Do. ...		...	Sundry claims	...	...	...	...	...	44·30	403·70	1,127·04	2,163·74	...
Western Shaw		...	Voided leases	...	...	...	...	...	...	...	1,222·50	957·80	...
Do. ...		...	Sundry claims	...	...	...	...	...	12·52	67·47	...	...	...
Wyman's Well		...	Voided leases	...	...	...	...	...	...	42·86	757·79	1,113·33	...
Do. ...		...	Sundry claims	...	...	...	...	...	·93	39·41	355·86	592·18	...
Yandicoogina		...	Voided leases	...	...	...	...	...	...	140·76	2,733·20	5,824·23	...
Do. ...		...	Sundry claims	...	...	...	...	...	...	238·35	103·75	120·34	...
			From District generally :—										
			Sundry Parcels treated at :										
			State Battery, Bamboo Creek	...	...	...	217·05	...	...	...	...	3,589·90	39·90
			State Battery, Marble Bar	...	...	...	...	...	...	...	...	621·64	...
			Various Works	...	...	...	...	...	...	...	237·95	1,204·91	...
			Reported by Banks and Gold Dealers	20·72	...	...	...	...	12,259·21	340·88	...	...	...
			Total	**20·72**	...	**837·50**	**1,857·37**	...	**12,558·51**	**3,727·97**	**86,047·53**	**130,023·27**	**613·91**

TABLE IV.—*Production of Gold and Silver from all sources, etc.*—continued.

PILBARA GOLDFIELD—continued.

NULLAGINE DISTRICT.

Mining Centre.	Number of Lease.	Registered Name of Company or Lease.	Total for 1928.					Total Production.				
			Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.
			Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs
Eastern Creek	219L	Shamrock	...	...	...	...	...	...	...	89·00	109·15	11·77
Do. ...	...	Voided leases	...	...	...	...	...	...	8·19	4,482·00	8,854·88	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	3·77	461·50	751·47	16·90
Elsie	...	Voided leases	...	...	...	...	...	...	...	408·25	1,323·85	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	...	24·00	27·48	...
Jimbel Bah ...	(225L) ([41H]) ...	Coobina	...	...	...	...	...	...	50·51	2·00	33·01	...
Do. ...	...	Sundry claims	13·79	...	...	...	...	13·79	...	...	...	...
McPhee's Creek	...	Voided leases	...	...	...	...	...	...	...	113·00	137·92	...
Middle Creek	...	Voided leases	...	...	...	...	...	...	...	6,848·90	8,603·45	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	...	286·00	408·82	...
Mosquito Creek	...	Voided leases	...	...	...	...	...	1·07	21·42	7,259·80	12,464·00	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	166·47	2,188·94	3,116·77	...
Nullagine ...	...	Voided leases	...	...	...	...	...	...	13·96	7,453·25	11,335·12	...
Do. ...	...	Sundry claims	...	...	...	...	...	165·69	210·96	3,984·75	9,336·03	...
20-Mile Sandy	...	Voided leases	...	...	...	...	...	...	3·20	5,093·70	7,786·99	...
Do. ...	...	Sundry claims	...	...	...	...	...	33·10	20·75	3,495·65	4,271·29	...
	From District generally :—											
	Sundry Parcels treated at :											
	Doherty's Works		...	...	...	41·80	...	...	...	...	1,304·73	...
	State Battery, 20-Mile Sandy		...	...	...	...	...	...	...	62·00	1,815·43	...
	Various Works		...	...	...	...	...	...	...	50·50	2,649·96	...
	Reported by Banks and Gold Dealers		12·30	...	...	...	...	6,606·04	35·54	...	...	...
	Total		26·09	...	...	**41·80**	...	**6,819·69**	**534·57**	**42,303·24**	**74,330·35**	**28·67**

West Pilbara Goldfield.

Croydon ...	...	Voided leases	...	...	...	...	...	...	...	8·00	5·44	...
Hong Kong	...	Voided leases	...	...	...	...	...	...	...	331·00	442·45	...
Do. ...	...	Sundry claims	...	...	...	...	...	21·40	·02	9·00	3·15	...

Lower Nicol...	...	Voided leases	...	...	...	...	...	...	1·10	653·20	402·22	...
Do. ...	...	Sundry claims	...	...	...	...	...	10·44	2·71	10·00	11·51	...
Mallina ...	...	Voided leases	...	...	...	...	...	...	...	141·60	128·44	...
Nicol ...	...	Voided leases	...	...	...	...	...	...	...	30·00	11·47	...
Pilbara ...	...	Voided leases	...	...	...	...	...	...	48·12	267·00	413·59	...
Do. ...	...	Sundry claims	...	...	...	...	...	1·11	86·24	163·00	249·86	...
Roebourne ...	M.L. 183, M.L. 167	Roebourne Copper Mines, Ltd. ...	...	...	...	...	...	...	...	...	21·12	...
Do. ...	...	Voided leases	...	...	...	...	...	...	...	113·36	577·87	350·74
Do. ...	...	Sundry claims	...	...	...	...	...	...	...	108·60	93·85	96·53
Station Peak	...	Voided leases	...	...	...	...	...	177·74	41·37	10,936·00	11,347·42	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	...	37·50	48·19	...
Towranna ...	...	Voided leases	...	...	...	...	...	...	2·62	3,965·80	5,187·51	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	...	22·00	12·35	...
Upper Nicol ...	...	Sundry claims	...	...	...	...	...	...	...	6·50	2·57	...
Weerianna ...	171	Yank Lennan	...	...	...	...	...	...	...	20·00	3·48	...
Do. ...	...	Voided leases	...	...	...	...	...	...	...	2,436·15	3,079·81	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	...	64·00	62·90	...
Whim Creek	...	Voided leases	...	...	...	...	...	...	...	...	...	883·80
	From Goldfield generally :— Reported by Banks and Gold Dealers :		14·35	...	...	...	...	5,651·38	92·82	...	7·16	...
	Total		**14·35**	...	...	...	...	**5,862·07**	**275·00**	**19,322·71**	**22,112·36**	**1,331·07**

Ashburton Goldfield.

Mt. Mortimer	...	Sundry claims	...	...	...	...	...	346·63	315·64	...	...	74·47
Uaroo ...	...	Voided leases	...	...	...	...	...	...	...	...	...	7,713·22
	From Goldfield generally :— Reported by Banks and Gold Dealers		36·30	...	...	...	...	8,323·87	...	...	...	...
	Total		**36·30**	...	...	...	...	**8,688·50**	**315·64**	...	...	**7,787·69**

Gascoyne Goldfield.

Bangemall ...	...	Voided leases	...	...	...	...	...	...	6·22	350·70	313·82	...
Do. ...	...	Sundry claims	...	12·81	...	...	...	85·21	28·47	6·00	24·01	...
	From Goldfield generally :— Reported by Banks and Gold Dealers		47·46	...	...	...	...	457·73	...	...	...	...
	Total		**47·46**	**12·81**	...	...	...	**542·94**	**34·69**	**356·70**	**337·83**	...

TABLE IV.—*Production of Gold and Silver from all sources, etc.*—continued.

Peak Hill Goldfield.

Mining Centre.	Number of Lease.	Registered Name of Company or Lease.	Total for 1928.					Total Production.				
			Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.
			Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs
Egerton ...	...	Voided leases	...	...	...	...	...	60·86	30·91	4,725·25	2,019·78	...
Do. ...	...	Sundry claims	...	...	...	...	...	235·35	23·51	1,093·75	506·79	...
Horseshoe ...	...	Voided leases	...	...	...	...	...	...	1,962·66	728·38	1,973·46	2·00
Do. ...	...	Sundry claims	...	...	...	...	...	15·70	648·12	16·05	45·14	...
Mt. Fraser ...	...	Voided leases	...	...	...	...	...	...	...	389·50	320·96	...
Do. ...	...	Sundry claims	...	...	34·50	42·68	...	88·28	40·61	194·75	189·52	...
Peak Hill ...	(459P)	Atlantic	...	...	...	...	...	...	...	936·50	829·09	...
Do. ...	448P	Evening Star	...	...	206·00	69·74	...	...	17·97	2,748·50	3,986·81	...
Do. ...	491P	Independent	...	...	64·75	101·74	...	...	...	420·00	498·33	...
Do. ...	5P, 306P ...	No. 1 North leases	...	...	799·00	277·67	...	...	61·10	6,480·00	4,247·92	·04
Do. ...	492P	North Star	...	10·99	...	...	...	...	10·99	963·50	170·05	...
Do. ...	(1P), (2P), (4P), 5P, (6P), (8P), (9P), (13P), (15P), (16P), (26P), (27P), (28P), (29P), (35P), (36P), (43P), (53P), (54P), (63P), (146P), (152P), (190P), (213P), (222P), (239P), (248P), (252P), (262P) (274P) 306P (313P)	(Peak Hill Goldfields, Ltd.)	...	...	...	...	...	...	191·46	462,057·01	223,273·59	2,285·59
Do. ...	496P	Wembly	...	...	122·75	64·10	...	...	...	436·25	208·29	...
Do. ...	...	Voided leases	...	...	...	...	...	...	543·06	22,068·12	7,554·33	...
Do. ...	...	Sundry claims	...	...	342·00	106·83	...	53·11	251·84	20,784·50	5,910·20	...
Ravelstone ...	...	Voided leases	...	...	...	...	...	...	101·64	4,219·85	3,117·68	...
Do. ...	...	Sundry claims ...	...	...	...	...	...	...	...	553·60	283·17	...
Wilgeena ...	...	Voided leases	...	...	...	...	...	...	23·54	128·50	146·79	...
Wilthorpe ...	...	Voided leases	...	...	...	...	...	...	...	47·00	20·93	...
Yowerina ...	...	Voided leases	...	...	...	...	...	...	...	19·50	36·46	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	...	24·50	105·59	...

From Goldfield generally :—												
Sundry Parcels treated at :												
Purcell's Works	...	...	...	67·79	...	...	...	...	3,363·49	...
State Battery Peak Hill	...	...	...	238·77	...	...	3·05	15·00	3,054·53	...
Various Works	...	...	...	...	...	...	...	30·00	614·84	...
Reported by Banks and Gold Dealers	53·97	...	...	...	...	2,001·74	345·17	...	...	...
Total	**53·97**	**10·99**	**1,569·00**	**969·32**	...	**2,455·04**	**4,255·63**	**529,080·01**	**262,477·74**	**2,287·63**

East Murchison Goldfield.

LAWLERS DISTRICT.

Bronzewing ...	...	Voided leases	...	...	...	...	...	...	...	468·00	318·03	1·14
Cork Tree ...	...	Voided leases	...	...	...	...	...	...	29·90	3,767·00	3,292·87	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	25·50	13·00	9·32	...
Kathleen Valley	(382)	(Yellow Aster)	...	...	...	...	...	...	...	37,605·00	27,051·42	...
Do. ...	(382)	(Yellow Aster)	...	...	...	...	...	...	...	1,714·00	949·04	...
Do. ...	(382), (1197) ...	Yellow Aster leases	...	...	...	...	...	...	...	3,555·00	2,819·91	...
Do. ...	(382)	(Yellow Aster : Yellow Aster G.M. Co., N.L.)	...	...	...	...	...	...	...	10,359·75	5,425·26	...
Do. ...	...	Voided leases	...	...	...	...	...	...	141·57	23,350·50	11,377·02	...
Do. ...	...	Sundry claims	...	...	...	20·25	...	...	478·40	1,569·75	913·25	...
Lake Darlot...	...	Voided leases	...	...	...	...	...	...	4,448·42	65,385·30	48,740·44	...
Do. ...	...	Sundry claims	...	...	...	...	...	1·16	474·45	3,972·64	3,387·61	2·60
Lawlers ...	(22), (37), (58), (62), (70), (155), (156), (157), (158), (376), (377), (381), (385), (399), (426), (427), (459), (474), (500), (508), (509), (510), (511), (512), (552), (562), (563), (573), (811), (840)	(East Murchison United, Ltd.) ...	...	...	...	...	...	...	...	291,797·00	155,594·26	900·48
Do. ...	(37), (58), (62), (70), (155), (156), (157), (158), (376), (377), (381), (385), (399), (426), (427), (459), (474), (500), (508), (509), (510), (511), (512), (552), (562), (563), (573), (811), (840)	(London and Western Australian Exploration Co., Ltd.)	...	...	...	...	...	...	...	179,563·00	40,438·14	2,560·31

TABLE IV.—*Production of Gold and Silver from all sources, etc.*—continued.

EAST MURCHISON GOLDFIELD—*continued.*

LAWLERS DISTRICT—*continued.*

Mining Centre.	Number of Lease.	Registered Name of Company or Lease.	Total for 1928.					Total Production.				
			Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.
			Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine oz.
Lawlers ...	(22), (37), (58), (62), (70), (155), (156), (157), (158), (376), (377), (385), (459), (508), (509), (562), (563), (811), (840), (918), (1053), (1106), (1109), (1110), (1123), (1160)	(Northern Mines, Ltd.)	...	...	...	...	...	...	...	398.856·50	102,005·52	8,356·89
Do. ...	(58), (62), (918), (1178)	Waroonga G.M. Co., Ltd.	...	...	...	...	...	...	3·27	55,416·00	13,455·56	...
Do. ...	1236	Waroonga G. M. Co., Ltd.	...	...	...	195·44	...	...	...	...	195·44	...
Do. ...	(62), (562), (563),	(Waroonga South leases)	...	...	...	...	...	...	...	42,150·00	14,329·48	...
Do. ...	(58)	(Woronga: London and Western Australian Exploration Co., Ltd.)	...	...	...	...	...	...	...	2,438·50	2,755·45	...
Do. ...	...	Voided leases	...	...	...	...	...	...	687·39	312,396·22	161,912·66	2,533·25
Do. ...	...	Sundry claims	...	...	...	...	...	14·81	261·04	11,551·98	7,115·54	268·34
New England ...	...	Voided leases	...	...	...	...	...	...	57·54	899·00	720·25	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	4·32	554·50	465·23	...
Sir Samuel ...	(1225)	Combine	...	...	...	...	...	...	...	13·00	7·74	...
Do. ...	1235	Dolly Pot	...	345·54	...	...	...	...	345·54	4·05	67·65	...
Do. ...	...	Voided leases	...	...	...	...	...	...	13·49	266,619·50	139,133·78	10,225·58
Do. ...	...	Sundry claims	...	...	...	...	...	...	22·71	4,350·00	2,995·88	...
Wiluna ...	542, [6J], 548, [7J], (550), ([8J]), (906), ([11J]), (930), ([13J]), (931), ([14J]), (932), ([15J]), (937), ([17J]), (938), ([18J]), (943), ([21J]), (944), ([22J]), (952), ([26J])	(Gwalia Consolidated, Ltd.)	...	...	...	...	...	...	...	210,230·32	74,536·14	69·03
Do. ...	870, [10J] ...	(Moonlight)	...	...	...	...	...	...	...	1,856·00	787·66	...
Do. ...	917, [12J] ...	(Squib)	...	...	...	...	...	...	...	276·50	67·00	...
Do. ...	...	Voided leases	...	...	...	...	...	...	537·27	104,086·75	62,811·02	124·00
Do. ...	...	Sundry claims	...	...	...	...	...	5·30	...	2,841·15	1,516·76	...

From District generally :—													
Sundry Parcels treated at :													
Great Eastern Battery			...	...	...	...	...	...	...	...	6,201·33	151·37	
Lawlers Public Battery (Retreatment Works) ...			...	...	...	...	...	...	...	...	1,439·37	...	
Queen Works			...	...	...	...	...	...	...	...	1,300·97	39·36	
State Battery, Lake Darlot			...	...	...	...	...	...	...	315·00	1,097·09	...	
State Battery, Sir Samuel			...	...	...	18·28	...	...	...	33·50	1,863·75	...	
State Battery, Wiluna			...	...	...	...	...	...	...	390·00	2,047·17	20·00	
Western Machinery Co., Ltd., Works ...			...	...	...	...	...	...	...	80·00	37·25	...	
Various Works			...	...	...	...	...	...	...	1,619·50	14,563·26	744·33	
Reported by Banks and Gold Dealers			...	...	...	...	...	5,593·22	67·15	...	5·74	...	
Total			...	**345·54**	...	**233·97**	...	**5,614·49**	**7,597·96**	**2,040,097·91**	**913,751·26**	**25,997·48**	
WILUNA DISTRICT.													
Collavilla ...	...	Voided leases	...	...	...	...	...	...	...	1,518·00	496·28	...	
Do. ...	...	Sundry claims	...	...	...	...	...	...	...	30·00	21·47	...	
Corboy's Find	(350J)	Corboy's Reward	...	...	...	...	...	...	...	707·00	386·80	...	
Do. ...	359J	Corboy's Reward, North ...	...	...	10·00	72·90	...	...	...	1,089·00	651·47	...	
Do. ...	404J	Tuscana	...	...	35·00	25·87	...	...	...	35·00	25·87	...	
Do. ...	355J	(Waratah)...	...	...	...	...	...	...	...	42·50	31·27	...	
Do. ...	355J, 357J ...	Waratah leases	...	...	...	...	...	...	...	234·00	91·02	...	
Do. ...	357J	(Waratah South)	...	...	...	...	...	...	...	190·50	126·30	...	
Do. ...	...	Voided leases	...	...	...	...	...	...	1·25	870·00	1,195·49	5·00	
Do. ...	...	Sundry Claims	...	...	52·50	23·92	...	...	...	819·50	369·66	...	
Gum Creek ...	...	Voided leases	...	...	...	...	...	...	...	1,334·50	579·16	...	
Mt. Keith ...	...	Voided leases	...	...	...	...	...	...	8·29	8,279·50	6,882·05	...	
Do. ...	...	Sundry claims	...	...	...	...	...	...	78·26	1,595·25	976·93	...	
New England	...	Voided leases	...	...	...	...	...	...	...	952·00	309·11	...	
Do. ...	...	Sundry claims	...	...	...	...	...	...	...	137·00	122·49	...	
Wiluna ...	91J, [940] ...	(Adelaide)	...	...	...	...	...	...	...	401·00	33·29	...	
Do. ...	(352J)	Black Adder	...	...	...	...	...	...	...	593·75	791·19	...	
Do. ...	231J	Brilliant	...	...	...	...	...	...	...	1,326·00	424·03	...	
Do. ...	373J	Brilliant, North	...	...	388·50	427·40	...	...	...	900·25	1,515·56	...	
Do. ...	(405J)	Capelli's Reward...	...	...	...	...	...	...	...	44·75	14·29	...	
Do. ...	369J	Cromarty Hope	...	...	...	...	...	...	...	618·50	317·49	...	
Do. ...	(391J)	Gloaming	...	...	74·75	22·08	...	...	...	216·25	76·87	...	
Do. ...	6J, [542], 7J, [548], (8J), ([550]), (11J), (13J), (14J), (15J), (17J), (18J), (21J), (22J), (24J), (25J), (26J), (39J), (161J), (163J)	(Gwalia Consolidated, Ltd.)	...	...	...	...	...	...	...	29,774·50	10,780·42	20·29	
Do. ...	119J	(Happy Jack)	...	...	...	...	...	...	...	743·00	236·41	...	
Do. ...	390J	Lake Violet Deeps	...	...	11·00	3·79	...	...	...	11·00	3·79	...	
Do. ...	10J, [870] ...	(Moonlight)	...	...	...	...	...	...	...	5,181·00	1,078·40	...	
Do. ...	10J, [870], 37J, 91J, 109J, (123J)	Moonlight leases	...	...	...	...	...	...	...	28,767·00	11,991·14	...	
Do. ...	377J	Mother of Gwalia	...	...	...	...	...	...	...	15·75	27·10	...	
Do. ...	333J	Neb	...	...	...	...	...	...	...	754·75	257·16	...	
Do. ...	275J	W.A.	...	...	20·25	12·77	...	...	...	193·50	148·87	...	

TABLE IV.—*Production of Gold and Silver from all sources, etc.*—continued.

EAST MURCHISON GOLDFIELD—*continued.*

WILUNA DISTRICT—*continued.*

Mining Centre.	Number of Lease.	Registered Name of Company or Lease.	Total for 1928.					Total Production.				
			Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.
			Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.
Wiluna ...	6J, [542], 7J, [548], (8J), ([550]), (11J), (13J), (14J), (15J), (17J), (21J), (161J), (163J), (193J), 194J, (256J), (257J)	(Western Machinery Co., Ltd.) ...	...	...	...	...	...	...	...	69,555·50	33,178·75	...
Do. ...	12J, [917], (23J), ([946]), (28J), ([954]), (30J), ([959]), (33J), ([967]), (36J), ([975]) (43J), ([1018]) (76J), ([1090]) (113J), 119J (124J), (137J), ([1002]), 266J	(Wiluna Gold Mines, Ltd.)	...	...	...	...	...	...	...	31,150·75	14,659·20	...
Do. ...	6J [542] 7J, [548] 12J [917] 119J 194J, 262J 263J, 264J, 266J, 271J, 272J, 276J, 277J, 278J, 280J, 281J, 282J, 283J, 287J, 365J, 366J, 389J, 395J, 397J, 398J, 400J, 402J, 403J, 415J, 416J, 417J, 418J, 419J, 421J	Wiluna Gold Mines Ltd.	...	...	...	331·55	...	...	...	...	766·73	...
Do. ...	...	Voided leases	...	...	...	...	...	...	27·92	23,977·75	11,003·48	...
Do. ...	...	Sundry claims	2·60	5·16	195·00	184·30	...	92·28	158·82	11,331·25	5,744·81	·33
	From District generally—											
	Sundry Parcels treated at:											
	Corboy's Reward North Battery		...	...	...	21·88	...	...	...	...	21·88	...
	State Battery, Mt. Keith		...	...	...	...	...	...	...	...	781·64	12·68
	State Battery, Wiluna		...	...	...	668·72	...	...	...	202·00	14,531·04	198·70
	Reported by Banks and Gold Dealers		...	...	...	...	...	9·78	2·92	...	...	...
	Total		**2·60**	**5·16**	**787·00**	**1,795·18**	...	**102·06**	**277·46**	**223,592·00**	**120,648·91**	**237·00**

Barrambie ...	...	Voided leases	...	...	...	...	...	...	...	455·50	1,862·24	...
Do. ...	...	Sundry claims	...	...	...	...	...	3·53	133·52	158·05	494·37	...
Bellchambers	...	Sundry claims	...	...	...	...	...	...	...	159·00	59·81	...
Birrigrin ...	...	Voided leases	...	...	...	...	...	...	820·68	12,018·16	15,040·45	...
Do. ...	...	Sundry claims	...	121·64	8·00	24·43	...	...	156·16	752·50	703·32	...
Curran's Find	...	Voided leases	...	...	...	...	...	18·24	222·89	7,038·50	3,001·02	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	29·38	1,188·50	430·37	...
Erroll's ...	...	Voided leases	...	...	...	...	...	14·17	132·04	72·00	426·68	...
Do. ...	...	Sundry claims	...	...	...	...	...	6·53	399·11	228·00	327·90	...
Hancock's ...	949B ...	Comedy King	...	...	84·50	97·18	...	...	...	242·75	334·87	...
Do. ...	...	Voided leases	...	...	...	...	...	...	6,523·59	31,359·75	32,496·84	55·72
Do. ...	...	Sundry claims	...	...	...	...	...	4·21	119·02	2,867·00	1,443·42	...
Maninga Marley	203B	(Havilah)	...	...	...	...	...	...	...	1,507·50	2,315·74	...
Do. ...	203B	(Havilah)	...	...	...	...	...	...	...	638·00	716·05	...
Do. ...	203B, (243B), (249B), (254B), (287B), (288B), (289B), (305B), (350B), (504B)	(Havilah G.M.Co., N.L.)	...	...	...	...	...	...	...	36,508·00	20,052·80	22·55
Do. ...	203B, (243B), (287B), (289B), (350B)	(Havilah G.M. Co., N.L.)	...	...	...	...	...	...	...	6,026·00	5,029·69	...
Do. ...	203B, (243B), (249B), (254B), (287B), (288B), (289B), (305B)	(Havilah leases)	...	...	...	...	...	...	...	2,240·00	2,432·48	...
Do. ...	203B, 345B ...	Havilah leases	...	...	296·00	274·07	...	...	...	1,148·00	1,216·66	...
Do. ...	203B, 243B, 289B	(Havilah leases: Tailings Treatment, Ltd.)	...	...	...	...	...	...	...	371·00	2,086·50	...
Do. ...	...	Voided leases	...	...	...	...	...	...	195·20	11,977·23	14,442·35	...
Do. ...	...	Sundry claims	...	...	108·00	55·78	...	...	158·16	961·50	725·46	...
Montagu ...	...	Voided leases	...	...	...	...	...	...	94·39	9,133·40	7,223·46	...
Do. ...	...	Sundry claims	...	...	195·50	151·09	...	...	45·67	1,072·00	823·97	...
Nungarra ...	...	Voided leases	...	...	...	...	...	25·94	952·34	9,000·75	4,813·99	...
Do. ...	...	Sundry claims	...	...	...	...	...	46·67	1,455·98	3,601·90	2,212·33	...
Sandstone ...	(947B) ...	Waratah	...	...	98·50	40·87	...	...	...	415·05	320·64	...
Do. ...	...	Voided leases	...	...	...	...	...	4·75	3,611·46	688,933·92	442,788·31	11,754·22
Do. ...	...	Sundry claims	3·60	...	134·50	110·84	...	37·32	1,358·39	5,763·65	3,594·14	...
Youanmi ...	...	Voided leases	...	...	...	...	...	·36	126·92	358,978·78	176,882·54	4,608·55
Do. ...	...	Sundry claims	...	...	295·00	169·32	...	1·07	2·31	4,529·75	1,200·95	...
	From District generally:											
	Sundry Parcels treated at:											
	State Battery, Sandstone		...	...	...	1,066·37	...	...	...	222·00	17,491·58	59·53
	State Battery, Youanmi		...	...	...	260·35	...	...	...	40·00	4,584·44	...
	Various Works		...	...	...	...	...	...	...	37·00	5,664·78	...
	Reported by Banks and Gold Dealers		...	...	...	...	...	1,353·43	11·43	...	...	...
	Total		**3·60**	**121·64**	**1,220·00**	**2,250·30**	...	**1,516·22**	**16,548·64**	**1,199,645·14**	**773,240·15**	**16,500·57**

TABLE IV.—*Production of Gold and S ilver from all sources, etc.*—continued.

Murchison Goldfield.

CUE DISTRICT.

Mining Centre.	Number of Lease.	Registered Name of Company or Lease.	Total for 1928.					Total Production.				
			Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.
			Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.
Barrambie ...	...	Voided leases	...	...	...	...	...	...	22·49	16,903·92	14,338·52	125·60
Do. ...	...	Sundry claims	...	...	...	...	...	...	...	70·50	35·81	...
Cuddingwarra	2050	Little Bell	...	...	430·25	34·48	...	...	4·49	579·75	60·95	...
Do. ...	...	Voided Leases	...	...	...	...	...	10·59	124·53	100,304·11	54,762·49	100·71
Do. ...	...	Sundry claims	...	...	93·50	59·73	...	6·90	91·39	1,092·48	1,438·25	...
Cue	(2053)	Carnation	...	...	...	...	...	...	...	28·25	3·93	...
Do. ...	...	Voided leases	...	...	...	...	...	41·26	544·21	281,065·37	215,778·70	66·63
Do. ...	...	Sundry claims	15·49	...	521·00	145·22	...	88·96	624·43	19,312·04	11,607·53	...
Eelya ...	...	Voided leases	...	...	...	...	...	...	8·78	971·00	1,778·94	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	101·86	595·15	630·47	...
Errolls ...	...	Voided leases	...	...	...	...	...	...	20·25	14,098·50	8,902·24	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	...	227·00	92·86	...
Mindoolah ...	...	Voided leases	...	...	...	...	...	3·07	...	7,935·50	4,773·33	42·97
Do. ...	...	Sundry claims	...	...	...	...	...	...	9·81	1,017·00	1,130·39	...
Reedy's Find	1977	Emu	...	...	...	...	...	...	...	555·50	280·88	...
Do. ...	1981	(Emu North)	...	...	...	...	...	...	...	529·00	282·46	...
Do. ...	1981	Emu North: Mararoa G.M. Co., N.L.	...	...	2,584·00	1,268·21	...	...	...	11,759·00	5,555·83	5·00
Do. ...	...	Voided leases	...	...	...	...	...	...	214·65	1,346·75	6,107·35	...
Do. ...	...	Sundry claims	...	...	...	...	...	169·59	89·74	505·50	672·27	...
Tuckabianna...	2048	Buttercup	...	...	287·75	86·89	...	...	...	1,016·00	254·33	...
Do. ...	...	Voided leases	...	...	...	...	...	...	162·70	3,020·00	4,302·51	...
Do. ...	...	Sundry claims	...	...	213·25	173·95	...	24·06	128·90	1,495·25	1,018·66	...
Tuckanarra ...	2056	Hermit	...	10·97	21·00	5·80	...	...	10·97	49·00	52·60	...
Do. ...	...	Voided leases	...	...	...	...	...	14·65	3,061·77	18,000·40	20,708·29	172·77
Do. ...	...	Sundry claims	...	...	227·00	54·49	...	99·95	622·49	4,620·73	7,982·32	...

From District generally :—														
Sundry Parcels treated at :														
Cue No. 1 Works			...	...	...	...	...	...	...	1,870·50	6,684·54	...
State Battery, Cue			...	...	...	456·73	...	...	...	12·75	3,723·15	...
State Battery, Tuckanarra			...	...	...	111·63	...	...	...	518·50	4,203·16	...
Various Works			...	...	...	...	...	...	...	5,055·02	22,115·22	...
Reported by Banks and Gold Dealers			14·11	...	...	...	...	884·37	7·54	...	...	...
Total			**29·60**	**10·97**	**4,377·75**	**2,397·13**	...	**1,343·40**	**5,851·00**	**494,554·47**	**399,277·98**	**513·68**

MEEKATHARRA DISTRICT.

Abbotts ...	...	Voided leases	...	...	...	...	...	...	26·45	35,210·60	37,124·40	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	·49	118·85	138·42	...
Belele ...	...	Sundry claims	...	...	...	...	...	...	...	75·50	45·07	...
Burnakura ...	...	Voided leases	...	...	...	...	...	...	3,239·43	38,480·95	30,579·03	26·90
Do. ...	...	Sundry claims	...	...	...	...	...	12·51	81·11	144·50	118·98	...
Chesterfield ...	...	Voided leases	...	...	...	...	...	29·02	409·15	6,756·26	7,445·01	·80
Do. ...	...	Sundry claims	...	...	...	...	...	...	41·63	435·60	487·80	...
Gabanintha ...	...	Voided leases	...	...	...	...	...	...	16·93	21,918·00	13,447·58	815·57
Do. ...	...	Sundry claims	...	...	...	...	...	13·05	74·38	1,080·50	810·72	...
Garden Gully	...	Voided leases	...	...	...	...	...	26·36	74·91	29,854·06	21,435·37	1,102·59
Do. ...	...	Sundry claims	...	...	5·00	4·70	...	...	5·38	488·10	519·32	...
Gum Creek ...	...	Voided leases	...	...	...	...	...	25·27	88·12	3,639·08	3,359·56	...
Do. ...	...	Sundry claims	...	...	3·75	8·25	...	...	...	385·25	306·92	...
Holden's Find	1291N	(Waterloo)	...	...	370·00	136·47	...	...	...	14,676·00	5,104·54	...
Do. ...	1291N, 1541N, 1545N, 1546N	Waterloo G.M. Co., N.L.	...	...	320·00	105·88	...	...	...	320·00	105·88	...
Do. ...	...	Voided leases	...	...	...	...	...	...	18·00	1,487·00	1,154·88	...
Do. ...	...	Sundry claims	...	...	...	...	...	164·95	44·63	230·25	195·97	...
Jillawarra ...	...	Voided leases	...	...	...	...	...	...	1,134·68	1,499·55	2,801·53	...
Do. ...	...	Sundry cliams	...	...	...	...	...	169·94	142·95	23·50	53·81	...
Meeka Pools	...	Voided leases	...	...	...	...	...	...	...	111·58	82·27	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	2·84	211·72	184·83	...
Meekatharra...	1534N	Empire	...	21·99	59·00	56·31	...	...	21·99	76·50	88·51	...
Do. ...	477N	(Fenian)	...	...	...	...	...	...	...	8,831·75	18,289·22	...
Do. ...	477N, 814N ...	Fenian leases	...	...	...	...	...	...	...	313,485·94	254,989·70	...
Do. ...	1466N	Haveluck	...	...	17·50	53·41	...	...	...	707·00	1,168·45	...
Do. ...	1542N	Ingliston Alberts	...	...	16·00	107·50	...	...	...	16·00	107·50	...
Do. ...	475N	(Ingliston Consols Extended) ...	...	...	...	...	...	...	...	1,536·25	4,248·25	·30
Do. ...	475N, 515N, 729N, 822N	Ingliston Consols Extended leases	...	...	32,543·00	14,910·98	...	...	...	518,992·22	267,559·91	...
Do. ...	1538N	Ingliston G.M. Co., N.L.	...	...	102·25	170·47	...	...	...	111·50	189·93	...
Do. ...	1539N	Ingliston South	...	...	62·25	387·06	...	...	...	62·25	387·06	...

TABLE IV.—*Production of Gold and Silver from all sources, etc.*—continued.

MURCHISON GOLDFIELD—*continued.*

MEEKATHARRA DISTRICT—continued.

Mining Centre.	Number of Lease.	Registered Name of Company or Lease.	Total for 1928.					Total Production.				
			Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.
			Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.
Meekatharra...	1547N	Lady Central	...	...	44·00	109·99	...	...	...	44·00	109·99	...
Do. ...	533N	Marmont	...	...	...	...	...	...	...	55,126·10	39,906·03	...
Do. ...	580N	(Marmont Extended) ...	...	...	...	...	...	...	...	43·00	38·03	...
Do. ...	580N	Marmont Extended	...	...	42·00	24·31	...	...	...	225·25	221·78	...
Do. ...	580N, (888N) ...	Marmont Extended leases ...	...	...	...	...	...	...	...	152·00	129·61	...
Do. ...	1537N	New Gwalia	...	11·44	130·75	122·63	...	...	11·44	183·50	208·48	...
Do. ...	1529N, 1540N ...	Prohibition G.M. Co., N.L.	...	...	5,400·00	889·33	...	...	...	6,400·00	1,047·12	...
Do. ...	(1532N)	Prohibition South	...	...	...	...	...	...	...	137·25	16·97	...
Do. ...	1530N	United	...	...	52·50	137·76	...	...	...	578·50	808·47	...
Do. ...	...	Voided leases	...	...	...	...	...	3·88	638·31	354,084·64	194,565·22	2,454·74
Do. ...	...	Sundry claims	...	1·27	266·75	216·39	...	187·56	217·88	8,521·70	4,354·88	...
Mistletoe ...	1502N	Munarra	...	...	...	...	...	...	1,000·24	309·00	268·66	...
Do. ...	...	Voided leases	...	...	...	...	...	4·15	...	...	...	...
Do. ...	...	Sundry claims	4·33	...	...	...	...	117·97	63·65	...	...	...
Mt. Maitland	...	Sundry claims	...	...	...	...	...	...	...	41·25	96·25	...
Munara Gully	...	Voided leases	...	...	...	...	...	...	...	13,167·75	6,489·65	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	11·62	90·50	66·31	...
Nannine ...	...	Voided leases	...	...	...	...	...	34·02	599·40	92,013·62	68,207·35	167·45
Do. ...	...	Sundry claims	...	...	13·00	17·96	...	74·53	419·02	2,495·45	2,009·24	...
Quinns ...	...	Voided leases	...	...	...	...	...	7·30	1,186·50	18,931·16	8,886·79	90·70
Do. ...	...	Sundry claims	...	...	...	...	...	15·07	1,172·91	1,671·50	1,458·18	...
Rugby Well	...	Voided leases	...	...	...	...	...	...	...	7,443·00	3,988·36	...
Do. ...	...	Sundry claims	17·57	...	8·00	3·97	...	1,015·87	389·32	269·00	345·63	...
Stake Well ...	...	Voided leases	...	...	...	...	...	...	200·12	21,362·00	9,566·18	...
Do. ...	...	Sundry claims	...	...	18·00	1·27	...	1·32	31·79	304·50	302·53	...
Star of the East	...	Voided leases	...	...	...	...	...	...	...	27,244·00	20,350·40	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	...	127·62	94·97	...
Yaloginda ...	1533N	Heroic	...	...	...	...	...	...	...	150·50	73·41	...
Do. ...	...	Voided leases	...	...	...	...	...	...	1,591·82	25,776·02	13,256·35	8·68
Do. ...	...	Sundry claims	...	...	16·25	15·62	...	13·82	536·58	2,390·42	1,956·31	...

	From District generally :—											
	Sundry Parcels treated at :											
	State Battery, Meekatharra	...	...	...	...	...	...	...	14·00	12,387·41	19·00	
	Tumbulgum Sand Syndicate Works	...	...	...	...	...	...	...	...	205·95	...	
	Various Works	...	...	...	...	...	...	...	172·75	5,793·53	342·17	
	Reported by Banks and Gold Dealers	...	...	...	...	...	9,949·63	13·79	...	...	...	
	Total	**21·90**	**34·70**	**39,490·00**	**17,480·26**	...	**11,866·22**	**13,507·46**	**1,640,436·24**	**1,069,695·46**	**5,028·90**	

DAY DAWN DISTRICT.

Day Dawn ...	1D, 170D, 210D ...	Great Fingall No. 1 leases ...	...	...	583·00	247·73	...	...	...	913·25	661·32	...
Do. ...	1D	(Great Fingall No. 1)	...	...	...	...	...	...	...	...	5·93	...
Do. ...	1D, (2D), (86D), (87D), (99D), (119D), (129D), (158D), (159D), 170D. (185D), (191D), (209D), 210D, (211D), (212D), (213D), (224D), (225D). (249D), (424D), (453D), (455D), (467D)	(Great Fingall Consolidated, Ltd.) ...	...	...	...	...	...	...	18·19	1,865,708·45	1,185,412·46	169,210·20
Do. ...	1D	(London Australian & General Exploration Co., Ltd.)	...	...	...	...	...	...	...	32·00	10·24	...
Do. ...	569	South Fingall	...	...	...	...	...	...	...	2,431·00	1,408·52	...
Do. ...	...	Voided leases	...	...	...	...	...	160·64	545·37	46,027·38	31,319·37	·24
Do. ...	...	Sundry claims	... ·36	2·16	461·25	162·50	...	34·35	306·52	5,155·16	3,028·02	...
Jasper Hill ...	...	Voided leases	...	...	...	...	...	4·90	1,210·23	16,080·75	9,369·47	...
Do. ...	...	Sundry claims	...	...	92·00	40·39	...	...	401·27	494·75	517·77	...
Lake Austin (Island)	536D	Eureka	...	...	14·50	41·01	...	...	1,271·01	71·75	933·62	...
Do. ...	...	Voided leases	...	...	...	...	...	601·92	1,591·39	29,954·12	45,477·99	...
Do. ...	...	Sundry claims	...	...	...	...	...	59·07	567·57	953·39	586·03	...
Mainland ...	571D	Mainland Consols	...	...	...	...	...	...	590·51	39·25	667·74	...
Do. ...	...	Voided leases	...	...	...	...	...	·41	2,706·26	7,272·13	23,129·51	...
Do. ...	...	Sundry claims	...	...	...	...	...	3·24	677·12	123·45	170·58	...
	From District generally :—											
	Sundry Parcels treated at :											
	Neptune Works	...	...	...	...	...	...	...	...	...	160·57	...
	Various Works	...	...	...	...	...	...	16·61	940·75	1,537·30	...	
	Reported by Banks and Gold Dealers	1·43	...	...	...	...	1,608·42	3·48	...	·77	...	
	Total	**1·79**	**2·16**	**1,150·75**	**491·63**	...	**2,472·95**	**9,905·53**	**1,976,197·58**	**1,304,397·21**	**169,210·44**	

TABLE IV.—*Production of Gold and Silver from all sources, etc.*—continued.

MURCHISON GOLDFIELD—*continued.*

MOUNT MAGNET DISTRICT.

Mining Centre.	Number of Lease.	Registered Name of Company or Lease.	Total for 1928.					Total Production.				
			Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.
			Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.
Lennonville ...	964M	(Empress)	...	...	...	...	...	...	...	1,649·00	7,361·81	...
Do. ...	964M	Empress	...	...	5·00	9·56	...	...	...	80·00	464·09	...
Do. ...	964M, (1078M), (1079M), (1115M), (1116M), (1117M)	(Empress leases)	...	...	...	...	...	...	...	4,813·00	3,171·33	...
Do. ...	(1227)M ...	Ray-luck	...	...	25·00	7·56	...	...	...	25·00	7·56	...
Do. ...	...	Voided leases	...	...	...	...	...	...	3,196·79	134,931·23	113,240·12	458·82
Do. ...	...	Sundry claims	...	...	310·00	77·43	...	19·14	98·01	3,292·17	2,527·51	...
Mt. Magnet ...	(1221M)	Broken Bond	...	8·77	32·75	19·57	...	...	8·77	245·00	560·75	...
Do. ...	1228M	Christmas Gift	...	...	12·75	83·55	...	...	...	50·75	352·00	...
Do. ...	1231M	Hill Crest	...	...	1,090·00	212·16	...	...	...	1,090·00	212·16	...
Do. ...	1215M	Hill 60	...	...	2,250·00	1,445·36	...	...	...	8,732·00	4,492·82	...
Do. ...	1201M	Neptune	...	...	106·50	326·52	...	...	6·70	466·50	871·20	...
Do. ...	1075M	New Havelock	...	...	...	...	...	...	15·77	2,105·00	1,005·29	...
Do. ...	1216M	Revenue	...	...	...	...	...	...	...	44·75	647·83	...
Do. ...	1224M	Saturn	...	...	173·75	79·33	...	...	41·00	449·25	298·87	...
Do. ...	...	Voided leases	...	...	...	...	...	27·83	8,409·19	370,275·61	210,951·28	714·36
Do. ...	...	Sundry claims	·99	21·81	867·50	395·34	...	2·81	1,283·62	24,988·75	16,608·18	...
Mt. Magnet, East	...	Voided leases	...	...	...	...	...	63·29	764·53	5,522·28	2,811·75	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	37·22	214·50	144·10	...
Moyagee ...	(1217M)	Moyagee	...	...	30·00	85·85	...	...	...	227·90	725·35	...
Do. ...	...	Voided leases	...	...	...	...	...	...	5·08	4,571·45	6,696·48	...
Do, ...	...	Sundry claims	...	...	...	...	...	2·83	111·10	661·73	762·65	...
Paynesville ...	(1196M)	Elsie	...	...	9·50	10·37	...	...	1,434·45	58·25	479·58	...
Do. ...	...	Voided leases	...	...	...	...	...	...	178·89	39·02	69·52	...
Do. ...	...	Sundry claims	...	...	57·50	12·84	...	...	469·98	198·17	894·46	...
Youanmi ...	...	Sundry claims	...	...	...	...	...	...	...	33·00	44·58	...

From District generally :—												
Sundry Parcels treated at :												
Brittania Cyanide Works	...	...	...	...	48·56	...	...	...	...	48·56	...
Long Reef Cyanide Works	...	...	...	...	...	...	...	...	...	260·76	...
State Battery, Boogardie	...	...	...	315·08	...	...	...	92·51	18,080·50	...
Various Works	...	...	...	...	...	...	...	43·06	16,847·32	1·00
Reported by Banks and Gold Dealers	5·25	...	...	...	...	1,781·07	·35	...	...	...
Total	**6·24**	**30·58**	**4,970·25**	**3,129·08**	...	**1,896·97**	**16,061·45**	**564,899·88**	**410,638·41**	**1,174·18**

Yalgoo Goldfield.

Adavale ...	...	Sundry claims	...	...	...	...	...	...	...	10·00	12·56	...
Bilberatha ...	...	Voided leases	...	...	...	...	...	...	...	554·00	200·07	...
Do. ...	...	Sundry claims	...	...	5·00	22·33	...	...	2·90	49·00	157·44	...
Carlaminda ...	...	Voided leases	...	...	...	...	...	...	...	947·32	524·72	3·30
Do. ...	...	Sundry claims	...	...	...	...	...	...	...	114·00	71·96	...
Field's Find	(986)	Baldwin	...	...	...	...	...	...	...	80·00	56·42	...
Do. ...	907, (909) ...	Brown's Reward leases ...	...	...	11·30	29·91	...	...	...	4,432·55	3,787·81	...
Do. ...	(985)	Churchill	...	...	...	...	...	...	...	70·00	38·45	...
Do. ...	902	Field's Find Extended	...	...	...	...	...	...	10·38	31·50	31·35	...
Do. ...	(984)	Mt. Guthrie	...	...	...	...	...	...	...	201·50	40·10	...
Do. ...	990	Mount William	...	...	11·50	3·18	...	...	...	11·50	3·18	...
Do. ...	...	Voided leases	...	...	...	...	...	...	209·34	36,207·05	26,833·68	...
Do. ...	...	Sundry claims	...	...	356·50	47·84	...	5·77	163·59	1,410·25	900·12	...
Goodingnow...	980	Lake View	...	...	825·00	1,205·18	...	...	...	1,398·00	2,045·08	...
Do. ...	974	Princess Mary	...	...	...	...	...	...	...	38·00	36·01	...
Do. ...	...	Voided leases	...	...	...	...	...	146·70	272·73	28,696·56	34,125·20	...
Do. ...	...	Sundry claims	...	...	75·50	54·21	...	148·00	80·76	3,384·50	1,899·74	...
Gullewa ...	...	Voided leases	...	...	...	...	...	...	·78	23,074·50	15,137·98	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	21·07	711·75	588·21	...
Kirkalucka ...	...	Sundry claims	...	...	...	...	...	...	...	8·80	4·01	...
Messenger's Patch	(987)	Brilliant	...	...	11·00	6·60	...	...	...	11·00	6·60	...
Do. ...	880, 897, 988 ...	Brilliant G.M. Co., N.L.	...	...	9,116·00	4,212·70	169·80	...	...	17,508·00	8,619·74	502·98
Do. ...	880	(Gnows Nest)	...	...	...	...	...	...	...	10,938·00	9,827·20	158·06
Do. ...	880, 897 ...	(Gnows Nest Gold Mines, Ltd.) ...	...	...	...	...	...	...	...	6,175·00	6,709·40	363·97
Do. ...	...	Voided leases	...	...	...	...	...	...	321·80	591·76	383·10	...
Do. ...	...	Sundry claims	...	9·69	37·00	83·93	...	463·12	333·98	490·55	377·71	...
Mt. Farmer ...	...	Voided leases	...	...	...	...	...	...	...	64·00	40·19	...
Do. ...	...	Sundry claims	...	...	58·50	25·80	...	...	...	63·50	32·02	...
Mt. Gibson ...	...	Voided leases	...	...	...	...	...	...	6·44	434·50	803·57	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	...	76·00	40·84	...

TABLE IV.—*Production of Gold and Silver from all sources, etc.*—continued.

YALGOO GOLDFIELD—*continued.*

Mining Centre.	Number of Lease.	Registered Name of Company or Lease.	Total for 1928.					Total Production.				
			Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.
			Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.
Ninghan ...	...	Voided leases	...	...	...	...	...	...	...	10·00	1·41	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	...	5·00	17·89	...
Noongal ...	953	Revival	...	...	115·00	35·25	...	...	...	1,475·00	789·46	...
Do. ...	...	Voided leases	...	...	...	...	...	...	15·86	3,086·95	1,847·66	...
Do. ...	...	Sundry claims	...	...	22·00	9·31	...	34·55	64·97	732·75	455·16	...
Nyounda ...	...	Voided leases	...	...	...	...	...	...	217·63	416·00	183·91	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	4·28	44·00	33·24	...
Pinyalling ...	...	Voided leases	...	...	...	...	...	...	1·36	2,281·60	902·03	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	2·59	160·50	132·57	...
Rothsay ...	...	Voided leases	...	...	...	...	...	...	...	9,360·25	3,560·38	...
Do. ...	...	Sundry claims	...	...	282·50	105·37	...	...	...	2,081·25	957·29	...
Wadgingarra	...	Voided leases	...	...	...	...	...	...	...	541·61	600·91	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	...	71·50	38·21	...
Warda Warra	...	Voided leases	...	...	...	...	...	...	...	51·50	24·70	...
Do. ...	...	Sundry claims	...	...	259·00	99·08	...	...	...	386·00	195·78	...
Warriedar ...	...	Voided leases	...	...	...	...	...	...	...	12,122·00	4,313·13	7·30
Do. ...	...	Sundry claims	...	...	11·00	7·20	...	...	2·84	2,042·10	741·89	...
Yalgoo ...	...	Voided leases	...	...	...	...	...	...	3·23	6,314·50	9,965·18	...
Do. ...	...	Sundry claims	...	...	7·50	1·81	...	...	19·89	864·00	520·56	...
Yuin	...	Voided leases	...	...	...	...	...	...	127·12	66,048·50	27,365·63	130·13
Do. ...	...	Sundry claims	...	...	...	...	...	...	4·70	279·50	59·20	...
		From Goldfields generally:—										
		Sundry Parcels treated at:										
		Brown's Reward Battery	...	...	...	136·83	...	...	...	...	209·43	...
		State Battery, Goodingnow (Paynes Find) ...	...	...	...	...	...	...	...	38·50	1,957·40	...
		State Battery, Warriedar	...	...	...	109·72	...	...	...	...	3,884·17	...
		Various Works	...	...	...	...	...	9·42	...	664·00	1,795·78	...
		Reported by Banks and Gold Dealers	...	...	...	...	...	804·93	...	...	...	...
		Total	...	**9·69**	**11,204·30**	**6,196·25**	**169·80**	**1,612·49**	**1,888·24**	**246,860·10**	**173,887·43**	**1,192·41**

MOUNT MORGANS DISTRICT.

Australia United	...	Voided leases	...	...	...	...	...	...	1,911·63	15,913·69	23,205·76	1·76
Do. ...	...	Sundry claims	...	...	...	...	...	...	580·98	799·25	2,072·62	...
Eucalyptus ...	...	Sundry claims	...	...	...	...	...	...	...	88·50	107·04	...
Federation Well	...	Voided leases	...	...	...	...	...	...	...	1,248·50	1,782·71	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	...	108·07	64·68	...
Korong ...	...	Voided leases	...	...	...	...	...	17·95	72·23	2,722·00	3,473·45	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	34·97	279·28	232·89	...
Linden ...	346F, [1024R] ...	Great Carbine	...	...	...	...	...	...	...	136·50	41·07	...
Do. ...	341F, [903R], (343F [985R])	Torquay leases	...	...	2,022·00	1,157·80	...	...	...	8,245·53	4,964·77	·68
Do. ...	...	Voided leases	...	...	...	...	...	...	...	26,124·75	12,939·25	...
Do. ...	...	Sundry claims	20·65	1·86	42·00	53·44	...	24·94	6·81	1,296·00	1,009·41	...
Mt. Margaret	...	Voided leases	...	...	...	...	...	·37	...	6,412·89	4,290·53	12·55
Do. ...	...	Sundry claims	1·77	...	...	...	...	18·38	66·95	366·10	289·21	...
Mt. Morgans	5F, (10F), (19F), (22F), (32F), (73F)	(Westralia Mt. Morgans G.M. Co., Ltd.)	...	...	...	...	...	...	...	575,148·00	294,758·28	5,552·63
Do. ...	(7F), (20F), (21F)	(Westralia Mt. Morgans G.M. Co., Ltd.)	...	...	...	...	...	...	...	18,261·00	8,127·69	...
Do. ...	5F, (6F), (7F), (10F), (19F), (20F), (22F), (32F), 301F	Westralia Mt. Morgans Mines, N.L. ...	...	...	910·00	1,603·20	...	...	...	198,103·82	56,486·89	...
Do. ...	...	Voided leases	...	...	...	...	...	...	76·56	38,923·75	22,769·63	77·86
Do. ...	...	Sundry claims	8·31	103·56	6·50	18·82	...	20·79	126·22	1,398·79	1,723·04	...
Murrin Murrin	...	Voided leases	...	...	...	...	...	10·43	222·93	128,706·22	101,163·09	29·60
Do. ...	...	Sundry claims	...	...	...	...	...	2·69	245·90	1,615·55	1,686·52	...
Redcastle ...	...	Voided leases	...	...	...	...	...	4·49	436·54	2,509·95	2,169·63	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	103·58	139·00	163·01	...
Yundamindera	...	Voided leases	...	...	...	...	...	...	...	2,553·50	2,093·61	...
Do. ...	...	Sundry claims	...	...	15·50	8·53	...	...	2·35	900·65	600·25	...
	From District generally :—											
	Sundry Parcels treated at :											
	Hainault Sulphide Plant, Kalgoorlie		...	...	...	...	...	...	...	127·21	83·91	...
	State Battery, Linden		...	...	...	...	...	...	...	10·00	1,981·34	...
	Westralia Mt. Morgans Works		...	...	...	...	...	...	...	...	153·10	...
	Various Works		...	...	...	...	...	...	...	914·50	3,509·55	99·97
	Reported by Banks and Gold Dealers		...	...	...	...	...	1,746·60	32·47	...	...	...
		Total	**30·73**	**105·42**	**2,996·00**	**2,841·79**	...	**1,846·64**	**3,920·12**	**1,033,053·00**	**552,042·93**	**5,775·05**

TABLE IV.—*Production of Gold and Silver from all sources, etc.*—continued.

MT. MARGARET GOLDFIELD—*continued.*

MOUNT MALCOLM DISTRICT.

Mining Centre.	Number of Lease.	Registered Name of Company or Lease.	Total for 1928.					Total Production.				
			Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.
			Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.
Cardinia ...	...	Voided leases	...	...	...	...	...	13·87	1,591·66	1,631·74	3,613·33	...
Do. ...	...	Sundry claims	·85	...	...	...	...	4·25	24·70	60·00	89·52	...
Diorite King	...	Voided leases	...	...	...	...	...	...	845·23	34,659·03	31,744·34	24·05
Do. ...	...	Sundry claims	...	...	...	...	...	11·21	148·62	2,664·80	3,190·15	...
Dodger's Well	...	Voided leases	...	...	...	...	...	...	57·90	1,299·30	1,927·94	...
Do. ...	...	Sundry claims	...	...	8·00	18·80	...	·95	3·37	806·75	683·93	...
Lake Darlot...	...	Voided leases	...	...	...	...	...	...	...	1,048·11	450·52	...
Do. ...	...	Sundry claims	1·83	10·74	...	...	...	64·87	68·99	599·20	146·05	...
Leonora ...	198c	(Eastern)	...	...	...	...	...	...	...	302·00	321·72	...
Do. ...	190c, 198c, 207c, 352c, 353c, 380c, 446c, 447c, (450c), (476c), 489c, 490c, 504c, (523c), 741c, 742c, 807c, 809c, 811, 812c, (813c), (814c), 980c, (981c), 1082c, (1225c), (1226c), (1227c), (1228c), (1229c), (1230c), (1231c), (1232c), 1259c, (1291)c, (1292c), 1341c, 1342c, (1343c), (1344c), (1345c), (1346c), (1347c)	Sons of Gwalia, Ltd.	...	...	108,086·00	30,916·23	2,182·63	...	...	3,172,296·67	1,454,916·88	94,229·48
Do. ...	198c, 1082c ...	(Sons of Gwalia South G.M. Co., N.L.)	...	...	...	...	...	...	...	631·00	903·61	...
Do. ...	198c, 1082c, (1257c), (1258c), 1259c. (1284c), (1285c), (1300c), (1301c)	(Sons of Gwalia South G.Ms., Ltd.) ...	...	...	...	...	...	...	...	98,239·00	51,593·99	8·66

Do. ...	198c, 1082c, 1259c	(Sons of Gwalia South G.Ms., Ltd.) ...	...	...	...	...	...	...	...	...	9.909·00	3,169·89	...
Do. ...	...	Voided leases	...	...	...	...	...	...	1,852·57	162,734·95	87,867·40	10·71
Do. ...	...	Sundry claims	...	...	15·50	8·45	...	30·31	330·67	10,766·30	9,505·63	...
Malcolm ...	...	Voided leases	...	...	...	...	...	...	47·07	62,301·78	47,425·54	...
Do. ...	...	Sundry claims	...	...	...	...	...	5·75	26·50	3,073·65	2,121·73	...
Mertondale ...	...	Voided leases	...	...	...	...	...	...	...	88,663·00	60,840·00	1,497·58
Do. ...	...	Sundry claims	...	...	...	...	...	1·82	63·04	1,092·46	1,538·97	...
Mt. Clifford ...	1329c	Victory No. 1	...	...	40·00	7·06	...	...	249·29	2,515·46	7,861·72	...
Do. ...	...	Voided leases	...	...	...	...	...	...	1,364·45	3,381·50	7,339·23	...
Do. ...	...	Sundry claims	4·72	3·61	52·00	48·13	...	53·98	277·44	1,094·75	1,690·04	...
Pig Well ...	1547c	Starlight	...	...	...	...	...	...	...	12·00	3·45	...
Do. ...	...	Voided leases	...	...	...	...	...	...	...	13,575·32	14,673·13	63·68
Do. ...	...	Sundry claims	...	...	...	...	...	...	34·61	2,738·40	1,160·33	...
Randwick ...	...	Voided leases	...	...	...	...	...	...	239·49	8,065·15	8,671·57	...
Do. ...	...	Sundry claims	...	...	...	...	...	66·57	159·37	1,282·14	944·20	...
Webster's Find	...	Voided leases	...	...	...	...	...	30·30	...	21,760·00	13,970·17	...
Do. ...	...	Sundry claims	...	...	...	...	...	36·84	16·52	1,397·80	939·58	...
Wilson's Creek	...	Voided leases	...	...	...	...	...	...	...	333·50	168·27	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	4·24	5·00	19·04	...
Wilson's Patch	...	Voided leases	...	...	...	...	...	...	99·38	27,395·10	12,638·18	1·05
Do. ...	...	Sundry claims	...	...	...	...	...	4·68	13·73	814·00	1,086·36	...
	From District generally :—											
	Sundry Parcels treated at :									103·00	11,334·80	98·14
	State Battery, Leonora		...	...	...	...	...	...	...	371·50	7,151·14	20·12
	Various Works		...	...	...	...	...	...	...	...	...	...
	Reported by Banks and Gold Dealers		22·91	...	...	...	...	2,506·05	131·00			
	Total		**30·31**	**14·35**	**108,201·50**	**30,998·67**	**2,182·63**	**2,831·45**	**7,649·84**	**3,737,623·36**	**1,851,702·35**	**95,953·47**

MOUNT MARGARET DISTRICT.

Burtville ...	2138T	Nil Desperandum	...	...	58·50	176·24	...	...	...	654·37	2,017·73	...
Do. ...	...	Voided leases	...	...	...	...	...	2·29	413·80	66,801·18	103,935·19	275·27
Do. ...	...	Sundry claims	1·90	...	...	...	...	1·90	133·54	3,261·90	2,942·79	...
Duketon ...	...	Voided leases	...	...	...	...	...	3·54	3,213·21	31,485·42	22,318·21	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	65·43	238·50	370·38	...
Eagle's Nest	...	Voided leases	...	...	...	...	...	...	145·34	331·00	1,215·78	...
Do. ...	...	Sundry claims	...	...	...	...	...	11·45	428·41	147·50	133·96	...
Erlistoun ...	2113T	Baneygo North	...	...	...	...	...	...	29·31	670·00	213·46	...
Do. ...	2141T, 2145T ...	King of Creation leases ...	...	...	460·00	157·23	...	...	...	1,514·00	638·97	...
Do. ...	...	Voided leases	...	...	...	...	...	...	11·66	27,012·07	18,461·35	...
Do. ...	...	Sundry claims	...	...	...	...	...	1,179·43	116·81	2,197·24	1,976·72	...

TABLE IV.—*Production of Gold and Silver from all sources, etc.*—continued.

MT. MARGARET GOLDFIELD—*continued.*

MOUNT MARGARET DISTRICT—*continued.*

Mining Centre.	Number of Lease.	Registered Name of Company or Lease.	Total for 1928.					Total Production.				
			Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.
			Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.
Euro	...	Voided leases	...	...	...	...	...	...	65·14	91,556·25	37,582·89	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	46·52	259·50	370·57	...
Laverton ...	715T, 806T, (1206T), (1207T), (1483T), (1523T), (1524T), (1525T), (1542T), (1544T), (1548T)	(Kalgoorlie and Boulder Firewood Co., Ltd.)	...	...	...	...	...	...	...	71,802·00	25,003·11	3,364·01
Do. ...	715T, 806T, (1206T), (1207T), (1483T), (1523T), (1524T), (1525T), (1542T), (1544T), (1548T)	(Lancefield G.M. Co., Ltd.)	...	...	...	...	...	...	...	102,179·78	39,402·81	...
Do. ...	715, 806T, (1206T), (1207T), (1483T), (1523T), (1524T), (1525T), (1542T), (1544T), (1548T)	(Lancefield G.M. Co., Ltd.)	...	...	...	...	...	...	...	153,829·00	58,842·47	5,824·39
Do. ...	715T, 806T, (1206T), (1207T), (1483T), (1523T), (1524T), (1525T), (1542T), (1544T), (1548T)	(Lancefield G.M. Co., Ltd.)	...	...	...	...	...	...	...	260,749·00	103,535·54	21,612·29
Do. ...	715T, 806T, (1206T), (1523T), (1524T), (1525T), (1542T), (2050T), (2051T)	Lancefield G.Ms., Ltd.	...	...	...	598·01	...	...	...	352,730·05	132,745·39	21,081·58
Do. ...	715T, 806T ...	Lancefield leases	...	...	...	191·30	...	...	...	...	191·30	...
Do. ...	(2200T)	Pinnacles	...	...	119·00	37·14	...	2·63	...	241·00	60·90	...
Do. ...	...	Voided leases	...	...	...	...	...	17·66	2,024·11	457,265·74	260,867·84	4,674·69
Do. ...	...	Sundry claims	...	20·22	...	17·78	...	209·18	1,416·70	5,196·45	5,030·17	...
Mt. Barnicoat ...	...	Voided leases	...	...	...	...	...	...	...	652·00	359·12	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	...	23·00	23·37	...
Mt. Shenton ...	...	Voided leases	...	...	...	...	...	...	...	15·00	26·65	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	...	39·25	52·69	...
Quartz Hill ...	...	Voided leases	...	...	...	...	...	...	...	10·00	3·86	...
Red Hill ...	...	Sundry claims	...	...	...	...	...	...	...	27·00	13·76	...

From District Generally :—													
Sundry Parcels treated at													
State Battery, Laverton		...	...	...	...	...	...	...	97·50	2,865·39	15·64
Various Works		...	...	...	...	...	...	...	157·00	9,798·34	...
Reported by Banks and Gold Dealers		2·80	...	...	...	...	2,032·29	...	...	...	...
Total		**4·70**	**20·22**	**637·50**	**1,177·70**	**...**	**3,460·37**	**8,109·98**	**1,631,142·70**	**831,000·71**	**56,847·87**

North Coolgardie Goldfield.

MENZIES DISTRICT.

Comet Vale ...	5217z	(Gladsome)	...	...	...	...	...	...	...	...	10,879·50	8,678·16	95·29
Do. ...	5217z, (5333z), (5380z), (5476z)	(Gladsome leases)	...	...	...	...	...	...	...	...	64,875·00	50,329·09	1,410·36
Do. ...	5507z	Lake View	...	...	51·50	13·51	...	...	...	...	51·50	13·51	...
Do. ...	5217z, 5476z ...	Sand Queen Gladsome Mines, N.L. ...	...	...	6,549·00	3,050·97	...	...	...	...	6,549·00	3,050·97	...
Do. ...	...	Voided leases	...	...	...	...	...	...	419·74	148,246·72	119,318·18	3,839·28
Do. ...	...	Sundry claims	...	...	20·00	10·33	...	...	34·99	947·54	646·13	...
Goongarrie ...	...	Voided leases	...	...	...	...	...	·94	1,027·51	27,198·29	17,428·84	...
Do. ...	...	Sundry claims	3·97	148·57	11·25	51·62	...	45·52	940·52	1,394·52	1,747·69	...
Menzies ...	5505z	Golden Age	...	...	199·75	569·41	...	...	...	318·75	1,176·27	...
Do. ...	5423z	(Lady Shenton)	...	...	...	...	...	...	...	5,256·58	4,185·99	...
Do. ...	5423z, 5485z ...	Lady Shenton G.M. Syndicate, Menzies, N.L.	...	...	15·00	3·26	...	...	...	73·00	31·50	...
Do. ...	5510z	Macaroni	...	...	32·50	9·77	...	...	...	32·50	9·77	...
Do. ...	5484z	Warrior	...	...	160·00	69·56	...	...	...	1,320·00	609·21	...
Do. ...	...	Voided leases	...	...	...	...	...	45·42	1,070·55	889,383·47	696,818·53	11,341·73
Do. ...	...	Sundry claims	3·18	...	274·00	252·83	...	48·75	372·98	20,880·39	15,784·16	776·49
Mt. Ida ...	(5506z)	D.D.	...	...	...	...	...	...	...	77·00	29·14	...
Do. ...	(5480z), (5481z)...	Unexpected leases	...	...	...	...	...	...	...	765·00	503·57	...
Do. ...	(5481z)	(Unexpected South)	...	...	...	...	...	...	...	36·00	29·45	...
Do. ...	...	Voided leases	...	...	...	...	...	...	78·26	57,887·37	68,231·08	106·63
Do. ...	...	Sundry claims	...	...	167·00	111·42	...	43·79	11·95	5,864·00	3,415·20	...
From District generally :—													
Sundry Parcels treated at :													
Lady Harriet Battery		...	...	...	235·16	...	...	...	279·50	5,264·18	30·00
Menzies Mining & Exploration Corporation, Ltd., Works		...	...	...	...	...	...	...	639·50	732·04	...
State Battery, Mt. Ida		...	...	...	...	...	...	...	1,842·25	5,028·57	...
Various Works		...	...	...	...	...	...	...	1,872·80	31,977·34	1,624·70
Reported by Banks and Gold Dealers		8·70	...	...	...	...	980·38	195·48	...	...	...
Total		**15·85**	**148·57**	**7,480·00**	**4,377·84**	**...**	**1,164·80**	**4,151·98**	**1,246,670·18**	**1,035,038·57**	**19,224·48**

TABLE IV.—*Production of Gold and Silver from all sources, etc.*—continued.

NORTH COOLGARDIE GOLDFIELD—*continued.*

ULARRING DISTRICT.

Mining Centre.	Number of Lease.	Registered Name of Company or Lease.	Total for 1928.					Total Production.				
			Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.
			Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.
Davyhurst ...	...	Voided leases	...	...	...	...	...	2·93	138·99	155,644·73	123,063·43	5,403·14
Do. ...	...	Sundry claims	...	...	...	...	...	...	30·12	5,999·15	3,219·41	...
Diemel's Find	...	Sundry claims	...	...	...	...	...	...	7·37	102·50	119·13	...
Mulline ...	998U, 999U ...	Riverina Proprietary leases ...	...	...	1,572·00	722·66	...	...	...	1,572·00	722·66	...
Do. ...	...	Voided leases	...	...	...	...	...	...	274·09	98,230·72	98,844·73	530·75
Do. ...	...	Sundry claims	...	...	...	...	...	...	53·82	7,122·60	5,061·70	·69
Mulwarrie ...	...	Voided leases	...	...	...	...	...	...	56·84	18,440·68	25,625·54	38·47
Do. ...	...	Sundry claims	...	...	...	...	...	...	21·45	2,099·07	1,888·49	...
Ularring ...	...	Voided leases	...	...	...	...	...	...	563·34	9,429·60	13,647·97	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	...	143·00	113·15	...
		From District generally:—										
		Sundry Parcels treated at:										
		Hannans Central Battery, Kalgoorlie	...	...	...	...	...	...	...	18·40	4·66	...
		State Battery, Mulline	...	...	...	313·59	...	...	...	538·50	14,075·56	...
		Various Works	...	...	...	...	...	...	15·82	799·93	5,475·67	...
		Reported by Banks and Gold Dealers	...	...	...	...	...	19·24	·77	...	...	...
		Total	...	...	1,572·00	1,036·25	...	22·17	1,162·61	300,140·88	291,862·10	5,973·05

NIAGARA DISTRICT.

Desdemona ...	...	Voided leases	...	...	...	...	...	...	5·73	9,585·25	7,471·39	12·04
Do. ...	...	Sundry claims	...	...	...	...	...	...	8·99	1,331·70	634·19	...
Kookynie ...	(783G)	Altona	...	...	12·00	17·59	...	...	...	12·00	17·59	...
Do. ...	...	Voided leases	...	...	...	...	...	...	267·56	735,397·93	389,399·99	5,375·97
Do. ...	...	Sundry claims	...	...	20·50	12·33	...	39·08	93·85	4,952·35	4,452·42	...
Niagara ...	...	Voided leases	...	...	...	...	...	...	104·54	84,472·50	51,887·97	...
Do. ...	...	Sundry claims	4·81	...	...	...	...	28·10	70·23	9,880·41	6,084·35	...
Tampa ...	...	Voided leases	...	...	...	...	...	...	35·94	49,285·87	22,246·08	174·24
Do. ...	...	Sundry claims	...	...	19·33	113·40	...	28·21	244·17	3,240·68	2,026·03	...

Twin Hills ...	...	Sundry claims	...	...	58·30	46·09	...	...	...	58·30	46·09	...
	From District generally :—													
	Sundry Parcels treated at :													
		Grafter Battery	...	...	...	...	...	...	...	98·00	448·91	...
		Hainault Sulphide Plant, Kalgoorlie	...	...	...	...	...	...	...	...	9·03	...
		State Battery, Niagara	...	...	...	...	...	...	...	671·50	8,955·70	...
		Various Works	...	...	...	...	...	...	...	451·00	6,509·90	41·17
		Reported by Banks and Gold Dealers	...	...	...	...	...	1,435·20	787·38	...	...	...
		Total	**4·81**	...	**110·13**	**189·41**	...	**1,530·59**	**1,618·39**	**899,437·49**	**500,189·64**	**5,603·42**

YERILLA DISTRICT.

Edjudina ...	1078R	Ace of Hearts	...	...	...	...	...	...	...	84·00	56·82	...
Do. ...	1011R	Neta	...	...	...	...	...	...	...	156·75	102·56	...
Do. ...	(1010R), 1011R ...	(Neta leases)	...	...	...	...	...	...	...	407·00	340·01	...
Do. ...	...	Voided leases	...	...	...	...	...	...	18·44	32,387·20	41,851·69	37·79
Do. ...	...	Sundry claims	...	...	...	...	...	...	21·26	4,055·33	3,305·49	...
Eucalyptus ...	...	Voided leases	...	...	...	...	...	...	2,864·77	1,351·35	3,020·68	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	367·50	362·50	381·82	...
Linden ...	1024R, [346F] ...	Great Carbine	...	...	...	...	...	...	...	67·75	20·30	...
Do. ...	903R, [341F], (985R), ([343F])	Torquay leases	...	...	...	...	...	...	...	325·68	107·45	...
Do. ...	903R, [341F], (904R), (985R), ([343F]), (992R)	(Westralia United Goldfields, Ltd.) ...	...	...	...	...	...	...	...	1,995·00	1,452·42	...
Do. ...	...	Voided leases	...	...	...	...	...	7·53	553·16	17,179·60	22,098·74	...
Do. ...	...	Sundry claims	...	...	...	...	...	77·81	35·11	6,493·25	4,798·42	...
Mt. Celia ...	...	Voided leases	...	...	...	...	...	...	...	14·00	5·39	...
Mt. Howe ...	...	Sundry claims	...	...	...	...	...	...	...	5·00	11·13	...
Mt. Remarkable	...	Voided leases	...	...	...	...	...	...	17·74	528·72	415·09	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	...	4·00	1·32	...
Pingin ...	...	Voided leases	...	...	...	...	...	...	46·99	14,637·80	10,306·68	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	99·36	3,422·35	2,297·51	...
Yarri ...	...	Voided leases	...	...	...	...	...	6·30	87·08	37,835·25	19,760·20	2·00
Do. ...	...	Sundry claims	...	...	...	...	...	·87	5·31	6,571·35	3,321·74	...
Yerilla ...	...	Voided leases	...	...	...	...	...	...	3,089·51	15,619·21	12,313·06	13·93
Do. ...	...	Sundry claims	...	...	...	...	...	19·30	15·88	2,401·00	1,338·07	...
Yilgangie ...	...	Voided leases	...	...	...	...	...	...	...	218·75	295·45	...
Do. ...	...	Sundry claims	...	...	...	...	...	121·67	29·83	40·50	65·53	...
Yundamindera	...	Voided leases	...	...	...	...	...	...	80·47	69,067·85	46,004·87	5·82
Do. ...	...	Sundry claims	...	...	...	...	...	...	85·22	3,151·25	2,740·75	...

TABLE IV.—*Production of Gold and Silver from all sources, etc.*—continued.

NORTH COOLGARDIE GOLDFIELD—*continued.*

YERILLA DISTRICT—*continued.*

Mining Centre.	Number of Lease.	Registered Name of Company or Lease.	Total for 1928.					Total Production.				
			Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.
			Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.
	From District generally :—											
	Sundry Parcels treated at :											
	Neta Battery		...	...	...	...	...	...	...	...	327·37	...
	State Battery, Linden		...	...	...	...	...	...	...	72·00	4,030·90	...
	State Battery, Yarri		...	...	...	...	...	...	...	251·50	5,016·74	3·50
	Various Works		...	...	...	...	...	2·17	...	858·35	7,161·17	...
	Reported by Banks and Gold Dealers		1·27	...	...	...	...	1,012·83	154·74	...	...	...
	Total		**1·27**	...	...	...	...	**1,248·48**	**7,572·37**	**219,564·29**	**192,949·37**	**63·04**
Broad Arrow Goldfield.												
Bardoc ...	1833w	Zoroastrian	...	...	...	...	...	...	23·25	22·45	106·77	...
Do. ...	...	Voided leases	...	...	...	...	...	...	1,863·68	73,236·55	51,823·64	203·60
Do. ...	...	Sundry claims	...	...	...	1·99	...	53·82	578·02	3,607·11	3,136·27	...
Black Flag ...	...	Voided leases	...	...	...	...	...	27·81	373·99	40,332·13	24,451·48	...
Do. ...	...	Sundry claims	...	2·32	...	24·80	...	710·99	182·81	2,181·08	2,087·82	...
Broad Arrow	1771w	North Duke	...	...	...	...	...	...	1,533·79	153·30	592·36	...
Do. ...	1933w	Oversight Tara United ...	...	...	...	...	...	...	457·99	187·79	448·52	...
Do. ...	...	Voided leases	...	...	...	...	...	54·85	6,915·18	119,584·24	102,266·10	18·85
Do. ...	...	Sundry claims	...	...	...	...	...	987·53	1,340·52	9,430·20	7,098·75	...
Canegrass ...	...	Voided leases	...	...	...	...	...	...	...	89·10	133·13	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	218·84	39·00	268·29	...
Carnage ...	...	Voided leases	...	...	...	...	...	...	...	138·00	251·97	...
Do. ...	...	Sundry claims	...	...	9·00	3·96	...	...	...	90·00	61·22	...
Paddington ...	...	Voided leases	...	...	...	...	...	5,557·72	257·75	175,109·58	82,198·30	18·96
Do. ...	...	Sundry claims	...	17·87	...	20·80	...	1,714·16	20·00	10,544·48	6,725·83	...
Siberia ...	1941w	Bent Tree	...	...	22·00	23·85	...	...	...	22·00	23·85	...
Do. ...	1336w, 1399w ...	Associated Northern Blocks (W.A.), Ltd.	...	...	...	42·67	...	...	...	20,401·61	12,604·36	...
Do. ...	1399w, (1424w), (1429w), (1442w), (1655w)	(Associated Northern Blocks (W.A.), Ltd.)	...	...	...	...	...	...	...	247,585·84	91,053·70	1,664·70

Do. ...	1371w	Gimblet South	...	...	184·50	62·08	...	...	...	72,585·72	12,269·44	...		
Do. ...	1399w	(Gimblet South Extended) ...	...	...	...	...	...	...	...	525·00	835·44	...		
Do. ...	1399w, (1424w), (1429w), (1442w)	(Gimblet South Extended leases)	...	...	...	...	...	...	...	215·00	39·98	...		
Do. ...	1289w [716s] ...	Lady Evelyn	...	...	...	12·85	...	...	2·16	902·00	1,590·04	...		
Do. ...	1289w (1308w) ...	Lady Evelyn leases	...	...	...	...	...	...	25·26	5,376·25	5,267·70	...		
Do. ...	1906w	Orinda	...	...	...	...	...	...	...	2,456·25	1,851·67	...		
Do. ...	1914w	Renown	...	...	12·00	6·31	...	...	595·62	158·00	444·25	...		
Do. ...	1375w	(Siberia Consols)	...	...	...	...	...	...	41·58	1,013·50	3,136·03	...		
Do. ...	1375w	Siberia Consols	...	...	...	...	...	...	46·30	709·75	1,393·84	...		
Do. ...	1375w, (1610w), (1720w)	(Siberia Consols G.M. Co., N.L.) ...	...	...	...	...	...	...	39·23	352·50	598·52	...		
Do. ...	1336w	(Slippery Gimblet)	...	...	...	...	...	...	...	26,110·50	8,217·79	...		
Do. ...	1336w, (1338w), (1419w)	(Slippery Gimblet leases) ...	...	...	...	...	...	...	...	6,897·00	2,528·10	...		
Do. ...	1936w	Wentworth	...	...	446·25	201·30	...	...	...	1,979·75	833·30	...		
Do. ...	...	Voided leases	...	...	...	...	...	...	789·17	25,880·67	14,982·12	...		
Do. ...	...	Sundry claims	15·80	9·59	347·00	200·44	...	253·88	868·51	14,764·79	9,745·62	...		
Smithfield ...	...	Voided leases	...	...	...	...	...	...	...	1,027·00	200·90	...		
Do. ...	...	Sundry claims	...	...	...	...	...	...	23·79	82·00	185·24	...		
	From Goldfield generally :—													
	Sundry Parcels treated at :													
	Hannans Central Works, Kalgoorlie		...	...	...	...	...	...	...	8·70	15·47	...		
	Hainault Sulphide Plant, Kalgoorlie		4·49	1·10	...	...	...	4·49	1·24	...	9·57	...		
	Pole Works		...	...	...	159·67	...	...	...	...	515·74	...		
	State Battery, Ora Banda		...	...	...	342·16	...	...	...	72·05	2,915·72	...		
	State Battery, Siberia		...	...	...	...	...	...	...	40·00	1,102·96	...		
	Zoroastrian Works		...	...	...	...	...	...	...	116·50	1,082·23	...		
	Various Works		...	...	...	...	...	2,271·17	...	16,688·67	32,455·14	278·85		
	Reported by Banks and Gold Dealers		35·69	...	...	...	...	8,009·68	...	...	2·40	...		
	Total		**55·98**	**30·88**	**1,020·75**	**1,102·88**	...	**19,646·10**	**16,198·68**	**880,716·06**	**487,551·57**	**2,184·96**		

North-East Coolgardie Goldfield.

KANOWNA DISTRICT.

Black Swan	...	Voided leases	...	...	...	...	...	...	...	160·00	141·76	...		
Gambier ...	...	Voided leases	...	...	...	...	...	...	38·73	12,729·00	6,638·30	·07		
Do. ...	...	Sundry claims	...	...	...	...	...	24·70	245·94	858·75	750·42	...		
Gindalbie ...	...	Voided leases	...	...	...	...	...	...	19·94	43,613·28	39,438·75	38·31		
Do. ...	...	Sundry claims	...	...	...	...	...	...	674·82	1,061·77	1,240·06	...		
Gordon ...	(1469x)	Sirdar	...	...	...	48·94	...	...	51·27	639·55	490·38	...		
Do. ...	1470x	Sirdar	...	...	82·00	332·68	...	...	...	82·00	332·68	...		
Do. ...	...	Voided leases	...	...	...	...	...	...	487·97	47,623·23	15,270·05	...		
Do. ...	...	Sundry claims	...	...	...	...	...	...	99·41	666·50	583·94	...		
Kanowna ...	(1461x)	Golden Eagle : North White Feather G.M.s, Ltd.	...	...	...	...	...	...	15·56	66·00	75·01	...		
Do. ...	1389x	Golden Valley	...	...	45·00	63·86	...	...	...	6,887·13	5,396·02	...		

TABLE IV.—*Production of Gold and Silver from all sources, etc.*—continued.

NORTH-EAST COOLGARDIE GOLDFIELD—*continued.*

KANOWNA DISTRICT—*continued.*

Mining Centre.	Number of Lease.	Registered Name of Company or Lease.	Total for 1928.					Total Production.				
			Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.
			Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.
Kanowna ...	1464x	Golden Valley West	...	...	592·00	199·27	...	...	...	1,437·00	589·15	...
Do. ...	1468x	Kanowna Main Lode	...	68·00	32·00	74·05	...	...	68·00	182·00	114·54	...
Do. ...	(1466x)	Kanowna Red Hill G.M. Co., N.L.	...	...	...	...	...	...	...	3,076·00	1,339·05	...
Do. ...	(12x), (13x), (14x), (15x), (18x), (19x), (72x), (855x), (974x), (1035x), (1103x), (1263x), (1278x), (1438x)	North White Feather G.Ms., Ltd. ...	...	...	...	...	...	...	...	56,060·27	25,299·82	...
Do. ...	(12x), (13x), (14x), (15x), (855x), (1001x), (1012x), (1103x), (1107x), (1108x), (1109x)	(White Feather Main Reefs, Ltd.) ...	...	...	...	...	...	...	...	123,327·56	82,334·52	1,675·68
Do. ...	(9x), (10x), (12x), 13x, (72x), (83x), (201x), (855x), (1001x), (1012x), (1108x), (1249x)	(White Feather Main Reefs (1906), Ltd.)	...	...	...	...	...	...	20·45	24 393·00	9,138·31	...
Do. ...	...	Voided leases	...	...	...	...	...	14·31	4,400·52	466,190·59	254,661·82	806·56
Do. ...	...	Sundry claims	...	...	122·25	48·30	...	88·95	1,871·33	15,097·52	8,055·67	1·50
Mulgarrie ...	...	Voided leases	...	...	...	...	...	...	1,216·63	6,902·26	4,197·98	...
Do. ...	...	Sundry claims	...	...	3·50	9·52	...	...	13·29	1,187·50	606·16	...
Six-Mile ...	...	Voided leases	...	...	...	...	...	...	1,595·63	559·00	767·72	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	31·44	141·50	103·37	...
	From District generally :—											
	Sundry Parcels treated at :											
	Old Cement Works (Martin's Battery) ...		...	...	...	26·54	...	...	...	11,043·78	15,678·27	...
	Various Works		...	...	...	...	...	330·42	867·52	147,874·26	132,820·99	...
	Reported by Banks and Gold Dealers		23·73	...	...	...	...	104,169·69	·86	...	85·64	...
		Total	**23·73**	**68·00**	**876·75**	**803·16**	**...**	**104,628·07**	**11,719·31**	**971,859·45**	**606,150·38**	**2, [illegible]**

KURNALPI DISTRICT.

Jubilee ...	...	Voided leases	...	...	...	...	...	...	145·13	1,821·25	1,408·51	...
Do. ...	...	Sundry claims	...	6·01	54·50	69·71	...	25·57	6·01	100·50	98·62	...
Kurnalpi ...	...	Voided leases	...	...	...	...	...	371·18	3,100·64	2,925·01	2,778·07	6·27
Do. ...	...	Sundry claims	5·78	·30	786·50	280·35	...	302·60	203·93	2,241·00	1,040·72	...
Mulgabbie ...	...	Voided leases	...	...	...	...	...	...	1,138·12	84·65	7,429·71	4·95
Do. ...	...	Sundry claims	...	...	...	...	...	6·50	1,528·51	139·50	955·10	...
	From District generally :—											
	Sundry Parcels treated at :											
	Success Battery		...	...	...	...	...	...	...	45·00	188·51	...
	Various Works		...	...	...	...	...	...	...	56·50	193·15	...
	Reported by Banks and Gold Dealers		41·90	...	...	...	...	11,521·02	19·62	...	...	...
	Total		**47·68**	**6·31**	**841·00**	**350·06**	...	**12,226·87**	**6,141·96**	**7,413·41**	**14,092·39**	**11·22**

East Coolgardie Goldfield.

EAST COOLGARDIE DISTRICT.

Binduli ...	...	Voided leases	...	...	...	...	...	...	...	334·10	224·30	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	...	566·51	528·43	...
Boorara ...	...	Voided leases	...	...	...	...	...	...	459·07	306,651·57	171,745·13	408·36
Do. ...	...	Sundry claims	...	...	36·31	13·08	...	·49	53·46	902·07	947·20	...
Boulder ...	392E	(Acrobat : Paringa Consolidated Mines, Ltd.)	...	...	...	...	...	...	...	10·25	37·15	...
Do. ...	392E	(Acrobat : Paringa Mines (1909), Ltd.)	...	...	...	...	...	...	...	17,035·57	7,856·69	...
Do. ...	38E, 71E, 72E, (101E)	(Associated G.Ms. of W.A., Ltd.) ...	...	...	...	...	...	...	8·49	2,204,190·28	1,159,144·86	35,284·05
Do. ...	38E, 71E, 72E ...	Associated G.Ms. of W.A. (new), Ltd.)	...	...	54,609·02	26,147·48	1,081·00	...	...	169,269·36	74,732·49	3,324·52
Do. ...	49E, (4211E) ...	Associated Northern Blocks (W.A.), Ltd.	...	...	287·51	66·60	...	...	538·31	426,561·34	513,968·67	4,844·50
Do. ...	24E	Blue Gap	...	...	92·78	37·62	...	...	...	309·39	165·13	...
Do. ...	(682E), 902E, 923E, 986E, (1064E), 1124E, 1196E, 4075E	(Boulder Deep Levels, Ltd.) ...	...	...	...	...	...	...	...	3,043·00	1,778·10	26·71
Do. ...	902E, 923E, 986E, 1124E, 1196E, 4075E	(Boulder Deep Levels (1907), Ltd.)...	...	...	...	...	...	...	...	787·50	210·30	...
Do. ...	66E	Boulder Perseverance, Ltd.	...	...	61,379·18	41,988·29	10,361·13	...	...	279,280·68	218,731·43	47,857·39
Do. ...	281E	(Brookman Bros. : Boulder G.M. Co., Ltd.)	...	...	...	...	...	...	...	8,655·00	8,417·00	...
Do. ...	5409E	Brownhill	...	...	648·36	1,355·35	...	...	...	648·36	1,355·35	...
Do. ...	24E, (888E), (949E)	(Central and West Boulder G.Ms., Ltd.)	...	...	...	...	...	...	...	70,895·31	36,261·65	...
Do. ...	352E	(Chaffers G.M. Co., Ltd.)	...	...	...	...	...	...	...	4,256·00	1,299·03	161·50
Do. ...	352E, 873E, 4334E	(Chaffers G.M. Co., Ltd.)	...	...	...	...	...	...	...	111,111·00	44,796·77	...
Do. ...	352E, 873E, 4334E	(Chaffers G.M. Co., (1913), Ltd.) ...	...	...	...	...	...	...	...	13,350·00	3,334·91	129·57
Do. ...	1621E	(Croesus Proprietary G.M. Co.) ...	...	...	...	...	...	...	...	79·00	45·87	...
Do. ...	5345E	Enterprise	...	...	967·35	623·84	...	...	...	5,175·02	2,900·44	...
Do. ...	351E, 1001E, 1002E, 1085E, 1113E, 1219E, 1326E, 1397E	Golden Horseshoe Estates Co., Ltd. ...	...	...	2,122·71	2,782·27	...	...	...	4,812,812·67	2,955,707·26	700,279·22

TABLE IV.—*Production of Gold and Silver from all sources, etc.*—continued.

EAST COOLGARDIE GOLDFIELD—*continued.*

EAST COOLGARDIE DISTRICT—*continued.*

Mining Centre.	Number of Lease.	Registered Name of Company or Lease.	Total for 1928.					Total Production.				
			Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom	Silver.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.
			Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.
Boulder ...	2325E, 2326E ...	(Golden Link Consolidated G.Ms., Ltd.)	...	...	...	...	...	...	...	1,525·00	733·48	...
Do. ...	750E, 6121E ...	(Golden Links, Ltd.)	...	...	...	...	...	...	...	87,115·02	43,504·60	19·06
Do. ...	(5419E)	Good Hope	...	...	24·08	30·83	...	...	...	85·68	90·79	...
Do. ...	873E	(Great Boulder Main Reefs, Ltd.) ...	...	...	...	...	...	...	...	143,292·39	119,541·14	761·98
Do. ...	66E	(Great Boulder Perseverance G.M., Ltd.)	...	...	...	...	...	...	...	3,306,942·88	1,841,159·00	203,821·43
Do. ...	16E, 51E, 61E, 102E, 280E, 1109E. (4361E)	Great Boulder Proprietary G.Ms., Ltd.	...	...	88,199·77	74,988·77	14,303·00	...	...	4,072,825·36	3,442,004·10	402,450·10
Do. ...	902E, 1124E ...	(Great Boulder South G.M. Co., Ltd.)	...	...	...	...	...	...	...	437·00	122·11	...
Do. ...	3643E	(Hainault G.M., Ltd.)	...	...	...	...	...	...	...	517,345·70	184,570·02	113·30
Do. ...	1004E	(Hannan's North Croesus G.M. Co., Ltd.)	...	...	...	...	...	...	...	50·00	13·21	...
Do. ...	15E, 60E, 902E, 923E, 986E, 1116E, 1124E, 1196E, 4075E	Hannan's Star Consolidated, Ltd. ...	...	...	...	...	...	...	...	360·00	175·59	...
Do. ...	15E, 60E, 1116E...	(Hannan's Star G.M. Co., Ltd.) ...	...	...	...	...	...	...	...	85,652·75	40,438·85	2,142·59
Do. ...	15E, 60E, 1116E ...	(Hannan's Star, Ltd.)	...	...	...	...	...	...	...	13,470·50	4,716·66	191·22
Do. ...	4317E	Idaho	...	...	32·50	464·82	...	...	1,243·96	387·17	1,099·83	6·20
Do. ...	4317E, (4318E), (4442E)	Idaho leases	...	...	...	...	...	...	4,847·57	128,727·26	63,546·75	...
Do. ...	31E, 1357E, 1413E, 1507E, 4399E, 4445E, 4476E	(Ivanhoe Gold Corporation, Ltd.) ...	...	...	...	...	...	...	...	4,296,179·00	2,571,681·86	447,123·80
Do. ...	1507E, (2899E), (3712E), (3713E)	(Ivanhoe Junction G.M. Co., N.L.) ...	...	...	...	...	...	...	...	1,764·00	121·43	...
Do. ...	1004E	(Kalgurli Golden Eagle) ...	...	...	...	...	...	...	...	4,891·50	1,289·65	...
Do. ...	1004E	(Kalgurli Golden Eagle: Golden Links, Ltd.)	...	...	...	...	...	...	...	193·00	31·63	...
Do. ...	22E, 34E ...	Kalgurli G.Ms., Ltd.	...	...	...	...	...	...	...	1,683,548·41	1,072,090·59	188·24
Do. ...	15E, 25E, 31E, 32E, 60E, 352E, 873E, 902E, 923E, 986E, 1116E, 1124E, 1196E, 1357E, 1413E, 1507E, 2325E, 2326E, 4075E, 4334E, 4399E, 4445E, 4476E, 4493E, 4503E, 4508E	Lake View and Star, Ltd.	...	...	136,439·10	94,338·02	8,944·72	...	...	555,928·47	319,269·49	48,084·58

Do.	...	15E, 25E, 32E, 60E, 352E, 873E, 902E, 923E, 986E, 1116E, 1124E, 1196E, 2325E, 2326E, 4075E, 4334E, (4432E), (4433E), (4434E), 4493E	(Lake View and Star, Ltd.)	...	...	...	...	...	...	...	1,764,864·70	630,551·50	56,537·86
Do.	...	25E, 32E, 2325E, 2326E	(Lake View Consols, Ltd.)	...	...	...	...	...	...	...	1,179,303·55	1,016,875·27	38,491·89
Do.	...	5159E	Lake View South	...	...	319·53	136·23	...	...	...	1,963·36	1,170·10	...
Do.	...	281E, 287E, 444E	(North Kalgurli Co., Ltd.)	...	...	...	...	...	43·99	...	104,116·49	60,229·47	7,202·47
Do.	...	22E, 34E, 281E, 287E, 410E, 444E, 1004E, 1621E, 5405E, 5407E, 5413E	North Kalgurli (1912), Ltd.	...	...	1,437·04	940·47	...	...	...	1,437·04	940·47	...
Do.	...	281E, 287E, 444E	(North Kalgurli (1912), Ltd.) ...	...	...	95·01	28·74	...	...	...	36,420·37	19,377·61	...
Do.	...	5232E	(Old Bank of England) ...	...	...	...	...	...	...	...	1,082·68	972·85	...
Do.	...	5232E	Old Bank of England: Boulder Perseverance, Ltd.	...	...	...	...	...	...	...	39·31	11·06	...
Do.	...	(73E), 410E, (448E), (532E), (578E), (698E), 944E, (1395E), (3031E), (4180E)	(Oroya Brownhill Co., Ltd.)	...	...	...	...	...	...	...	1,075,862·55	1,163,881·77	61,682·30
Do.	...	(6E), 22E, 34E, (73E), (131E), (245E), (269E), (301E), 410E, (448E), (532E), (578E), (698E), (739E), (743E), (750E), (794E), 944E, (969E), 1004E, (1395E), 1621E, (3031E), (4180E), 5405E, (5406E), 5407E, 5408E, 5409E, (5410E), 5413E,	(Oroya Links, Ltd.)	...	...	...	...	...	...	...	1,017,456·92	447,023·92	28,532·96
Do.	...	392E	Paringa Mining & Exploration Co., Ltd.	...	...	...	...	...	...	...	193·31	64·50	...
Do.	...	(4E), 392E ...	(Paringa Mines (1909), Ltd.) ...	...	...	...	...	...	...	...	26,890·74	12,599·54	...
Do.	...	1208E, 3612E, 3643E	South Kalgurli Consolidated, Ltd. ...	...	...	89,515·20	44,261·12	...	...	...	1,304,832·53	553,322·34	15,071·52
Do.	...	1208E, 3612E ...	(South Kalgurli G.Ms., Ltd.) ...	...	...	...	...	...	...	...	826,909·00	347,222·75	17,609·67
Do.	...	...	Voided leases	...	...	...	...	...	109·90	5,888·84	488,317·84	406,455·08	·63
Do.	...	...	Sundry claims	...	...	545·01	335·44	...	24·58	5·80	3,493·48	1,972·19	...
Feysville	...	Block 48 ...	Hampton Gold Mining Areas, Ltd.—	...	...	...	...	...	...	15·36	278·73	443·28	...
			P.P.L. 40—Learhinan, D. ...	...	...	...	...	...	...	...	8·00	9·68	...
			P.P.L. 306—Excelsior	...	...	...	...	...	...	...	17·00	2·79	...
			P.P.L. 63, 84, 86—Golden Hope G.Ms., N.L.	...	...	3·54	28·32	...	...	...	16,588·84	8,505·97	69·60
			P.P.L. 98—Mabie, C. C.	...	...	...	2·62	...	...	...	...	2·62	...
			P.P.L. 1—White Hope: Hopeful Syndicate, Ltd.	...	...	...	11·21	...	...	...	29,850·03	11,729·78	...
			Sundry claims	...	...	...	...	...	...	...	20·53	22·06	...
Do.	...	Block 48 ...	(Hampton Plains Estate, Ltd.) ...	...	...	...	...	...	4,565·62	21·59	20,615·28	2,502·56	...
Do.	...	Block 50 ...	(Hampton Plains Estate (1906), Ltd.)	...	...	...	...	...	...	...	85·00	108·82	...

TABLE IV.—*Production of Gold and Silver from all sources, etc.*—continued.

EAST COOLGARDIE GOLDFIELD—*continued.*

EAST COOLGARDIE DISTRICT—*continued.*

Mining Centre.	Number of Lease.	Registered Name of Company or Lease.	Total for 1928.					Total Production.				
			Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.
			Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs
Feysville ...	Block 45 ...	Hampton Properties, Ltd.—										
		P.P.L. 252—Mount Martin ...	...	...	...	...	...	...	...	9,563·00	4,675·67	...
		Cancelled leases	...	...	...	...	...	...	52·75	69·75	80·52	...
Do. ...	Block 50 ...	(Hampton Properties, Ltd.)	...	...	...	...	...	...	7·26	6,348·00	3,956·22	...
Do. ...	Block 50 ...	Hampton Properties, Ltd.	...	...	...	...	...	...	106·23	943·27	699·50	...
		P.P.L. 17—McFarlane	...	...	...	...	...	...	...	67·40	33·40	...
		P.P.L. 12—Celebration Junction ...	...	...	408·46	496·14	...	...	...	718·57	772·06	...
		P.P.L. 9, 274—Hampton Celebration (W.A.), Ltd.	...	...	...	...	...	...	...	22,117·75	9,461·47	...
		P.P.L. 222—Hampton Jubilee ...	...	...	...	...	...	...	...	382·06	278·75	...
		P.P.L. 74—Lavis, H.	...	...	...	...	...	...	...	7·00	1·68	...
		P.P.L. 23—Mutooroo Copper Corporation, N.L.	...	...	...	...	...	...	...	1,436·88	2,256·19	...
		P.P.L. 10—Pernatty Central Copper Mining Co., N.L.	...	·75	129·31	67·64	...	...	·75	1,047·60	911·36	...
		P.P.L. 29—Pernatty East ...	...	...	...	...	...	...	...	11·27	3·43	...
Do. ...	...	Voided leases	...	...	...	...	...	...	110·74	561·30	394·24	...
Do. ...	...	Sundry claims	...	...	5·10	5·39	...	...	92·23	449·40	401·27	...
Kalgoorlie ...	5418E	Charlis	...	...	13·00	10·05	...	...	...	22·00	25·85	...
Do. ...	5421E	Close's Find	...	...	6·00	3·93	...	...	...	6·00	3·93	...
Do. ...	5350E, 5351E ...	Great Boulder Proprietary G.Ms., Ltd.	...	...	...	...	...	...	...	8 980·56	6 365·89	...
Do. ...	(4546E), 4547E, 4548E	Hannans Hill leases	...	...	2,678·00	1,040·40	...	...	...	4,045·00	2,109·57	...
Do. ...	(4546E), 4547E, 4548E, (4551E)	(Hannan's Reward, Ltd.)	...	...	...	...	...	...	5·72	33,378·00	9,005·69	...
Do. ...	(5417E)	Hidden Secret	...	...	40·00	50·98	...	...	6·89	279·00	223·00	...
Do. ...	5416E	Miss Australia	...	...	427·00	260·47	...	...	...	829·00	547·92	...
Do. ...	4632E	North End	...	...	...	...	...	...	...	388·68	89·36	...
Do. ...	5415E	Return	...	...	16·00	5·77	...	...	...	43·00	21·04	...
Do. ...	5368E	Rose of Diorite	...	...	13·50	10·43	...	...	1·73	4,204·50	3,950·59	...
Do. ...	(5389E)	Sons of Gwalia, Kalgoorlie ...	...	...	...	...	...	...	...	175·99	93·82	...
Do. ...	...	Voided leases	...	...	...	...	...	242·48	9,478·81	942,856·00	384,440·37	44,017·12
Do. ...	...	Sundry claims	1·69	2·11	120·21	76·83	...	209·38	507·42	46,548·57	19,641·81	...
Wombola ...	5420E	Eclipsall	...	...	98·00	182·07	...	...	...	98·00	182·07	...
Do. ...	4766E	Great Hope	...	...	623·00	2,606·34	...	...	146·61	3 801·53	17 318·30	...
Do. ...	...	Voided leases	...	...	...	...	...	...	1,872·31	9,918·25	13,547·12	...
Do. ...	...	Sundry claims	...	...	179·85	211·20	...	...	4·15	1,894·56	2,651·48	...

From District generally :—												
Sundry claims	84·54	23·66	...	125·85	...	11,014·57	464·94	5,440·46	2,405·39	...
Sundry parcels treated at :										
Fraser's Works	...	...	...	18·25	...	...	...	...	101·19	...
Great Boulder Perseverance Battery	...	...	...	...	...	...	...	...	7·18	...
Hainault Sulphide Plant	...	...	...	...	...	...	...	35·66	5,658·62	870·95
Hannan's Central Battery	...	...	...	323·99	...	...	...	193·80	65,684·25	67·17
Hannan's Reward Battery	...	...	...	242·80		...	...	...	2,415·27	...
Kalgoorlie G.M., Ltd., Works	...	...	...	...	...	...	...	7·44	658·04	...
Lone Hand Works	...	...	...	...	...	...	14·43	507·00	6,189·24	...
North Kalgurli Battery	...	...	...	...	...	...	...	...	810·22	...
Oroya Links Battery	...	...	...	...	...	...	...	32·24	453·58	...
Various Works	...	...	...	...	...	384·36	50·27	39,778·06	170,524·43	11,640·89
Reported by Banks and Gold Dealers	351·92	·75	...	...	...	12,218·91	9,015·67	2·39	52·06	...
Total	**438·15**	**27·27**	**441,511·43**	**294,319·65**	**34,689·85**	**28,814·28**	**35,021·36**	**32,384,481·39**	**20,335,489·96**	**2,179,013·35**

BULONG DISTRICT.

Balagundi ...	...	Voided leases	...	...	...	...	...	...	2,408·98	1,110·68	1,473·73	12·92
Do. ...	...	Sundry claims	...	41·57	6·50	25·63	...	...	242·32	301·26	257·54	...
Bulong ...	1266y	Peacehaven	...	...	10·00	20·80	...	...	...	22·10	128·76	...
Do. ...	1191y	Sweet Nell	...	...	...	..	...	...	...	400·84	980·20	...
Do. ...	...	Voided leases	...	...	...	...	...	107·54	8,433·70	99,635·96	82,526·49	...
Do. ...	...	Sundry claims	...	42·87	23·75	32·50	...	1,648·60	1,156·25	7,023·06	15,073·17	...
Hogan's Find	...	Voided leases	...	...	...	...	...	...	908·82	309·50	276·51	...
Majestic ...	Block 41 ...	Hampton Gold Mining Areas, Ltd. :—										
		P.P.L. 275—Long Looked For ...	...	...	...	...	...	19·45	...	235·34	218·57	...
Do. ...	Block 41 ...	(Hampton Properties, Ltd.) ...	...	...	...	...	...	...	...	41·00	22·66	...
Do. ...	...	Voided leases	...	...	...	...	...	...	...	1,007·70	333·30	...
Do. ...	...	Sundry claims	...	...	...	...	...	42·88	43·20	101·90	46·25	...
Mt. Monger ...	...	Voided leases	...	...	...	...	...	...	1,862·57	1,128·35	979·59	...
Do. ...	...	Sundry claims	...	...	...	...	...	215·60	...	369·80	302·47	...
Do. ...	...	Voided leases	...	...	...	...	...	...	60·04	31,820·04	10,645·98	...
Do. ...	...	Sundry claims	...	...	...	...	...	20·45	...	1,893·55	486·04	...
Sudden Jerk	...	Voided leases	...	...	...	...	...	...	63·91	14·25	53·67	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	...	·15	10·23	...
Taurus ...	...	Voided leases	...	...	...	...	...	2·06	3·70	1,697·60	891·34	...
Do. ...	...	Sundry claims	...	...	...	...	...	112·69	47·56	311·50	530·82	...
Trans Find ...	1198y	Transville	...	...	...	...	...	...	...	957·42	831·03	...
Do. ...	...	Voided leases	...	...	...	...	...	...	...	4·50	31·63	...
Woodline ...	...	Voided leases	...	...	...	...	...	...	...	792·75	610·57	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	...	39·33	61·57	...
From District generally :—												
...		Sundry claims	...	...	...	...	...	5·64	41·85	744·55	254·99	...
Sundry Parcels treated at :												
Various Works	...	...	...	...	...	...	...	...	...	6,102·15	5,848·25	...
Reported by Banks and Gold Dealers	5·97	...	...	...	...	24,601·51	52·39	...	...	...
Total	**5·97**	**84·44**	**40·25**	**78·93**	**...**	**26,776·42**	**15,325·29**	**156,065·28**	**122,875·36**	**12·92**

TABLE IV.—*Production of Gold and Silver from all sources, etc.*—continued

Coolgardie Goldfield.

COOLGARDIE DISTRICT.

Mining Centre	Number of Lease.	Registered Name of Company or Lease.	Total for 1928.					Total Production.				
			Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.
			Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs
Bonnievale ...	4600	Melva Maie	...	...	...	...	...	...	...	580·00	1,522·44	...
Do. ...	...	Voided leases	...	...	...	...	...	...	25·00	350,852·84	188,088·12	...
Do. ...	...	Sundry claims	...	...	16·00	6·40	...	...	122·62	2,343·33	2,886·34	...
Bulla Bulling	...	Voided leases	...	...	...	...	...	...	...	776·81	668·19	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	12·82	375·56	263·64	...
Burbanks ...	...	Voided leases	...	...	...	...	...	13·36	342·96	408,391·36	301,719·13	521·06
Do. ...	...	Sundry claims	...	...	54·25	25·89	...	43·37	158·43	5,610·15	4,688·61	...
Cave Rocks ...	...	Voided leases	...	...	...	...	...	...	...	132·00	28·04	...
Coolgardie ...	5218	Great Western	...	...	21·00	470·29	...	...	...	21·00	470·29	...
Do. ...	4567	Griffiths Gold Mine	...	...	...	...	...	...	4·16	17,782·50	2,043·31	...
Do. ...	Block 59... ...	Hampton Gold Mining Areas, Ltd. ...	...	...	...	...	...	...	...	9·00	1·57	...
		P.P.L. 308—Golden Bell	...	29·57	58·25	135·77	...	...	29·57	104·75	220·15	...
		P.P.L. 119—Golden Eagle ...	...	...	47·00	88·89	...	...	...	529·09	1,042·12	...
Do. ...	Block 49 ...	Hampton Plains Estates, Ltd. ...	...	...	...	...	...	...	10·94	150·00	157·31	...
		P.P.L. 384—Paul, A. W. ...	...	...	...	...	...	...	...	39·25	20·95	...
		P.P.L. 395—Paul, A. W. ...	...	...	...	...	...	...	...	18·00	21·54	...
Do. ...	Block 53 ...	(Hampton Plains Estates, Ltd.) ...	...	...	...	...	...	...	358·42	67·00	112·49	...
Do. ...	Block 59 ...	(Hampton Plains Estates, Ltd.) ...	...	...	...	...	...	...	4·12	8,008·25	7,194·52	...
Do. ...	...	Voided leases	...	...	...	...	...	1,299·02	4,494·64	543,683·98	320,522·17	·96
Do. ...	...	Sundry claims	1·77	15·88	110·80	378·49	...	138·37	2,101·13	39,707·61	16,735·96	...
Eundynie ...	...	Voided leases	...	...	...	...	...	...	...	29,812·50	14,966·76	1·75
Do. ...	...	Sundry claims	...	...	...	...	...	...	...	117·00	31·11	...
Gibraltar ...	4586	Carlton	...	...	82·00	51·47	...	...	15·28	1,527·00	1,226·94	...
Do. ...	5217	Lloyd George	...	...	202·00	213·95	...	...	...	202·00	213·95	...
Do. ...	5200	Perseverance	...	...	88·00	79·89	...	...	...	304·62	294·27	...
Do. ...	...	Voided leases	...	...	...	...	...	...	...	29,343·25	14,916·26	...
Do. ...	...	Sundry claims	...	...	102·50	104·82	...	...	48·55	893·95	672·18	...
Gnarlbine ...	...	Voided leases	...	...	...	...	...	...	10·94	1,899·75	1,049·90	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	1·31	228·10	170·61	...
Higginsville ...	...	Voided leases	...	...	...	...	...	...	287·26	32,578·00	14,938·44	134·79
Do. ...	...	Sundry claims	...	·51	...	...	...	...	17·03	772·90	516·90	...

Londonderry...	...	Voided leases	...	...	...	...	...	...	...	46·25	27,102·85	18,537·59	...
Do. ...	...	Sundry claims	...	...	63·50	18·07	...	...	...	6·00	1,864·67	1,634·29	...
Mungari ...	...	Voided leases	...	...	...	...	...	...	...	17·71	735·00	331·78	...
	...	Sundry claims		...	...	...	...	...	...	107·82	346·51	204·90	...
Paris ...	...	Voided leases	...	...	...	...	...	...	...	4·30	...	...	...
Red Hill ...	...	Voided leases	...	...	...	...	...	...	...	1,541·48	40,797·40	31,070·65	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	...	34·62	160·42	287·90	...
Ryan's Find	...	Voided leases	...	...	...	...	...	...	...	...	54·16	151·69	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	...	·44	87·69	226·64	...
St. Ives ...	(4905)	Brennan's Idough	...	...	...	...	...	9·53	38·03	2,697·50	1,795·25	...	
Do. ...	5195	Clifton	...	...	...	...	...	...	...	1,319·65	574·37	...	
Do. ...	4732	Ives Lake View Reward Junction	...	...	648·00	391·05	...	...	...	4,091·75	2,482·75	...	
Do. ...	4720, 4721, 4722	Ives Reward Gold Mines, N.L. ...	...	...	330·00	101·10	...	...	...	12,879·41	3,878·31	...	
Do. ...	4720, 4721, 4722	(Lake View Reward leases) ...	...	...	...	...	...	...	...	883·25	544·64	...	
Do. ...	(5210)	Rose Doreen	...	...	...	...	...	...	...	88·75	47·60	...	
Do. ...	...	Voided leases	...	...	...	...	...	45·10	2·75	1,205·75	1,463·86	...	
Do. ...	...	Sundry claims	20·39	866·79	...	68·38	...	207·36	866·79	994·56	451·68	...	
Widgiemooltha	5207	Elgin	...	...	63·00	66·60	...	...	...	305·50	411·21	...	
Do. ...	...	Voided leases	...	...	...	...	...	9·42	867·11	9,960·35	7,413·68		·17
Do. ...	...	Sundry claims	...	18·26	17·75	33·51	...	33·84	123·66	4,797·86	2,792·89	...	
	From District generally :—												
	Sundry parcels treated at:												
	Highgate Battery		...	...	...	...	...	...	...	100·00	336·90	...	
	Imperial Battery		...	...	...	129·26	...	...	...	26·00	141·18	...	
	State Battery, Coolgardie...		...	...	...	876·85	...	...	...	691·01	14,203·41		9·65
	State Battery, St. Ives		...	...	...	...	...	...	...	60·50	982·52	...	
	Various Works		...	...	...	...	...	7·75	...	3,711·11	17,248·08		223·06
	Reported by Banks and Gold Dealers		85·81	...	...	...	...	7,914·59	543·04	...	...	...	
	Total		**107·97**	**931·01**	**1,904·05**	**3,240·68**	...	**9,721·71**	**12,245·18**	**1,591,823·20**	**1,004,617·98**		**891·44**

KUNANALLING DISTRICT.

Balgarrie ...	...	Voided leases	...	...	...	...	...	10·94	75·48	5,142·25	4,825·96		1·38
Do. ...	...	Sundry claims	...	...	...	...	...	...	18·57	1,149·75	424·74	...	
Carbine ...	33s	(Carbine)	...	...	...	...	...	...	10·85	2,401·00	1,164·53	...	
Do. ...	33s	Carbine	...	...	1,920·00	1,205·45	...	...	...	2,500·00	1,625·02	...	
Do. ...	33s, (710s), (711s), (807s), (863s), (890s)	(Carbine leases)	...	...	...	...	...	...	677·13	49,590·86	38,697·72	...	
Do. ...	...	Voided leases	...	...	...	...	...	...	...	3,347·00	3,233·60	...	
Do. ...	...	Sundry claims	...	...	...	...	...	123·94	...	93·00	175·29	...	
Carnage ...	...	Voided leases	...	...	...	...	...	176·04	659·31	2,402·00	2,170·67	...	
Do. ...	...	Sundry claims	...	...	...	...	...	...	...	61·00	27·50	...	

TABLE IV.—*Production of Gold and Silver from all sources, etc.*—continued.

COOLGARDIE GOLDFIELD—*continued.*

KUNANALLING DISTRICT—*continued.*

Mining Centre.	Number of Lease.	Registered Name of Company or Lease.	Total for 1928.					Total Production.				
			Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.
			Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.
Cashman's (Siberia)	716s, [1289w] ...	Lady Evelyn	...	...	...	...	...	...	...	241·75	479·81	...
Do. ...	...	Voided leases	...	...	...	...	...	67·51	793·44	7,187·90	6,395·33	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	6·16	116·00	67·61	...
Chadwin ...	...	Voided leases	...	...	...	...	...	...	...	1,111·75	2,062·12	...
Do. ...	...	Sundry claims	...	...	53·00	33·27	...	...	8·87	560·00	482·49	...
Dunnsville ...	...	Voided leases	...	...	...	...	...	...	181·12	17,407·10	7,982·23	...
Do. ...	...	Sundry claims	...	48·55	46·00	99·50	...	·43	169·82	359·19	494·35	...
Jourdie Hills	...	Voided leases	...	...	...	...	...	...	18·00	28,009·74	19,401·09	28·45
Do. ...	...	Sundry claims	...	...	11·00	18·91	...	1·86	27·85	771·50	441·24	...
Kandana ...	...	Voided leases	...	...	...	...	...	...	...	465·00	68·12	...
Kintore ...	...	Voided leases	...	...	...	...	...	6·66	143·66	44,174·14	31,882·70	...
Do. ...	...	Sundry claims	...	...	...	...	...	100·30	20·63	1,259·20	1,199·39	...
Siberia ...	...	Voided leases	...	...	...	...	...	1·07	1,557·81	8,216·85	10,530·14	...
Do. ...	...	Sundry claims	...	...	...	...	...	30·91	...	223·00	349·86	...
25-Mile ...	(696s)	Blue Bell	...	...	...	...	...	...	...	85·00	24·19	...
Do. ...	(696s)	(Blue Bell)	...	...	...	...	...	...	8·05	697·00	429·47	...
Do. ...	(696s), (727s) ...	(Blue Bell leases)	...	...	...	...	...	...	...	1,693·00	1,647·99	...
Do. ...	645s	Star of Fremantle	...	...	18·50	65·47	...	32·67	...	5,531·50	4,109·14	...
Do. ...	(847s)	Turn of the Tide	...	...	30·00	71·37	...	...	2·72	4,762·48	5,547·28	...
Do. ...	...	Voided leases	...	...	...	...	...	...	1,701·43	92,411·49	73,409·88	18·84
Do. ...	...	Sundry claims	4·96	...	300·65	208·94	...	206·01	514·08	8,648·53	6,447·02	...
	From District generally:—											
	Sundry parcels treated at:											
	Blue Bell Battery		14·38	...	...	53·55	...	18·15	...	72·00	2,555·76	...
	Various Works		...	...	...	...	...	24·08	...	1,679·26	2,390·95	...
	Reported by Banks and Gold Dealers		...	...	...	...	...	269·58	1·10	...	...	...
	Total		**19·34**	**48·55**	**2,379·15**	**1,756·46**	...	**1,070·15**	**6,596·08**	**292,370·24**	**230,743·19**	**48·67**

Blackbourne...		Voided leases	...	...	...	...	...	...	...	...	1,282·50	341·37	...
Bullfinch ...	3345	Copperhead	...	...	80·00	21·83	...	...	...	80·00	21·83	...
Do. ...	3337	Easter Gift	...	32·20	355·00	157·45	...	...	46·62	513·00	240·21	...
Do. ...	(3340)	Hansfordhaven	...	...	33·50	26·73	...	...	...	339·10	194·27	...
Do. ...	3350	Rising Sun	...	...	109·75	113·19	...	...	...	109·75	113·19	...
Do. ...	3363	White Hope	...	...	29·00	13·49	...	...	...	29·00	13·49	...
Do. ...		Voided leases	...	...	...	...	...	...	3·57	480,486·66	178,685·23	27,833·41
Do. ...		Sundry claims	3·71	...	121·25	66·83	...	3·71	...	1,289·80	916·92	...
Corinthian ...		Voided leases	...	...	...	...	...	...	...	134,508·00	29,324·83	...
Do. ...		Sundry claims	...	...	...	...	...	...	...	104·50	77·35	...
Ennuin ...		Voided leases	...	...	...	...	...	...	...	134·56	361·34	...
Do. ...		Sundry claims	...	...	...	...	...	...	...	131·50	104·05	...
Forrestonia ...		Voided leases	...	...	...	...	...	...	...	1,185·00	298·15	...
Do. ...		Sundry claims	...	...	...	...	...	...	...	327·00	114·95	...
Golden Valley	8PP	Magpie	...	...	16·25	10·68	...	...	...	16·25	10·68	...
Do. ...	3311	Great Bingin	...	...	22·00	7·46	...	...	...	22·00	7·46	...
Do. ...	2994	Radio	...	...	646·00	1,764·07	...	...	...	5,930·80	18,027·69	7·43
Do. ...	3248	Radio Deeps	...	...	...	7·19	...	...	...	610·00	1,145·80	...
Do. ...	(3338)	Valley Queen Extended ...	...	...	31·50	23·85	...	...	...	135·50	130·23	...
Do. ...		Voided leases	...	...	...	...	...	...	18·05	8,303·24	8,647·56	2·00
Do. ...		Sundry claims	...	...	83·50	89·40	...	...	2·75	2,490·72	2,390·99	...
Greenmount	(3264)	Transvaal Mine	...	...	...	...	...	...	...	997·00	252·18	...
Do. ...		Voided leases	...	...	...	...	...	45·99	21·62	123,806·64	31,275·22	944·50
Do. ...		Sundry claims	...	...	...	...	...	...	4·12	875·00	334·48	...
Holleton ...	(3334)	Empress	...	...	...	...	...	...	...	23·00	19·35	...
Do. ...	3312	Glenelg Queen	...	...	...	...	...	...	...	211·00	495·54	...
Do. ...	3280	Hollow & Heaton's Reward ...	...	...	...	...	...	...	9·33	21·50	127·55	...
Do. ...		Sundry claims	...	...	14·00	8·43	...	...	...	36·50	34·99	...
Hope's Hill ...	(2544)	Colleen Bawn	...	...	...	...	...	...	17·81	410·20	1,916·07	...
Do. ...		Voided leases	...	...	...	...	...	...	56·97	129,884·85	33,899·78	1·00
Do. ...		Sundry claims	...	...	41·75	30·43	...	...	25·38	1,718·75	576·51	...
Kennyville ...		Voided leases	...	...	...	...	...	...	18·76	32,377·13	15,222·68	·59
Do. ...		Sundry claims	...	...	...	...	...	...	5·06	2,068·50	912·84	...
Koolyanobbing		Voided leases	...	...	...	...	...	...	...	308·00	116·74	...
Do. ...		Sundry claims	...	...	...	...	...	...	...	55·00	11·24	...
Marvel Loch	(719)	(Great Victoria)	...	...	...	...	...	...	...	1,356·00	281·53	...
Do. ...	(719), (944), (945), (1227), (1228), (1606)	Great Victoria G.Ms., N.L.	...	...	...	38·41	...	...	...	74,101·00	16,697·40	...
Do. ...	(719), (944), (945), (1227), (1228), (1606)	(Great Victoria leases)	...	...	...	...	...	...	...	132,664·26	17,869·89	...
Do. ...	3277	Just in Time	...	...	277·00	57·96	...	...	...	5,957·00	1,354·87	...
Do. ...	852	May Queen	...	...	161·00	583·61	...	...	4·07	1,598·50	6,174·07	...
Do. ...	(3281)	(Resurrection)	...	...	...	...	...	...	...	61·00	59·14	...

TABLE IV.—*Production of Gold and Silver from all sources, etc.*—continued

YILGARN GOLDFIELD —*continued.*

Mining Centre.	Number of Lease.	Registered Name of Company or Lease.	Total for 1928.					Total Production.				
			Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.
			Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs
Marvel Loch	(3281)	Resurrection: Great Victoria G.Ms., N.L.	...	...	...	13·29	...	...	...	2,194·00	428·70	...
Do. ...	...	Voided leases	...	...	...	...	...	...	104·39	260,499·00	97,798·34	771·03
Do. ...	...	Sundry claims	...	...	228·00	93·64	...	8·87	84·82	11,761·74	6,008·24	...
Mt. Jackson...	...	Voided leases	...	...	...	...	...	...	114·88	37,186·03	27,676·47	2,305·28
Do. ...	...	Sundry claims	...	...	...	...	...	5·71	30·46	1,697·00	1,177·74	·74
Mt. Rankin ...	...	Voided leases	...	...	...	...	...	3·84	5·20	496·00	122·17	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	...	170·00	54·38	...
Parker's Range	2801	Scots Greys	...	...	...	2·97	...	...	...	1,516·00	561·08	...
Do. ...	(724)	(Spring Hill)	...	...	...	...	...	...	...	3,232·00	607·21	...
Do. ...	(724), (760) ...	(Spring Hill leases)	...	...	...	...	...	...	...	8,910·00	2,215·59	...
Do. ...	(724), (2633), (2793)	Spring Hill G.M. Co., N.L.	...	...	...	...	...	...	...	5,222·00	2,964·41	...
Do. ...	3365	White Horse	...	...	85·00	97·81	...	...	...	85·00	97·81	...
Do. ...	...	Voided leases	...	...	...	...	...	...	105·14	18,147·25	13,594·96	...
Do. ...	...	Sundry claims	...	...	80·00	52·67	...	...	...	2,344·25	1,597·03	...
Southern Cross	...	Voided leases	...	...	...	...	...	2·13	211·22	434,105·88	212,008·46	364·41
Do. ...	...	Sundry claims	...	...	10·50	4·87	...	5·50	595·45	4,366·73	1,453·53	...
Westons ...	3308	Consolidated	...	...	1,250·00	1,007·69	...	...	...	1,797·00	1,497·95	...
Do. ...	3310	Les Trois	...	...	...	...	...	...	...	304·00	256·77	...
Do. ...	(3226)	Royal Flush	...	...	...	...	...	...	...	880·00	649·42	...
Do. ...	...	Voided leases	...	...	...	...	...	...	4·06	421,897·99	299,018·68	21·78
Do. ...	...	Sundry claims	...	...	...	...	...	...	52·91	1,458·75	1,395·38	...
	From Goldfields Generally:—											
	Sundry parcels treated at:											
	Berrigan & Jones' Cyanide Works		...	...	...	712·46	...	...	...	...	712·46	...
	Glideaway Battery		...	...	...	...	...	...	...	...	250·87	...
	Great Victoria Cyanide Works		...	...	...	...	...	...	...	...	5,847·54	...
	Howlett's Battery		...	...	10·00	295·63	...	...	...	10·00	1,734·93	...
	Spring Hill Works		...	...	...	...	...	...	...	...	854·27	...
	Sunbeam Works		...	...	...	...	...	...	...	38·50	7,244·60	...
	Various Works		...	...	...	...	...	...	...	118·28	28,858·43	36·54
	Reported by Banks and Gold Dealers		...	...	...	...	...	23·65	3·53	...	...	...
	Total		**3·71**	**32·20**	**3,685·00**	**5,302·04**	...	**99·40**	**1,546·17**	**2,364,997·11**	**1,085,487·08**	**32,288·71**

Dundas Goldfield.

Buldania ...	...	Voided leases	...	...	...	...	...	...	...	3·02	846·05	708·99	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	...	36·53	341·27	519·77	...
Dundas ...	...	Voided leases	...	...	...	...	...	...	...	...	4,543·23	2,208·48	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	...	385·37	182·50	143·88	...
Killaloe ...	...	Voided leases	...	...	...	...	...	...	...	...	20·65	6·88	...
Norseman ...	1291	Mararoa No. 1	...	...	5,500·00	3,924·43	...	...	...	...	9,566·96	7,479·23	...
Do. ...	1290	Mararoa No. 2	...	...	...	...	...	...	...	...	436·50	285·39	...
Do. ...	1288	Mararoa No. 3	...	...	...	...	...	...	...	...	1,026·25	1,382·14	...
Do. ...	1315	New Mararoa	...	...	74·50	25·55	...	...	...	...	682·50	188·50	...
Do. ...	1317	O.K.	...	8·34	88·50	199·03	...	...	8·34	408·50	582·16	...	
Do. ...	990	Viking No. 1	...	...	95·75	36·72	...	...	42·44	984·05	2,104·16	...	
Do. ...	990	(Viking No. 1)	...	...	...	...	...	...	...	...	1,274·00	3,095·95	...
Do. ...	990 (1060) ...	(Viking No. 1 leases)	...	...	...	...	...	...	...	...	775·50	1,176·13	16·89
Do. ...	990, (1016), (1060), (1117), (1181), (1194), (1235)	(Viking No. 1 leases)	...	...	...	...	...	...	...	...	48,452·00	44,457·70	242,83
Do. ...	...	Voided leases	...	...	...	...	...	4·23	10,415·94	821,517·77	526,246·91	34,600·73	
Do. ...	...	Sundry claims	...	...	771·25	146·48	...	1,013·97	3,088·24	22,482·71	13,044·51	59	
Peninsula ...	...	Voided leases	...	...	...	...	...	...	17·61	7,807·14	4,833·88	...	
	From Goldfield generally :—												
	Sundry Parcels treated at.:												
	Rawlings & Bullen's Works		...	...	...	...	...	...	...	57·39	4,266·10	...	
	State Battery, Norseman		...	...	...	...	...	...	...	405·14	14,143·21	885·41	
	Various Works		...	...	...	...	...	...	54·52	425·75	6,562·86	646·45	
	Reported by Banks and Gold Dealers		·04	...	...	...	...	1,035·19	...	...	1·04	...	
	Total		**·04**	**8·34**	**6,530·00**	**4,332·21**	**...**	**2,053·39**	**14,052·01**	**922,235·86**	**633,487·87**	**36,392·90**	

Phillips River Goldfield.

Hatter's Hill	...	Sundry claims	...	...	...	...	...	...	1·49	40·00	14·98	...
Kundip ...	184	Gem	...	...	...	...	...	...	...	4,159·15	3,324·86	...
Do. ...	(151), (156) ...	Gem Consolidated leases ...	...	...	...	...	...	...	...	6,315·76	5,690·35	8·00
Do. ...	M.L. 52, M.L. 94	Harbour View Gold & Copper Co., Ltd.	...	...	...	...	...	...	...	1,602·89	1,836·05	360·11
Do. ...	M.L. 52, M.L. 94	(Harbour View leases)	...	...	...	...	...	...	379·86	3,619·25	1,560·86	61·41
Do ...	M.L. 52, M.L. 94	(Harbour View leases)	...	...	...	...	...	...	...	3,403·50	2,227·62	1·88
Do. ...	M.L. 370 ...	North Harbour View	...	...	...	...	...	...	...	35·27	22·16	...
Do. ...	M.L. 52, M.L. 74	(Ravensthorpe G.M. Syndicate, N.L.)	...	...	...	...	...	...	...	1,124·00	433·94	164·98
Do. ...	(203)	Two Boys	...	...	61·00	24·50	...	...	...	234·00	125·04	...
Do. ...	...	Voided leases	...	...	...	...	...	113·28	176·31	46,637·76	40,762·43	3,200·86
Do. ...	...	Sundry claims	...	...	20·00	3·53	...	84·05	71·58	1,076·88	659·01	15·45
Mt. Desmond	...	Voided leases	...	...	...	...	...	...	1·40	9·00	3,905·46	6,891·59
Do. ...	...	Sundry claims	...	...	...	...	...	...	...	...	32·81	51·01
Mt. Purchas ...	...	Voided leases	...	...	...	...	...	...	4·38	346·05	293·13	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	...	4·75	4·68	...
Ravensthorpe	...	Voided leases	...	...	...	...	...	...	141·80	21,933·76	25,149·50	4,384·07
Do. ...	...	Sundry claims	...	...	...	85·28	...	163·96	6·60	2,268·18	1,628·83	20·65

TABLE IV.—*Production of Gold and Silver from all sources, etc.*—continued.

PHILLIPS RIVER GOLDFIELD—*continued.*

Mining Centre.	Number of Lease.	Registered Name of Company or Lease.	Total for 1928.					Total Production.				
			Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.
			Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs
West River ...	...	Voided leases	...	...	...	...	...	...	...	...	10·34	31·06
Do. ...	...	Sundry claims	...	...	...	...	...	...	...	...	3·29	3·44
	From Goldfield generally :—											
	Sundry Parcels treated at :											
	Gem Battery		...	...	...	...	...	...	...	...	138·89	...
	Phillips River Smelter		...	...	...	...	...	...	...	...	385·96	493·66
	Two Boys Works		...	...	...	...	...	...	...	...	100·95	...
	Various Works		...	...	...	...	...	...	...	...	4·76	...
	Reported by Banks and Gold Dealers		...	...	...	...	...	122·48	...	...	...	...
	Total		...	...	81·00	113·31	...	483·77	783·42	92,810·20	88,315·90	15,688·17
Donnybrook Goldfield.												
Donnybrook ...	...	Voided leases	...	...	...	...	...	23·24	...	1,613·30	816·23	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	...	40·00	2·29	...
		Total	...	...	...	...	...	23·24	...	1,653·30	818·52	...
State generally.												
Burracoppin ...	...	Sundry claims	...	...	9·00	10·20	...	...	...	9·00	10·20	...
Jimbel Bar ...	(41H). ([225L]) ...	(Coobina)	...	...	...	...	...	...	57·42	...	...	·58
Do. ...	...	Voided leases	...	...	...	...	...	...	53·66	...	...	...
Do. ...	...	Sundry claims	...	10·20	...	...	...	...	10·20	...	...	...
Narra Tarra...	Loc. 833 ...	Narra Tarra : Fremantle Trading Co., Ltd.	...	...	...	...	...	...	...	...	91·51	20,718·76
	From State generally :—											
	Sundry Parcels treated at :											
	Hainault Sulphide Plant, Kalgoorlie		...	...	...	...	...	...	...	...	21·28	...
	State Smelter, Ravensthorpe		...	...	...	...	...	...	...	...	41·20	...
	Various Works		...	...	...	...	...	...	...	27·00	7,711·30	10,157·20
	Sundry Specimens		...	...	...	...	...	4·24	56·85	...	...	...
	Reported by Banks and Gold Dealers		...	...	...	...	...	150·21	183·87	...	...	...
	Total		...	...	9·00	10·20	...	154·45	362·00	36·00	7,875·49	30,876·54

TABLE V.

TOTAL OUTPUT OF GOLD BULLION ENTERED FOR EXPORT, AND RECEIVED AT THE PERTH BRANCH OF THE ROYAL MINT, FROM 1ST JANUARY, 1886, TO 31ST DECEMBER, 1928, SHOWING, IN FINE OUNCES, THE QUANTITY OBTAINED FROM THE RESPECTIVE GOLDFIELDS, AND THE TOTAL ANNUAL VALUE.

Year.	KIMBERLEY.			PILBARA.			*a* WEST PILBARA.			ASHBURTON.		
	Export.	Mint.	Total.	Export.	Mint.	Total.	Export.	Mint.	Total.	Export.	Mint.	Total.
Previous to 1928	fine ozs. 22,422·06	fine ozs. 7,209·88	fine ozs. 29,631·94	fine ozs. 147,302·43	fine ozs. 156,749·40	fine ozs. 304,051·83	fine ozs. 4,351·11	fine ozs. 26,596·44	fine ozs. 30,947·55	fine ozs. 4,104·96	fine ozs. 2,193·74	fine ozs. 6,298·70
1928 ...	...	40·38	40·38	...	1,865·76	1,865·76	...	·38	·38	...	36·30	36·30
Total ...	22,422·06	7,250·26	29,672·32	147,302·43	158,615·16	305,917·59	4,351·11	26,596·82	30,947·93	4,104·96	2,230·04	6,335·00

Year.	*b* GASCOYNE.			*c* PEAK HILL.			*c* EAST MURCHISON.			MURCHISON.		
	Export.	Mint.	Total.	Export.	Mint.	Total.	Export.	Mint.	Total	Export.	Mint.	Total.
Previous to 1928	fine ozs. 304·55	fine ozs. 744·05	fine ozs. 1,048·60	fine ozs. 41,102·62	fine ozs. 175,160·34	fine ozs. 216,262·96	fine ozs. 230,585·11	fine ozs. 1,418,213·45	fine ozs. 1,648,798·56	fine ozs. 1,448,444·91	fine ozs. 2,030,418·38	fine ozs. 3,478,863·29
1928 ...	...	47·42	47·42	...	1,261·91	1,261·91	...	4,447·18	4,447·18	865·86	20,853·34	21,719·20
Total ...	304·55	791·47	1,096·02	41,102·62	176,422·25	217,524·87	230,585·11	1,422,660·63	1,653,245·74	1,449,310·77	2,051,271·72	3,500,582·49

Year.	*d* YALGOO.			*e* MT. MARGARET.			*f* NORTH COOLGARDIE.			*g* BROAD ARROW.		
	Export.	Mint.	Total.	Export.	Mint.	Total.	Export.	Mint.	Total.	Export.	Mint.	Total.
Previous to 1928	fine ozs. 11,478·21	fine ozs. 95,229·16	fine ozs. 106,707·37	fine ozs. 607,310·81	fine ozs. 2,699,897·89	fine ozs 3,307,208·70	fine ozs 261,964·27	fine ozs. 1,716,049·80	fine ozs. 1,978 014·07	fine ozs. 121,620·16	fine ozs. 216,076·39	fine ozs. 337,696·55
1928 ...	...	5,755·08	5,755·08	192·34	32,825·71	33,018·05	...	3,293·51	3,293·51	...	821·22	821·22
Total ..	11,478·21	100,984·24	112,462·45	607,503·15	2,732,723·60	3,340,226·75	261,964·27	1,719,343·31	1,981,307·58	121,620·16	216,897·61	338,517·77

Year.	*f* NORTH-EAST COOLGARDIE.			*f* EAST COOLGARDIE.			*h* COOLGARDIE.			YILGARN.		
	Export.	Mint.	Total.	Export.	Mint.	Total.	Export.	Mint.	Total.	Export.	Mint.	Total.
Previous to 1928	fine ozs. 234,979·30	fine ozs. 438,134·01	fine ozs. 673,113·31	fine ozs. 6,796,879·14	fine ozs. 14,669,688·75	fine ozs. 21,466,567·89	fine ozs. 661,362·03	fine ozs. 856,370·34	fine ozs. 1,517,732·37	fine ozs. 215,873·72	fine ozs. 959,747·75	fine ozs. 1,175,621·47
1928 ...	200·00	596·03	796·03	1,840·55	304,441·27	306,281·82	133·63	3,499·84	3,633·47	...	4,953·49	4,953·49
Total ...	235,179·30	438,730·04	673,909·34	6,798,719·69	14,974,130·02	21,772,849·71	661,495·66	859,870·18	1,521,365·84	215,873·72	964,701·24	1,180,574·96

Year.	*i* DUNDAS.			*j* PHILLIPS RIVER.			¶ DONNYBROOK.			STATE GENERALLY.		
	Export.	Mint.	Total.	Export.	Mint.	Total.	Export.	Mint.	Total.	Export.	Mint.	Total.
Previous to 1928	fine ozs. 113,896·47	fine ozs. 605,561·37	fine ozs. 719,457·84	fine ozs. 39,035·37	fine ozs. 42,767·49	fine ozs. 81,802·86	fine ozs. 282·21	fine ozs. 557·53	fine ozs. 839·74	fine ozs. 17,918·52	fine ozs. 18,278·28	fine ozs. 36,196·80
1928 ...	...	5,028·04	5,028·04	...	189·50	189·50	...	...	...	106·92	112·83	219·75
Total ...	113,896·47	610,589·41	724,485·88	39,035·37	42,956·99	81,992·36	282·21	557·53	839·74	18,025·44	18,391·11	36,416·55

a Prior to 1st May, 1898, included with Pilbara. *b* Prior to March, 1899, included with Ashburton. *c* From 1st August, 1897.
d Prior to 1st April, 1897, included with Murchison. *e* From 1st August, 1897. *f* Prior to 1st May, 1896, included with Coolgardie.
g From 1st September, 1897. *h* Declared 5th April, 1894, to which date included with Yilgarn.
i Prior to 1893 included with Yilgarn. *j* Prior to 1902, included in State generally. ¶ Abolished 4th March, 1908.

Total Output of Gold Bullion entered for Export, and Received at the Perth Branch of the Royal Mint, etc.

Year.	GRAND TOTAL. Export.	Mint.	Total.	Value.
	fine ozs.	fine ozs.	fine ozs.	£ s. d.
1886	270·17	...	270·17	1,147 12 2½
1887	4,359·37	...	4,359·37	18,517 8 6½
1888	3,124·82	...	3,124·82	13,273 7 10½
1889	13,859·52	...	13,859·52	58,871 9 11½
1890	20,402·42	...	20,402·42	86,663 19 5
1891	27,116·14	...	27,116·14	115,182 0 10½
1892	53,271·65	...	53,271·65	226,283 11 8
1893	99,202·50	...	99,202·50	421,385 8 8½
1894	185,298·73	...	185,298·73	787,098 19 6
1895	207,110·20	...	207,110·20	879,748 4 2½
1896	251,618·69	...	251,618·69	1,068,808 5 2
1897	603,846·44	...	603,846·44	2,564,976 12 9½
1898	939,489·49	...	939,489·49	3,990,697 13 10
1899	1,283,360·25	187,244·41	1,470,604·66	6,246,731 10 7½
1900	894,387·27	519,923·59	1,414,310·86	6,007,610 13 4½
1901	923,686·96	779,729·56	1,703,416·52	7,235,653 9 1
1902	707,039·75	1,163,997·60	1,871,037·35	7,947,661 9 7½
1903	833,685·78	1,231,115·62	2,064,801·40	8,770,718 17 0½
1904	810,616·04	1,172,614·03	1,983,230·07	8,424,225 17 3½
1905	655,089·88	1,300,226·00	1,955,315·88	8,305,653 18 5½
1906	562,250·59	1,232,296·01	1,794,546·60	7,622,749 8 7
1907	431,803·14	1,265,750·45	1,697,553·59	7,210,749 6 2½
1908	356,353·96	1,291,557·17	1,647,911·13	6,999,881 10 10½
1909	386,370·58	1,208,898·83	1,595,269·41	6,776,273 14 7½
1910	233,970·34	1,236,661·68	1,470,632·02	6,246,847 15 0
1911	160,422·28	1,210,445·24	1,370,867·52	5,823,075 1 9½
1912	83,577·12	1,199,080·87	1,282,657·99	5,448,384 16 5½
1913	86,255·13	1,227,788·15	1,314,043·28	5,581,701 1 2½
1914	51,454·65	1,181,522·17	1,232,976·82	5,237,352 12 6½
1915	17,340·47	1,192,771·23	1,210,111·70	5,140,227 15 5½
1916	26,742·17	1,034,655·87	1,061,398·04	4,508,532 5 11
1917	9,022·49	961,294·67	970,317·16	4,121,645 6 2½
1918	15,644·12	860,867·03	876,511·15	3,723,182 14 9
1919	6,445·89	727,619·90	734,065·79	3,118,113 5 6½
1920	5,261·13	612,581·00	617,842·13	2,624,426 11 0
1921	7,170·74	546,559·92	553,730·66	2,352,098 6 8½
1922	5,320·16	532,926·12	538,246·28	2,286,324 17 5
1923	5,933·82	498,577·59	504,511·41	2,143,028 5 0½
1924	2,585·20	482,449·78	485,034·98	2,060,297 12 8½
1925	3,910·59	437,341·56	441,252·15	1,874,319 19 10½
1926	3,188·22	434,154·98	437,343·20	1,857,715 16 7
1927	3,359·10	404,993·41	408,352·51	1,734,571 4 1½
1928	3,339·30	390,069.19	393,408·49	1,671,093 1 0
Total ...	10,984,557·26	26,525,713·63	37,510,270·89	159,333,502 19 10½

PART II.—MINERALS OTHER THAN GOLD.

TABLE VI.—GENERAL RETURN OF ORE AND MINERALS, OTHER THAN GOLD, SHOWING THE QUANTITY PRODUCED AND THE VALUE THEREOF AS REPORTED TO THE MINES DEPARTMENT FROM THE RESPECTIVE GOLDFIELDS AND MINERAL FIELDS, DURING 1928, AND PREVIOUS YEARS.

BLACK TIN.

Period.	Pilbara Goldfield—Marble Bar District.				Greenbushes Mineral Field.				Total.			
	Quantity.			Value.	Quantity.			Value.	Quantity.			Value.
	Lode.	Stream.	Total.		Lode.	Stream.	Total.		Lode.	Stream	Total.	
	tons.	tons.	tons.	£	tons.	tons.	tons.	£	tons.	tons.	tons.	£
Previous to 1917* ...	362·87	4,982·17	5,345·04	460,540	244·53	9,465·12	9,709·65	754,309	607·40	14,452·16	15,059·56	1,215,224
1917	4·05	65·00	69·05	9,264	11·18	226·74	237·92	29,928	15·23	291·74	306·97	39,192
1918	5·70	93·80	99·50	20,984	50·52	245·28	295·80	57,653	56·22	339·08	395·30	78,637
1919	...	36·70	36·70	5,871	23·66	220·95	244·61	34,959	23·66	257·65	281·31	40,830
1920	...	41·50	41·50	7,616	10·25	179·84	190·09	31,249	10·25	221·34	231·59	38,865
1921	...	14·50	14·50	1,460	7·00	45·87	52·87	5,778	7·00	60·37	67·37	7.238
1922	...	25·35	25·35	2,446	·15	15·71	15·86	1,393	·15	41·06	41·21	3,839
1923	...	24·40	24·40	2,960	...	28·02	28·02	3,024	...	52·42	52·42	5,984
1924	...	28·55	28·55	4,048	·32	52·24	52·56	7,469	·32	80·79	81·11	11,517
1925	...	23·96	23·96	3,609	1·21	54·00	55·27	8,764	1·21	78·02	79·23	12,373
1926	...	35·42	35·42	5,446	...	61·41	61·41	10,126	...	96·83	96·83	15,572
1927	...	37·44	37·44	6,229	1·23	57·11	58·34	9,544	1·23	94·55	95·78	15.773
1928	...	35·48	35·48	5,171	...	54·54	54·54	6,355	...	90·02	90·02	11,526
Total	372·62	5,444·27	5,816·89	535,644	350·05	10,706·89	11,056·94	960,551	722·67	16,156·03	16,878·70	1,496,570

* Includes 4·72 tons value £360 the produce of Cue District and ·15 tons value £15 the produce of Coolgardie District.

TANTALITE.

Period.	Pilbara Goldfield—Marble Bar District.				Greenbushes Mineral Field.				Total.			
	Quantity.			Value.	Quantity.			Value.	Quantity.			Value.
	Lode.	Stream.	Total.		Lode.	Stream.	Total.		Lode.	Stream.	Total.	
	tons.	tons.	tons.	£	tons.	tons.	tons.	£	tons.	tons.	tons.	£
Previous to 1917 ...	2·25	83·80	86·05	11,682	...	3·19	3·19	1,804	2·25	86·99	89·24	13,486
1917	...	12·50	12·50	1,782	...	...	...	...	...	12·50	12·50	1,782
1918	...	...	...	...	...	...	...	...	...	...	...	...
1919	...	...	...	...	...	...	...	...	...	..	...	...
1920	...	...	...	...	...	...	...	...	...	...	...	...
1921	...	...	...	...	...	...	...	...	...	...	...	...
1922	...	...	...	...	...	...	...	...	...	...	...	...
1923	...	...	...	...	...	...	...	...	...	...	...	...
1924	...	...	...	...	...	...	...	...	...	...	...	...
1925	...	6·25	6·25	750	...	...	...	...	...	6·25	6·25	750
1926	...	19·45	19·45	2,357	...	...	...	...	...	19·45	19·45	2,357
1927	...	15·28	15·28	3,808	...	...	...	...	...	15·28	15·28	3,808
1928	...	8·76	8·76	2,213	...	...	...	...	...	8·76	8·76	2,213
Total	2·25	146·04	148·29	22,592	...	3·19	3·19	1,804	2·25	149·23	151·48	24,396

Period.	Pyritic Ore.		Copper Ore.													
	Mt. Margaret G.F. Mt. Morgans D.		West Kimberley Goldfield		Pilbara Goldfield. Marble Bar D		Pilbara Goldfield. Nullagine D.		West Pilbara Gf.		Ashburton Gf.		Peak Hill Gf.		E. Murchison Gf. Lawlers D.	
	Quantity.	Value.	Q'ntity.	Value.	Quantity.	Value	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£
Previous to 1917 ...	48,506·57	17,846	109·52	1,709	32·87	386	5·00	120	75,822·37	631,901	347·36	6,341	601·21	18,295	81·12	1,527
1917 ...	3,575·46	1,752	...	...	...	...	...	...	783·61	13,406	3·71	67	287·84	9,683	75·00	1,523
1918 ...	2,251·81	1,629	...	...	...	...	...	...	1,844·19	28,961	...	...	76·28	2,480	82·44	1,314
1919 ...	4 135·93	4,919	...	...	...	...	...	...	1,030·78	15,807	...	...	14·39	353	...	...
1920 ...	6,919·98	7,276	...	...	...	...	9·00	360	1,700·50	32,059	...	...	35·39	1,401	...	...
1921 ...	6,116·66	7,871	...	...	...	...	...	...	1,055·00	18,955	...	...	...	...	...	...
1922 ...	3,441·15	4,203	...	...	...	...	...	...	164·00	2,481	...	...	...	...	...	...
1923 ...	...	...	...	...	...	...	...	...	221·00	3,500	...	...	...	...	...	...
1924 ...	...	...	...	...	...	...	...	...	79 00	1,012	...	...	...	...	...	...
1925 ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1926 ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1927 ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1928 ...	...	...	...	...	...	...	...	...	45·00	400	...	...	...	...	...	...
Total ...	74,047·56	45,496	109·52	1,709	32·87	386	14·00	480	82,745·45	748,482	351·07	6,408	1,015·11	32,212	238·56	4,364

‖ Represents the value of the sulphur only, the copper contents not having been treated yet.

COPPER ORE—*continued.*

Period.	Murchison Gf. Meekatharra D.		Murchison Gf. Day Dawn D.		Yalgoo Gf.		Northampton Mf.		Yandanooka Mf.		Mt. Margaret Goldfield. Mt. Morgans District.		Mt. Margaret Goldfield. Mt. Margaret District.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£
Previous to 1917	790·39	6,379	55·56	522	38·40	413	136·50	1,992	171·55	1,889	47,857·67	230,820	2·85	26
1917	82·92	2,164	...	...	...	...	...	...	...	...	...	...	...	...
1918	78·34	1,794	...	...	...	...	...	...	...	...	...	...	...	...
1919	16·81	377	...	...	...	...	...	...	...	...	...	...	...	...
1920	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1921	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1922	...	...	...	...	...	...	998·66	13,435	...	...	...	...	...	...
1923	...	...	...	...	...	...	9,626·29	59,143	...	...	...	...	...	...
1924	...	...	...	...	...	...	10,672·00	34,955	...	...	...	...	...	...
1925	...	...	...	...	...	...	2,469·72	8,952	...	...	...	...	...	...
1926	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1927	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1928	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total ...	968·46	10,714	55·56	522	38·40	413	23,903·17	118,477	171·55	1,889	47,857·67	230,820	2·85	26

TABLE VI.—*Minerals other than Gold, etc.*—continued.

Period.	COPPER ORE—*continued.*										GYPSUM.					
	North Coolgardie Goldfield. Menzies District.		East Coolgardie Goldfield. E. Coolgardie D.		Phillips River Goldfield.		State generally.		Total.		Yilgarn Goldfield.		State generally.		Total.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Previous to 1917	tons. 6·12	£ 51	tons. 50·67	£ 330	tons. 86,947·55	£ 466,722	tons. 18·61	£ 249	tons. 213,075·32	£ 1,369,672	tons. ...	£ ...	tons. ...	£ ...	tons. ...	£ ...
1917	...	...	...	...	5,255·57	66,868	...	...	6,488·65	93,711	...	...	...	...	...	...
1918	...	...	...	...	2,901·66	42,978	...	...	4,982·91	77,527	...	...	...	...	...	...
1919	...	...	...	...	215·02	4,993	...	...	1,277·00	21,530	...	...	...	...	...	...
1920	...	...	...	...	217·27	4,125	...	...	1,962·16	37,945	...	...	...	...	...	...
1921	...	...	...	...	95·34	1,207	...	...	1,150·34	20,162	...	...	664·50	622	664·50	622
1922	...	...	...	...	31·84	217	...	...	1,194·50	16,133	...	...	63·00	16	63·00	16
1923	...	...	...	...	26·01	541	...	...	9,873·30	63,184	...	...	...	...	...	...
1924	...	...	...	...	3·69	44	...	...	10,754·69	36,011	...	...	4,237·00	5,278	4,237·00	5,278
1925	...	...	...	...	...	...	...	...	2,469·72	8,952	...	...	3,059·95	4,118	3,059·95	4,118
1926	...	...	...	...	...	...	...	...	...	...	139·00	139	3,778·76	5,479	3,917·76	5,618
1927	...	...	...	...	...	...	...	...	...	...	698·25	698	5,976·25	9,120	6,674·50	9,818
1928	...	...	...	...	...	...	...	...	45·00	400	1,214·00	1,214	3,000·00	4,211	4,214·00	5,425
Total ...	6·12	51	50·67	330	95,693·95	587,695	18·61	249	253,273·59	1,745,227	2,051·25	2,051	20,779·46	28,844	22,830·71	30,895

Period.	IRONSTONE.								LEAD ORE.					
	W. Pilbara Gf.		E. Coolgardie Gf. E. Coolgardie D.		State generally.		Total.		Northampton Mf.		West Pilbara Gf.		Total.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Previous to 1917	tons. 100·00	£ 300	tons. 450·00	£ 247	tons. 57,280·00	£ 36,148	tons. 57,830	£ 36,695	tons. 112,076·90	£ 274,979	tons. 44·00	£ 770	tons. 112,120·90	£ 275,749
1917	...	...	...	...	...	...	...	...	46,801·97	143,925	62·57	759	46,864·54	144,684
1917	...	...	...	...	...	...	...	...	47,079·68	176,330	...	...	47,079·68	176,330
1918	...	...	...	...	...	...	...	...	7,385·70	29,841	...	...	7,385·70	29,841
1919	...	...	...	...	...	...	...	...	27,716·40	172,483	...	...	27,716·40	172,483
1920	...	...	...	...	...	...	...	...	10,330·43	25,649	...	...	10,330·43	25,649
1921	...	...	...	...	...	...	...	...	29,602·90	72,338	...	...	29,602·90	72,338
1922	...	...	...	...	...	...	...	...	21,634·50	59,194	...	...	21,634·50	59,194
1923	...	...	...	...	...	...	...	...	36,750·00	101,219	...	...	36,750·00	101,219
1924	...	...	...	...	...	...	...	...	37,865·99	119,299	...	...	37,865·99	119,299
1925	...	...	...	...	...	...	...	...	23,973·35	72,872	...	...	23,973·35	72,872
1926	...	...	...	...	...	...	...	...	5,809·50	17,347	...	...	5,809·50	17,347
1927	...	...	...	...	...	...	...	...	112·00	315	...	...	112·00	315
1928	...	...	...	...	...	...	...	...						
Total ...	100·00	300	450·00	247	57,280·00	36,148	57,830·00	36,695	407,139·32	1,265,791	106·57	1,529	407,245·89	1,267,320

Period.	SILVER LEAD ORE.						TUNGSTEN ORES.											
	Pilbara Goldfield. Marble Bar District.		Ashburton Gfd.		Total.		WOLFRAM.		SCHEELITE.									
							State generally.		North Coolgardie Gf. Menzies District.		Broad Arrow. Goldfield.		Coolgardie Gf. Coolgardie District.		Dundas Goldfield.		Total.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Previous to 1917	tons.	£	tons. 2,431·54	£ 27,410	tons. 2,431·54	£ 27,410	tons. 265·89	£ 1,295	tons. ...	£ ...	tons. ...	£ ...	tons. ...	£ ...	tons. ...	£ ...	tons. ...	£ ...
1917	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1918	...	...	237·48	3,461	237·48	3,461	...	...	...	...	...	...	...	...	...	...	...	...
1919	...	...	214·76	3,116	214·76	3,116	...	...	273·06	829	...	...	45·71	101	...	...	318·77	930
1920	...	...	...	...	...	...	...	...	134·25	113	3·35	175	40·00	54	·41	10	178·01	352
1921	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1922	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1923	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1924	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1925	51·00	1,268	30·00	630	81·00	1,898	...	...	...	...	...	...	...	...	...	...	...	...
1926	90·50	1,305	...	...	90·50	1,305	...	...	...	...	...	...	...	...	...	...	...	...
1927	36·00	792	60·00	1,179	96·00	1,971	...	...	...	...	...	...	...	...	...	...	...	...
1928	17·85	293	...	...	17·85	293	...	...	...	...	...	...	...	...	...	...	...	...
Total ...	195·35	3,658	2,973·78	35,796	3,169·13	39,454	265·89	1,295	407·31	942	3·35	175	85·71	155	·41	10	496·78	1,282

Period.	COAL.		FIRECLAY.		GADOLINITE.		ASBESTOS.							
	Collie Mf.		Collie Mf.		Pilbara Gf. Marble Bar D.		Pilbara Gf. Marble Bar D.		Pilbara Gf. Nullagine D.		West Pilbara Goldfield.		Total.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Q'nty.	Value.	Quantity.	Value.
Previous to 1917	tons. 3,544,356·95	£ 1,657,415	tons. ...	£ ...	tons. 1·00	£ 112	tons. 42·83	£ 1,754	tons. ...	£ ...	tons. ...	£ ...	tons. 42·83	£ 1.754
1917	326,550·07	191,822	...	...	...	...	...	...	...	...	...	...	...	...
1918	337,039·24	204,319	...	...	...	...	...	...	...	...	...	...	...	...
1919	401,713·18	270,355	...	...	...	...	...	...	53·00	1,443	...	...	53·00	1,443
1920	462,020·78	350,346	...	...	...	...	32·00	1,900	124·50	5,386	...	...	156·50	7,286
1921	468,816·65	407,117	677·80	646	...	...	32·60	1,360	202·75	12,221	...	...	235·35	13,581
1922	438,442·78	381,555	...	...	...	...	2·50	250	179·18	7,350	...	...	181·68	7,600
1923	420,713·98	368,949	...	...	...	...	3·00	150	111·00	3,865	·85	17	114·85	4,032
1924	421,863·86	363,255	...	...	...	...	...	...	73·58	2,206	...	...	73·58	2,206
1925	437,461·20	363,203	...	...	...	...	...	...	50·00	1,619	·74	22	50·74	1,641
1926	474,818·69	394,400	...	...	...	...	...	...	91·45	2,436	13·89	292	105·34	2,728
1927	501,504·95	407,967	...	...	...	...	...	...	10·80	304	...	...	10·80	304
1928	528,420·00	420,145	373·00	92	...	...	5·70	600	6·00	182	...	...	11·70	783
Total ...	8,763,722·33	5,780,848	1,050·80	738	1·00	112	118·63	6,014	902·26	37,012	15·48	331	1,036·37	43,357

TABLE VI.—*Minerals other than Gold, etc.*—**continued.**

Period.	LIMESTONE.								DIAMONDS.		EMERALDS.		MAGNESITE.		ANTIMONY.		MANGANESE.	
	Murchison Gf. Cue District.		Yilgarn Goldfield.		State generally.		Total.		Pilbara Gf. Nullagine District.		Murchison Gf. Cue District.		E. Coolgardie Goldfield. Bulong District.		West Pilbara Goldfield.		Peak Hill Goldfield.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Valu
	tons.	£	tons.	£	tons.	£	tons.	£	carats.	£	carats.	£	tons.	£	tons.	£	tons.	£
Previous to 1917 ...	298·00	772	2,548·85	1,607	90,858·88	15,911	93,705·73	18,290	...	24	...	...	699·00	698	20·78	491	...	...
1917 ...	...	...	...	...	...	...	...	...	...	...	...	...	20·50	21	...	...	...	...
1918 ...	...	...	...	...	...	...	...	...	...	...	...	...	105·25	334	...	...	...	...
1919 ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1920 ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1921 ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1922 ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	18·11	142
1923 ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1924 ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	58·63	294
1925 ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1926 ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1927 ...	...	...	...	...	...	...	...	...	...	...	200·00	421	...	...	...	...	...	...
1928 ...	...	...	...	...	...	...	...	...	...	...	17,564.00	910	...	...	...	...	...	...
Total ...	**298·00**	**772**	**2,548·85**	**1,607**	**90,858·88**	**15,911**	**93,705·73**	**18,290**	...	**24**	**17,764.00**	**1,331**	**824·75**	**1,053**	**20·78**	**491**	**76·74**	**436**

NOTE.—As the collection of Statistics of Minerals other than Gold commenced during 1899, the total production from the different localities can only be approximately estimated by the Customs Records, the latest available returns of which are to be found in Table XXVI., page 66.

TABLE VII.

QUANTITY AND VALUE OF BLACK TIN REPORTED TO THE MINES DEPARTMENT DURING 1928, AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1928.				TOTALS TO DATE.			
			Quantity.			Value.	Quantity.			Value.
			Lode.	Stream.	Total.		Lode.	Stream.	Total.	
			tons.	tons.	tons.	£	tons.	tons.	tons.	£
PILBARA GOLDFIELD.										
MARBLE BAR DISTRICT.										
Cooglegong ...	...	Sundry claims	...	8·97	8·97	1,265	...	1,770·22	1,770·22	161,531
Mills Find ...	...	Sundry claims	...	...	...	...	...	·85	·85	69
Moolyella ...	...	Voided leases	...	...	...	...	...	330·53	330·53	21,340
Do. ...	...	Sundry claims	...	24·05	24·05	3,514	...	2,926·97	2,926·97	283,025
Old Shaw ...	...	Voided leases	...	...	...	...	...	6·75	6·75	424
Do. ...	...	Sundry claims	...	·81	·81	111	...	214·85	214·85	14,636
Tabba Tabba ...	...	Sundry claims	...	·10	·10	13	...	117·80	117·80	13,278
Wodgina ...	M.Ls. 86, 87, 95	H.M. and Anchorite leases ...	...	...	...	...	...	5·00	5·00	500
Do. ...	...	Voided leases	...	...	...	...	366·84	21·55	388·39	35,511
Do ...	...	Sundry claims	...	1·55	1·55	268	5·78	49·75	55·53	5,330
		Totals	...	**35·48**	**35·48**	**5,171**	**372·62**	**5,444·27**	**5,816·89**	**535,644**
MURCHISON GOLDFIELD.										
CUE DISTRICT.										
Poona	...	Sundry claims	...	...	...	...	...	1·52	1·52	118
Cuddingwarra ...	...	Sundry claims	...	...	...	...	...	3·20	3·20	242
		Totals	...	...	...	...	...	**4·72**	**4·72**	**360**
COOLGARDIE GOLDFIELD.										
COOLGARDIE DISTRICT.										
Bulla Bulling ...	...	Sundry claims	...	...	...	...	...	·15	·15	15
		Totals	...	...	...	...	...	**·15**	**·15**	**15**
GREENBUSHES MINERAL FIELD.										
Greenbushes ...	M.L. 620 ...	Gold Coin	...	1·09	1·09	115	...	1·09	1·09	115
Do. ...	M.L. 515 ...	Kapanga	...	...	...	...	35·53	1·35	36·88	4,757
Do. ...	M.L. 628 ...	Lost and Found	...	...	...	...	·33	...	·33	50
Do. ...	M.L. 505, 614...	Scotia leases	...	1·80	1·80	201	...	99·81	99·81	11,907
Do. ...	Locs. 289, 290	Clarth and others	...	...	...	...	...	318·04	318·04	28,959
Do. ...	Loc. 290 ...	McKay & Struthers ...	...	...	...	...	...	5·39	5·39	762
Do. ...	...	Voided leases	...	...	...	...	243·09	3,471·20	3,714·29	368,249
Do. ...	...	Sundry claims	...	51·65	51·65	6,039	71·10	6,810·01	6,881·11	545,752
		Totals	...	**54·54**	**54·54**	**6,355**	**350·05**	**10,706·89**	**11,056·94**	**960,551**

TABLE VIII.

QUANTITY AND VALUE OF TANTALITE REPORTED TO THE MINES DEPARTMENT DURING 1928, AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1928.				TOTAL TO DATE.			
			Quantity.			Value.	Quantity.			Value.
			Lode.	Stream.	Total.		Lode.	Stream.	Total.	
			tons.	tons.	tons.	£	tons.	tons.	tons.	£
PILBARA GOLDFIELD.										
MARBLE BAR DISTRICT.										
Tabba Tabba ...	M.L. 317 ...	Koolinda North	...	1·00	1·00	250	...	1·00	1·00	250
Do. ...	M.L's. 321, 322	Strelley North Leases	...	·57	·57	165	...	·57	·57	165
Wodgina ...	M.Ls. 86, 87, 95	H.M. and Anchorite leases ...	...	7·19	7·19	1,798	2·25	90·97	93·22	15,813
Do. ...	M.L. 293 ...	May Be	...	...	...	...	...	2·00	2·00	240
Do. ...	...	Sundry claims	...	...	...	...	...	51·50	51·50	6,124
		Totals	...	**8·76**	**8·76**	**2,213**	**2·25**	**146·04**	**148·29**	**22,592**
GREENBUSHES MINERAL FIELD.										
Greenbushes ...	(369)	Enterprise	...	...	...	...	...	3·19	3·19	1,804
		Totals	...	...	...	...	...	**3·19**	**3·19**	**1,804**

TABLE IX.

QUANTITY AND VALUE OF PYRITIC ORE REPORTED TO THE MINES DEPARTMENT DURING 1928, AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1928.		TOTAL TO DATE.	
			Quantity.	†Value.	Quantity.	†Value.
			tons.	£	tons.	£
MT. MARGARET GOLDFIELD.						
MT. MORGANS DISTRICT.						
Eulaminna ...	M.Ls. (4F), (5F), (11F), (12F)	West Australian Copper Co., Ltd.	...	...	61,687·98	38,818
Murrin Murrin...	M.L (18F) ...	Nangeroo: Nangaroo Mines, Ltd.	...	...	12,359·58	6,678
		Totals	...	..	74,047·56	45,496

† Represents the value of the sulphur only, the copper contents not having been treated.

TABLE X.

QUANTITY AND VALUE OF COPPER ORE REPORTED TO THE MINES DEPARTMENT DURING 1928, AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1928.			TOTAL TO DATE.		
			Quantity.		Value.	Quantity.		Value.
			Ore.	Metallic Copper.		Ore.	Metallic Copper.	
			tons.	tons.	£	tons.	tons.	£
WEST KIMBERLEY GOLDFIELD.								
Berylton ...	...	Voided leases	...	...	...	13·19	2·76	200
Yampi Sound ...	M.L. (1), [221H]	Yampi Sound Copper Mine	...	...	...	92·86	22·80	1,473
Do. ...	... ...	Sundry claims	...	...	...	3·47	·36	36
		Totals	...	...	...	109·52	25·92	1,709
PILBARA GOLDFIELD.								
MARBLE BAR DISTRICT.								
Marble Bar ...	... ...	Voided Leases	...	...	...	11·00	1·64	90
Do. ...	... ...	Sundry claims	...	...	...	4·75	·48	25
North Pole ...	... ...	Voided leases	...	...	...	9·35	1·39	81
North Shaw ...	... ...	Voided leases	...	...	...	7·77	1·90	190
		Totals	...	...	...	32·87	5·41	386
NULLAGINE DISTRICT.								
Lionel	... ...	Sundry claims	...	...	...	9·00	4·75	360
McPhee's Creek	M.L. (14L) ...	Tambina	...	...	...	5·00	2·22	120
		Totals	...	...	...	14·00	6·97	480
WEST PILBARA GOLDFIELD.								
Croydon ...	... ...	Voided leases	...	...	...	604·00	108·65	7,333
Egina	... ...	Voided leases	...	...	...	542·00	104·15	6,643
Roebourne ...	M.L. 183 ...	(Carlow Castle: Roebourne Copper Mine, Ltd.)	...	...	...	69·00	7·80	780
Do. ...	M.L. 174 ...	Good Fortune	...	...	...	56·77	8·58	904
Do. ...	M.Ls. 174, (175)	(Good Fortune leases)	...	...	...	63·40	9·58	1,011
Do. ...	M.L. 184 ...	Good Luck	...	...	...	5·21	1·01	111
Do. ...	M.L. 167 ...	(Quod Est.)	...	...	...	22·43	3·49	256
Do. ...	M.Ls. 167, 183	Roebourne Copper Mines, Ltd.	45·00	6·25	400	167·45	24·75	2,455
Do. ...	M.Ls. 144, (192), (193)	Yannery and Whundo Copper Mining Co., Ltd.	...	...	...	404·50	87·14	8,116
Do. ...	M.L. 144 ...	Yannery Hill Copper Mine	...	...	...	469·25	113·81	9,961
Do. ...	...	Voided leases	...	...	...	2,729·28	515·83	44,459
Do. ...	...	Sundry claims	...	...	...	77·41	13·61	800
Whim Creek ...	M.L. 34 ...	(Balla Balla Copper Mines, Ltd.)	...	...	...	2,009·00	166·33	12,036
Do. ...	M.L. 34 ...	Mons. Cupri: Whim Well Copper Mines, Ltd.	...	...	...	282·50	33·75	2,979
Do. ...	Loc. 71 ...	Pilbarra Copper Fields, Ltd.	...	...	...	2,650·50	574·31	46,096
Do. ...	Loc. 71 ...	(Whim Well Copper Mines, Ltd.)	...	...	...	72,562·75	9,343·89	604,492
Do. ...	...	Voided leases	...	...	...	30·00	5·50	250
		Totals	45·00	6·25	400	82,745·45	11,122·18	748,482

TABLE X.— *Quantity and Value of COPPER ORE, etc.*— continued.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1928.			TOTALS TO DATE.		
			Quantity.		Value.	Quantity.		Value.
			Ore.	Metallic Copper.		Ore.	Metallic Copper.	
			tons.	tons.	£	tons.	tons.	£
ASHBURTON GOLDFIELD.								
Ashburton ...	...	Sundry claims	...	...	...	6·32	·79	94
Red Hill ...	...	Voided leases	...	...	...	175·50	33·85	2,126
Uaroo	...	Voided leases	...	...	...	169·25	62·49	4,188
		Totals	...	...	...	**351·07**	**97·13**	**6,408**
PEAK HILL GOLDFIELD.								
Peak Hill ...	M.L. (35P) ...	Burra Copper Mines, Ltd.	...	...	...	25·84	8·85	943
Do. ...	M.Ls. (37P), (38P)	Sonia leases	...	...	...	135·04	47·26	4,807
Do. ...	M.L. (9P) ...	Sons of Gwalia	...	...	...	458·49	169·89	15,680
Do. ...	M.Ls. (29P), (30P) (31P)	(Two Sisters leases)	...	...	...	64·04	30·93	1,466
Do. ...	M.L. (31P) ...	Two Sisters North...	...	...	...	115·76	31·40	3,594
Do. ...	... ...	Voided leases	...	...	...	153·91	43·02	3,885
Do. ...	... ...	Sundry claims	...	...	...	62·03	21·96	1,837
		Totals	...	...	...	**1,015·11**	**353·31**	**32,212**
EAST MURCHISON GOLDFIELD.								
LAWLERS DISTRICT.								
Kathleen Valley	M.L. (12) ...	Shepherd	...	...	...	6·77	1·32	69
Lawlers ...	M.L. (29 ...	Bungarra	...	...	...	157·44	23·85	2,837
Do. ...	...)	Sundry claims	...	...	...	74·35	13·25	1,458
		Totals	...	...	...	**238·56**	**38·42**	**4,364**
MURCHISON GOLDFIELD.								
MEEKATHARRA DISTRICT.								
Gabanintha ...	...	Voided leases	...	...	...	920·56	119·84	9,381
Do. ...	...	Sundry claims	...	...	...	34·42	9·23	1,072
Holden's Find...	...	Sundry claims	...	...	...	6·72	1·11	111
Yalogindа ...	...	Sundry claims	...	...	...	6·76	1·41	150
		Totals	...	...	...	**968·46**	**131·59**	**10,714**
DAY DAWN DISTRICT.								
Day Dawn ...	... ...	Voided leases	...	...	...	26·95	5·17	805
Do. ...	... ...	Sundry claims	...	...	...	28·61	2·93	217
		Totals	...	...	...	**55·56**	**8·10**	**522**
YALGOO GOLDFIELD.								
Mount Gibson ...	... ...	Sundry claims	...	...	...	4·99	1·10	95
Twin Peaks ...	... ...	Sundry claims	...	...	...	19·50	3·49	227
Wadgingarra ...	M.L. (6) ...	Olive Queen	...	...	...	13·91	·98	91
		Totals	...	...	...	**38·40**	**5·57**	**413**
NORTHAMPTON MINERAL FIELD.								
Geraldine ...	M.Ls. (10), (11)	Geraldine leases	...	...	...	136·50	36·05	1,992
Narra Tarra ...	Loc. 833 ...	Narra Tarra : Fremantle Trading Co., Ltd.	...	...	...	23,766·67	1,784·64	116,485
		Totals	...	...	...	**23,903·17**	**1,820·69**	**118,477**
YANDANOOKA MINERAL FIELD.								
Arrino	... ...	Sundry claims	...	...	...	126·05	18·48	1,386
Yandanooka ...	Freehold Gd. ...	Muggawa Copper Mines	...	...	...	7·50	1·20	96
Do. ...	... ...	Voided leases	...	...	...	38·00	7·95	407
		Totals	...	...	...	**171·55**	**27·63**	**1,889**
MOUNT MARGARET GOLDFIELD.								
MOUNT MORGANS DISTRICT.								
Eurimina ...	[10C, 11C], (4F), (5F) (12C, 37C)	(Mt. Malcolm Copper Mine leases) ...	...	...	...	13,516·00	1,001·98	70,754
Do. ...	[10C, 11C], (4F), (5F)	(Mt. Malcolm Copper Mine leases) ...	...	...	...	3,839·00	418·00	17,065
Do. ...	[10C, 11C], (4F), (5F), (12C, 37C)	(Murrin Copper Mines, Ltd.)	...	...	...	19,165·00	798·50	45,817
Do. ...	(4F), (5F), (11F), (12F)	West Australian Copper Co., Ltd.	...	...	...	9,794·05	1,976·08	80,199
Mt. Margaret ...	G.M.L. (66F) ...	Mt. Morven	...	...	...	11·53	2·40	163
Murrin Murrin...	(18F)	Nangeroo : Nangaroo Mines, Ltd.	...	...	...	6·80	3·00	160
Do. ...	... ...	Voided leases	...	...	...	1,525·29	248·04	16,662
		Totals	...	...	...	**47,357 67**	**4,448·00**	**230,82**

TABLE X.— *Quantity and Value of COPPER ORE, etc.*—continued.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LESSEE.	1928.			TOTALS TO DATE.		
			Quantity.		Value.	Quantity.		Value.
			Ore.	Metallic Copper.		Ore.	Metallic Copper.	
			tons.	tons.	£	tons.	tons.	£
MOUNT MARGARET GOLDFIELD—*continued.*								
MOUNT MARGARET DISTRICT.								
Burtville ...	M.L. (16f) ...	Dreadnought	...	...	...	2·85	·29	26
		Totals	...	...	...	2·85	·29	26
NORTH COOLGARDIE GOLDFIELD.								
MENZIES DISTRICT.								
Goongarrie ...	M.L. (13z) ...	Providence Copper Mining Syndicate, Ltd.	...	...	...	4·70	·42	33
Do. ...	... ...	Sundry claims	...	...	...	1·42	·40	18
		Totals	...	...	...	6·12	·82	51
EAST COOLGARDIE GOLDFIELD.								
EAST COOLGARDIE DISTRICT.								
Boorara ...	M.L. (100E) ...	Premier Copper Mine	...	...	...	50·67	6·22	330
		Totals	...	...	...	50·67	6·22	330
PHILLIPS RIVER GOLDFIELD.								
Kundip ...	G.M.Ls. 147, 179	Fair Play leases	...	...	...	130·09	131·30	11,975
Do. ...	G.M.L. 184 ...	Gem	...	...	...	90·98	22·58	2,404
Do. ...	G.M.Ls. 151, 156	Gem Consolidated leases	...	...	...	48·00	76·75	8,327
Do. ...	M.Ls. 52, 94 ...	Harbour View Gold and Copper Co., Ltd. ...	...	...	...	1,209·93	90·14	8,236
Do. ...	M.Ls. 52, 94 ...	(Harbour View leases)	...	...	...	604·36	76·80	4,524
Do. ...	M.Ls. 52, 94 ...	(Harbour View leases)	...	...	...	508·27	64·66	3,642
Do. ...	G.M.L. (98) ...	Hillsborough	...	...	...	692·84	57·65	4,746
Do. ...	M.L. 370 ...	North Harbour View	...	...	...	15·72	·99	124
Do. ...	M.Ls. 52, 94 ...	(Ravensthorpe G.M. Syndicate, N.L.) ...	...	...	...	132·56	24·36	1,382
Do. ...	... ...	Voided leases	...	...	...	3,430·67	319·32	22,398
Do. ...	... ...	Sundry claims	...	...	...	111·12	17·40	1,372
Mt. Desmond ...	... ...	Voided leases	...	...	...	46,952·31	4,107·47	279,054
Do. ...	... ...	Sundry claims	...	...	...	140·25	25·17	1,901
Ravensthorpe ...	M.L. (16) ...	Marion Martin	...	...	...	2,270·63	256·94	26,496
Do. ...	M.L. (16) ...	(Marion Martin)	...	...	...	865·69	130·61	6,650
Do. ...	M.L. (16) ...	(Marion Martin: Phillips River Gold and Copper Co., Ltd.)	...	...	...	2,855·36	375·44	23,506
Do. ...	M.L. (15) ...	Mount Cattlin	...	...	...	2,178·01	142·64	15,296
Do. ...	M.L. (15) ...	(Mount Cattlin)	...	...	...	281·56	31·35	1,716
Do. ...	M.L. (15) ...	(Mount Cattlin: Mount Cattlin Copper Mining Co., Ltd.)	...	...	...	6,608·76	333·59	28,841
Do. ...	M.L. (15) ...	(Mount Cattlin: Phillips River Gold & Copper Co., Ltd.)	...	...	...	1,263·76	80·26	7,646
Do. ...	M.L. (15) ...	(Mount Cattlin: Phillips River Gold and Copper Co., Ltd.)	...	...	...	14,432·25	714·90	40,313
Do. ...	... ...	Voided leases	...	...	...	7,880·86	986·55	63,429
Do. ...	... ...	Sundry claims	...	...	...	1,157·36	133·24	11,482
West River ...	... ...	Voided leases	...	...	...	44·04	7·41	414
Do. ...	... ...	Sundry claims	...	...	...	150·69	25·84	2,061
		From Goldfield generally	...	...	...	1,637·88	128·64	9,760
		Totals	...	...	...	95,693·95	8,362·00	587,695
STATE GENERALLY.								
...	... ...	Voided leases	...	...	...	5·11	1·54	56
...	... ...	Sundry claims	...	...	...	13·50	2·27	193
		Totals	...	...	...	18·61	3·81	249

TABLE XI.

QUANTITY AND VALUE OF IRONSTONE REPORTED TO THE MINES DEPARTMENT DURING 1928, AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1928.		TOTALS TO DATE.	
			Quantity.	Value.	Quantity.	Value.
			tons.	£	tons.	£
WEST PILBARA GOLDFIELD.						
Whim Creek ...	(17), (18), (21)	Whim Well Copper Mines	...	...	100·00	300
		Totals	...	...	**100·00**	**300**
EAST COOLGARDIE GOLDFIELD.						
EAST COOLGARDIE DISTRICT.						
Boulder ...	(1490E) ...	Mt. Ferrum	...	...	450·00	247
		Totals	...	...	**450·00**	**247**
STATE GENERALLY.						
		Avon	...	...	22,223·00	16,241
		Clackline	...	...	18,253·50	8,789
		Coates' Paddock	...	...	4,712·00	3,277
		Greenbushes	...	...	7,481·00	4,629
		Koolan Island—Yampi Sound	...	...	10·50	12
		Werribee	...	...	4,600·00	3,200
		Totals	...	...	**57,280·00**	**36,148**

TABLE XII.

QUANTITY AND VALUE OF LEAD ORE REPORTED TO THE MINES DEPARTMENT DURING 1928, AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1928.			TOTALS TO DATE.		
			Lead Ore.	Metal therefrom.	Value.	Lead Ore.	Metal therefrom.	Value.
			tons.	tons.	£	tons.	tons.	£
NORTHAMPTON MINERAL FIELD.								
Geraldine ...	Loc. 1 ...	Geraldine Mine	...	...	...	774·59	257·13	5,139
Do. ...	M.L. 200 ...	Grand Junction	...	...	...	227·50	39·19	795
Do. —	M.L. 24P.P. ...	(Springvale)	...	...	...	2,290·00	261·23	8,893
Do. ...	M.L. 24P.P. ...	Springvale: Tarcoola Blocks Mines, N.L.	...	...	...	3,350·00	357·46	9,640
Do. ...	M.Ls.(148), (150), (154), (158), 20P.P.	Surprise leases...	...	...	...	93,834·03	13,019·33	392,709
Do. ...	M.L. (158) ...	(Surprise South)	...	...	...	14·00	5·41	170
Do. ...	M.L. 153 ...	Three Sisters: Ajana Lead Mines, Ltd.	...	...	...	8,726·00	892·88	30,619
Do. ...	M.L. 153 ...	(Three Sisters)...	...	...	...	6·25	3·94	112
Do. ...	M.L. 197 ...	(Two Boys)	...	...	...	4,874·50	547·99	16,403
Do. ...	M.L. 197 ...	Two Boys: Two Boys Lead Mining Co., Ltd.	...	...	...	4,870·75	394·17	12,089
Do. ...	M.L. 202 ...	Welcome: Two Boys Lead Mining Co., Ltd.	...	...	...	1,263·00	115·21	3,274
Do. ...	M.L. 23P.P. ...	Wheal Ina	...	...	...	513·00	85·27	1,877
Do. ...	Loc. 7 ...	Thring & Green	...	...	...	3,168·38	979·25	23,893
Do. ...	...	Voided leases	...	...	...	145·49	87·61	1,357
Do. ...	...	Sundry claims	...	...	...	327·04	175·65	3,408
Narra Tarra ...	Loc. 833 ...	Jupp and others (Tributers) ...	112·00	21·00	315	846·00	129·60	2,293
Do. ...	Loc. 833 ...	Narra Tarra: Fremantle Trading Co., Ltd.	...	...	...	126,429·50	12,377·27	361,745
Do. ...	Locs. 118, 119	Lauder & Raven (Tributers)	...	...	...	106·21	60·02	1,345
Do. ...	...	Sundry claims	...	...	...	238·16	34·18	442
Northampton ...	Loc. 1472 ...	Baddera: Fremantle Trading Co., Ltd.	...	...	...	129,264·56	13,888·33	317,631
Do. ...	Loc. 436 ...	Fortune Exploration Co., N.L. ...	...	...	...	123·38	51·17	1,316
Do. ...	M.L. 27P.P. ...	Lady Samson	...	...	...	45·00	7·25	132
Do. ...	Loc. 1146 ...	Wheal Ellen: Fremantle Trading Co., Ltd.	...	...	...	22,033·28	1,818·71	52,456
Do. ...	Loc. 436 ...	Wheal of Fortune Extended Syndicate	...	...	...	125·82	43·13	793
Do. ...	...	Voided leases	...	...	...	3,266·76	723·13	14,329
Do. ...	...	Sundry claims	...	...	...	257·12	139·14	2,719
Victoria... ...	...	Voided leases	...	...	...	19·00	12·54	212
		Totals	**112·00**	**21·00**	**315**	**407,139·32**	**46,506·29**	**1,265,791**
WEST PILBARA GOLDFIELD.								
Roebourne ...	... ...	Sundry claims	...	...	...	2·57	1·36	39
Whim Creek ...	M.L. (172) ...	Cumstock	...	...	...	104·00	46·00	1,490
		Totals	..	...	...	**106·57**	**47·36**	**1,529**

TABLE XIII.

QUANTITY AND VALUE OF SILVER-LEAD ORE REPORTED TO THE MINES DEPARTMENT DURING 1928, AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE CLAIM OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1928.		TOTALS TO DATE.	
			Quantity.	Value.	Quantity.	Value.
			tons.	£	tons.	£
		PILBARA GOLDFIELD.				
		MARBLE BAR DISTRICT.				
Braeside ...	M.L. 295 ...	Koongalin	...	...	46·00	1,140
Do. ...	M.L. 297 ...	Oakover	17·85	293	20·85	347
Do. ...	M.L. 288 ...	Ragged Hill	...	...	28·50	627
Do. ...	...	Sundry claims	...	...	98·50	1,509
Do. ...	...	Voided leases	...	...	1·50	35
		Totals	17·85	293	195·35	3,658
		'ASHBURTON GOLDFIELD.				
Uaroo ...	M.L. 102 ...	Silver Star	...	...	90·00	1,809
Do. ...	...	Voided leases	...	...	2,880·95	33,947
Do. ...	...	Sundry claims	...	...	2·83	40
		Totals	...	...	2,973·78	35,796

TABLE XIV.

QUANTITY AND VALUE OF COAL REPORTED TO THE MINES DEPARTMENT DURING 1928, AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1928.		TOTALS TO DATE.	
			Quantity.	Value.	Quantity.	Value.
			tons.	£	tons.	£
		COLLIE MINERAL FIELD.				
Collie	197, etc. ...	Amalgamated Collieries of W.A., Ltd. (Cardiff Mine)	89,877·00	70,834	596,444·28	485,279
Do. ...	244, etc. ...	Amalgamated Collieries of W.A., Ltd. (Co-operative Mine) ...	120,619·80	96,627	1,028,037·51	855,775
Do. ...	85, etc. ...	Amalgamated Collieries of W.A., Ltd. (Proprietary Mine) ...	171,603·50	137,455	1,111,782·36	931,464
Do. ...	74, etc. ...	Amalgamated Collieries of W.A., Ltd. (Stockton Mine) ...	23,913·20	16,949	24,114·30	17,069
Do. ...	250, etc. ...	Amalgamated Collieries of W.A., Ltd. (Westralia Mine) ...	122,406·50	98,280	671,865·92	575,881
Do. ...	151, etc. ...	(Amalgamated Collieries of W.A., Ltd.) (Scottish Mine) ...	...	...	380·00	251
Do. ...	197, etc. ...	(Cardiff Coal Mining Co., Ltd.)	...	...	976,824·78	471,417
Do. ...	151, etc. ...	(Collie Boulder Coal Co., Ltd.)	...	...	71,512·70	26,139
Do. ...	244, etc. ...	(Collie Co-operative Collieries, Ltd.	...	...	970,044·30	511,862
Do. ...	88 (part of) ...	(Collie Proprietary Coalfields of W.A., Ltd.)	...	...	477,781·55	242,918
Do. ...	85, etc. ...	(Collie Proprietary Coalfields of W.A., Ltd.)	...	...	580,392·15	289,246
Do. ...	314, etc. ...	(Griffin leases)	...	...	1,866·27	1,228
Do. ...	314, etc. ...	Griffin Coal Mining Co., Ltd.	...	...	287·18	172
Do. ...	260, etc. ...	Premier Coal Mining Co., Ltd.	...	...	468,086·03	347,155
Do. ...	151, etc. ...	(Scottish Collieries, Ltd.)	...	...	2,314·51	1,210
Do. ...	151, etc. ...	(Scottish Co-operative Collieries, Ltd.)	...	...	430,796·95	171,303
Do. ...	85, etc. ...	(The Proprietary Coal Mines of W.A., Ltd.)	...	...	693,045·34	413,755
Do. ...	88 (part of) ...	(The Proprietary Coal Mines of W.A., Ltd.)	...	...	109·00	54
Do. ...	250, etc. ...	(Westralian Coal Mining Co., Ltd.)	...	...	507,384·11	307,913
Do. ...	250, etc. ...	(Westralia Black Diamond Collieries, Ltd.)	...	...	125,083·24	117,827
		Voided leases	...	...	25,569·85	12,930
		Totals	528,420·00	420,145	8,763,722·33	5,780,848

TABLE XV.

QUANTITY AND VALUE OF FIRECLAY REPORTED TO THE MINES DEPARTMENT DURING 1928, AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1928.		TOTALS TO DATE.	
			Quantity.	Value.	Quantity.	Value.
		COLLIE MINERAL FIELD.	tons.	£	tons.	£
Collie	87	Amalgamated Collieries of W.A., Ltd. (Proprietary lease) ...	373·00	92	1,050·80	738
		Totals	373·00	92	1,050·80	738

TABLE XVI.

QUANTITY AND VALUE OF LIMESTONE REPORTED TO THE MINES DEPARTMENT DURING 1928, AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1928.		TOTALS TO DATE.	
			Quantity.	Value.	Quantity.	Value
			tons.	£	tons.	£
		MURCHISON GOLDFIELD.				
		CUE DISTRICT.				
Cuddingwarra ...	M.L. (3) ...	Linella	...	...	298·00	772
		Totals	...	...	298·00	772
		YILGARN GOLDFIELD.				
Southern Cross	... ...	Voided leases	...	...	2,548·85	1,607
		Totals	...	...	2,548·85	1,607
		STATE GENERALLY.				
Fremantle ...	... ...	... ...	...	...	90,858·88	15,911
		Totals	...	...	90,858·88	15,911

TABLE XVII.

QUANTITY AND VALUE OF ASBESTOS REPORTED TO THE MINES DEPARTMENT DURING 1928, AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1928.		TOTALS TO DATE.	
			Quantity.	Value.	Quantity.	Value.
			tons.	£	tons.	£
		PILBARA GOLDFIELD.				
		MARBLE BAR DISTRICT.				
Cooglegong ...	... ...	Voided leases	...	...	70·10	3,660
Soansville ...	M.L. 324 ...	Chrysotile West	5·70	600	5·70	600
Do. ...	... ...	Voided leases	...	...	42·83	1,754
			5·70	600	118·63	6,014
		NULLAGINE DISTRICT.				
Lionel	...	Voided leases	...	...	578·98	27,197
Do. ...	...	Sundry claims	6·00	182	323·28	9,815
		Totals	6·00	182	902·26	37,012
		WEST PILBARA GOLDFIELD				
Roebourne ...	... ...	Sundry claims	...	...	·85	17
Do. ...	M.L. 215 ...	Greenhill Reward	...	...	14·63	314
		Totals	...	...	15·48	331

TABLE XVIII.

QUANTITY AND VALUE OF GADOLINITE REPORTED TO THE MINES DEPARTMENT DURING 1928, AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1928.		TOTALS TO DATE.	
			Quantity.	Value.	Quantity.	Value.
			tons.	£	tons	£
		PILBARA GOLDFIELD.				
		MARBLE BAR DISTRICT.				
Cooglegong ...	(M.L. 254) ...	Iverna	...	...	1 00	112
		Totals	...	...	1 00	112

TABLE XIX.

QUANTITY AND VALUE OF TUNGSTEN ORES REPORTED TO THE MINES DEPARTMENT DURING 1928, AND TOTALS TO DATE.

SCHEELITE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1928.			TOTALS TO DATE.		
			Ore.	Contents Tungstic Trioxide.	Value.	Ore.	Contents Tungstic Trioxide.	Value.
			tons.	units.	£	tons.	units.	£
NORTH COOLGARDIE GOLDFIELD.								
MENZIES DISTRICT.								
Comet Vale ...	G.M.L. 5410Z...	Lake View	...	...	...	380·84	338·39	818
Do. ...	... ...	Sundry claims	...	...	...	26·47	47·38	124
		Totals	...	...	...	407·31	385·77	942
BROAD ARROW GOLDFIELD.								
Ora Banda ...	... ...	Sundry claims	...	...	...	3·35	66·50	175
		Totals	...	...	...	3·35	66·50	175
COOLGARDIE GOLDFIELD.								
COOLGARDIE DISTRICT.								
Higginsville ...	... ...	Sundry claims	...	...	...	85·71	59·07	155
		Totals	...	...	...	85·71	59·07	155
DUNDAS GOLDFIELD.								
Norseman ...	... ...	Sundry claims	...	...	...	·41	3·98	10
		Totals	...	...	...	·41	3·98	10

WOLFRAM.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1928.			TOTALS TO DATE.		
			Ore.	Metallic contents.	Value.	Ore.	Metallic contents.	Value.
			tons.	tons.	£	tons.	tons.	£
MURCHISON GOLDFIELD.								
CUE DISTRICT.								
Callie Spring ...	M.L. (11) ...	Socialist	...	...	...	194·00	6·11	877
Do. ...	... ...	Sundry claims	...	...	...	44·64	2·30	271
		Totals	...	...	...	238·64	8·41	1,148
YALGOO GOLDFIELD.								
Yalgoo	M.L. (36) ...	Yandanoo King North	...	...	...	·25	·12	27
		Totals	...	...	...	·25	·12	27
STATE GENERALLY.								
Derby	(146H) ...	Taylor's Wolfram Reward ...	...	...	...	27·00	2·00	120
		Totals	...	...	...	27·00	2·00	120

TABLE XX.

QUANTITY AND VALUE OF MAGNESITE REPORTED TO THE MINES DEPARTMENT DURING 1928, AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1928.		TOTALS TO DATE.	
			Quantity.	Value.	Quantity.	Value.
			tons.	£	tons.	£
EAST COOLGARDIE GOLDFIELD.						
		BULONG DISTRICT.				
Bulong	... ...	Sundry claims	...	...	824·75	1,053
		Totals	...	...	824·75	1,053

TABLE XXI.

QUANTITY AND VALUE OF ANTIMONY REPORTED TO THE MINES DEPARTMENT DURING 1928, AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1928.			TOTALS TO DATE.		
			Ore.	Metallic contents.	Value.	Ore.	Metallic contents.	Value.
			tons.	tons.	£	tons.	tons.	£
WEST PILBARA GOLDFIELD.								
Balla Balla ...	M.L. (185) ...	Star	...	...	...	20·78	11·58	491
		Totals	...	...	...	20·78	11·58	491

TABLE XXII.

QUANTITY AND VALUE OF GYPSUM REPORTED TO THE MINES DEPARTMENT DURING 1928, AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1928.		TOTALS TO DATE.	
			Quantity.	Value.	Quantity.	Value.
			tons	£	tons.	£
YILGARN GOLDFIELD.						
Lake Seabrook	... ...	Sundry claims	1,214·00	1,214	2,051·25	2,051
		Totals	**1,214·00**	**1,214**	**2,051·25**	**2,051**
STATE GENERALLY.						
Baandee ...	...	Sundry claims	551·50	827	4,187·71	6,017
Dukin	...	Sundry claims	...	...	487·00	615
Hines Hill ...	...	Sundry claims	722·00	722	2,699·00	2,381
Koorda ...	M.L. 280H ...	White Cross	277·50	416	5,727·55	7,955
Woolundra ...	...	Sundry claims	1,449·00	2,246	7,678·20	11,930
		Totals	**3,000·00**	**4,211**	**20,779·46**	**28,844**

TABLE XXIII.

QUANTITY AND VALUE OF EMERALDS REPORTED TO THE MINES DEPARTMENT DURING 1928, AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1928.			TOTALS TO DATE.		
			Quantity.		Value.	Quantity.		Value.
			carats (rough).	carats (cut).	£	carats (rough).	carats (cut).	£
MURCHISON GOLDFIELD.								
CUE DISTRICT.								
Poona	M.L. 79 ...	Star One: Star Mining Syndicate, Ltd.	17,564	...	910	17,564	200	1,331
		Totals	**17,564**	...	**910**	**17,564**	**200**	**1,331**

TABLE XXIV.

QUANTITY AND VALUE OF DIAMONDS REPORTED TO THE MINES DEPARTMENT DURING 1928, AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1928.		TOTALS TO DATE.	
			Quantity.	Value.	Quantity.	Value.
			carats.	£	carats.	£
		PILBARA GOLDFIELD.				
		NULLAGINE DISTRICT.				
Nullagine ...	M.R.C. (6L) ...	Morgans, A. E.	...	...	...	24
		Totals	...	...	...	24

TABLE XXV.

QUANTITY AND VALUE OF MANGANESE REPORTED TO THE MINES DEPARTMENT DURING 1928, AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1928.		TOTALS TO DATE.	
			Quantity.	Value.	Quantity.	Value.
			tons.	£	tons.	£
		PEAK HILL GOLDFIELD.				
Horseshoe ..	...	Voided leases	...	...	18·11	142
Do. ...	...	Sundry claims	...	...	58·63	294
		Totals	...	...	76·74	436

TABLE

RETURN OF ORE AND MINERALS OTHER THAN GOLD

YEAR.	COPPER.												
	COPPER ORE.										COPPER INGOT, MATTE, ETC.		Total Value of Copper Exported.
	West Pilbara Gf.		Northampton Mf.		Phillips River Gf.		State generally.		Total.		State generally.		
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	
	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	£
1850 ...	...	...	...	...	...	...	...	...	...	...	...	...	...
1 ...	...	...	...	...	...	...	...	...	...	...	...	...	...
2 ...	...	...	...	...	...	...	...	...	...	...	...	...	...
3 ...	...	...	[2]†	7	...	...	...	...	...	7	...	...	7
4 ...	...	...	...	...	...	...	...	...	...	...	...	...	...
5 ...	...	...	2	26	...	...	...	...	2	26	...	...	26
6 ...	...	...	57	1,018	...	...	...	...	57	1,018	...	...	1,018
7 ...	...	...	80	1,920	...	...	...	...	80	1,920	...	...	1,920
8 ...	...	...	433	9,531	...	...	...	...	433	9,531	...	...	9,531
9 ...	...	...	941	14,122	...	...	...	...	941	14,122	...	...	14,122
1860 ...	...	...	517	8,021	...	...	...	...	517	8,021	...	...	8,021
1 ...	...	...	409	6,339	...	...	...	...	409	6,339	...	...	6,339
2 ...	...	...	783	12,536	...	...	...	...	783	12,536	...	...	12,536
3 ...	...	...	763	12,208	...	...	...	...	763	12,208	...	...	12,208
4 ...	...	...	1,076	17,216	...	...	...	...	1,076	17,216	...	...	17,216
5 ...	...	...	886	13,290	...	...	...	...	886	13,290	...	...	13,290
6 ...	...	...	557	8,362	...	...	...	...	557	8,362	...	...	8,362
7 ...	...	...	337	5,055	...	...	...	...	337	5,055	...	...	5,055
8 ...	...	...	83	1,245	...	...	...	...	83	1,245	...	...	1,245
9 ...	...	...	155	2,325	...	...	...	...	155	2,325	...	...	2,325
1870 ...	...	...	6	90	...	...	...	...	6	90	...	...	90
1 ...	...	...	...	...	...	...	...	...	...	...	...	...	...
2 ...	...	...	...	...	...	...	...	...	...	...	...	...	...
3 ...	...	...	56	848	...	...	...	...	56	848	...	...	848
4 ...	...	...	67	998	...	...	...	...	67	998	...	...	998
5 ...	...	...	205	3,071	...	...	...	...	205	3,071	...	...	3,071
6 ...	...	...	279	4,185	...	...	...	...	279	4,185	...	...	4,185
7 ...	...	...	54	803	...	...	...	...	54	803	...	...	803
8 ...	...	...	9	135	...	...	...	...	9	135	...	...	135
9 ...	...	...	...	...	...	...	...	...	...	...	...	...	...
1880 ...	...	...	8	120	...	...	...	...	8	120	...	...	120
1 ...	...	...	...	...	...	...	...	...	...	...	...	...	...
2 ...	...	...	2	23	...	...	...	...	2	23	...	...	23
3 ...	...	...	5	75	...	...	...	...	5	75	...	...	75
4 ...	...	...	118	1,770	...	...	...	...	118	1,770	...	...	1,770
5 ...	...	...	120	1,793	...	...	...	...	120	1,793	...	...	1,793
6 ...	...	...	249	3,735	...	...	...	...	249	3,735	...	...	3,735
7 ...	...	...	23	345	...	...	...	...	23	345	...	...	345
8 ...	...	...	88	1,488	...	...	...	...	88	1,488	...	...	1,488
9 ...	...	...	112	1,904	...	...	...	...	112	1,904	...	...	1,904
1890 ...	...	...	8	136	...	...	...	...	8	136	...	...	136
1 ...	263	4,462	...	...	...	...	...	...	263	4,462	...	...	4,462
2 ...	[1]†412	6,319	155	2,377	...	...	...	...	567	8,696	...	...	8,696
3 ...	50	606	...	...	...	...	...	...	50	606	...	...	606
4 ...	...	...	...	...	...	...	...	...	...	...	...	...	...
5 ...	802	12,832	24	120	...	...	...	...	826	12,952	...	...	12,952
6 ...	6	100	...	...	...	...	...	...	6	100	...	...	100
7 ...	65	731	21	302	...	...	...	...	86	1,033	...	...	1,033
8 ...	281	3,334	75	932	...	...	...	..	356	4,266	...	...	4,266
9 ...	1,404	31,979	587	9,473	...	...	...	...	1,991	41,452	...	...	41,452
1900 ...	544	10,696	...	...	105	2,411	197	3,355	846	16,462	249	17,475	33,937
1 ...	1,058	26,464	1	10	1,205	22,107	397	6,322	2,661	54,903	880	55,866	110,769
2 ...	68	1,698	20	330	162	2,469	33	489	283	4,986	175	7,918	12,904
3 ...	4	180	25	460	302	3,538	15	349	346	4,527	1,075	33,288	37,815
4 ...	50	500	...	...	11	154	310	3,378	371	4,032	102	3,827	7,859
5 ...	...	...	...	...	80	2,808	713	8,576	793	11,384	794	53,867	65,251
6 ...	112	323	...	...	...	...	224	2,930	336	6,162	343	30,367	36,529
7 ...	...	...	...	...	...	...	3,727	61,493	3,727	61,493	1,602	141,883	203,376
8 ...	...	...	...	...	...	...	2,503	29,272	2,503	29,272	479	27,819	57,091
9 ...	...	...	...	...	...	...	6,959	59,541	6,959	59,541	833	45,100	104,641
1910 ...	...	...	...	...	...	...	6,309	27,271	6,309	27,271	1,281	68,657	95,928
1 ...	...	...	...	...	...	...	9,825	33,709	9,825	33,709	828	44,409	78,118
2 ...	...	...	...	...	...	...	9,536	58,688	9,536	58,688	28	1,136	59,824
3 ...	...	...	...	...	...	...	4,339	136,472	4,339	136,472	82	5,891	142,363
4 ...	...	...	...	...	...	...	3,913	33,654	3,913	33,654	183	4,520	38,174
5 ...	...	...	...	...	...	...	737	13,768	737	13,768	946	77,401	91,169
6 ...	...	...	...	...	...	...	650	14,971	650	14,971	457	49,862	64,833
7 ...	...	...	...	...	...	...	966	20,878	966	20,878	535	64,860	85,738
8 ...	...	...	...	...	...	...	1,643	24,877	1,643	24,877	478	41,269	66,146
9 ...	...	...	...	...	...	...	455	9,740	455	9,740	4	365	10,105
1920 ...	...	...	...	...	...	...	1,511	22,467	1,511	22,467	137	2,698	25,165
1921 ...	...	...	...	...	...	...	1,040	16,153	1,040	16,153	206	8,448	24,601
1922 ...	...	...	...	...	...	...	352	5,519	352	5,519	660	14,860	20,379
1923 ...	...	...	...	...	...	...	3,394	48,907	3,394	48,907	1,057	16,193	65,100
1924 ...	...	...	...	...	...	...	2,795	40,676	2,795	40,676	...	...	40,676
1925 ...	...	...	...	...	...	...	1,201	18,200	1,201	18,200	...	...	18,200
1926 ...	...	...	...	...	...	...	...	...	...	...	1	84	84
1927 ...	...	...	...	...	...	...	...	...	...	...	2	101	101
1928 ...	...	...	...	...	...	...	100	765	100	765	...	...	765
Total ...	...	...	...	...	...	...	...	...	80,224	987,784	13,417	818,164	1,805,948

[1]† *See* Woodward's Mining Handbook, Perth : By Authority, 1895 ; page 123.

[2]† Weight not stated.

XXVI.

ENTERED FOR EXPORT FROM 1850 TO 1928, INCLUSIVE.

TIN											
BLACK TIN (Dressed Tin ore).								TIN INGOT.		Total Value of Tin Exported.	YEAR.
Pilbara Gf.		Greenbushes Mf.		[3]†State generally.		Total.		Greenbushes Mf.			
Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.		
tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	£	
...	...	...	...	...	...	...	...	...	...	...	1850
...	...	...	...	...	...	...	...	...	...	...	1
...	...	...	...	...	...	...	...	...	...	...	2
...	...	...	...	...	...	...	...	...	...	...	3
...	...	...	...	...	...	...	...	...	...	..	4
...	...	...	...	...	...	...	...	...	...	...	5
...	...	...	...	...	...	...	...	...	...	...	6
...	...	...	...	...	...	...	...	...	...	...	7
...	...	...	...	...	...	...	...	...	...	...	8
...	...	...	...	...	...	...	...	...	...	...	9
...	...	...	...	...	...	...	...	...	...	...	1860
...	...	...	...	...	...	...	...	...	...	...	1
...	...	...	...	...	...	...	...	...	...	...	2
...	...	...	...	...	...	...	...	...	...	...	3
...	...	...	...	...	...	...	...	...	...	...	4
...	...	...	...	...	...	...	...	...	...	...	5
...	...	...	...	...	...	...	...	...	...	...	6
...	...	...	...	...	...	...	...	...	...	...	7
...	...	...	...	...	...	...	...	...	...	...	8
...	...	...	...	...	...	...	...	...	...	...	9
...	...	...	...	...	...	...	...	...	...	...	1870
...	...	...	...	...	...	...	...	...	...	...	1
...	...	...	...	...	...	...	...	...	...	...	2
...	...	...	...	...	...	...	...	...	...	...	3
...	...	...	...	...	...	...	...	...	...	...	4
...	...	...	...	...	...	...	...	...	...	...	5
...	...	...	...	...	...	...	...	...	...	...	6
...	...	...	...	...	...	...	...	...	...	...	7
...	...	...	...	...	...	...	...	...	...	...	8
...	...	...	...	...	...	...	...	...	...	...	9
...	...	...	...	...	...	...	...	...	...	...	1880
...	...	...	...	...	...	...	...	...	...	...	1
...	...	...	...	...	...	...	...	...	...	...	2
...	...	...	...	...	...	...	...	...	...	...	3
...	...	...	...	...	...	...	...	...	...	...	4
...	...	...	...	...	...	...	...	...	...	...	5
...	...	...	...	...	...	...	...	...	...	...	6
...	...	...	...	...	...	...	...	...	...	...	7
...	...	...	...	...	...	...	...	...	...	...	8
...	...	...	...	...	...	...	...	...	...	...	9
...	...	5	300	...	...	5	300	...	...	300	1890
...	...	68	5,400	...	...	68	5,400	...	...	5,400	1
...	...	204	10,200	...	...	204	10,200	...	...	10,200	2
...	...	265	13,843	...	...	265	13,843	...	...	13,843	3
57	3,470	171	7,664	...	...	228	11,134	...	...	11,134	4
19	949	371	14,325	...	...	390	15,274	...	...	15,274	5
...	...	277	9,703	...	...	277	9,703	...	...	9,703	6
...	...	137	4,338	...	...	137	4,338	...	...	4,338	7
...	...	96	3,275	...	...	96	3,275	...	...	3,275	8
...	...	68	2,760	...	...	68	2,760	...	...	2,760	9
30	2,025	278	21,138	...	...	308	23,163	...	...	23,163	1900
368	30,146	102	8,032	...	...	470	38,178	142	18,872	57,050	1
439	34,600	68	4,895	...	...	507	39,495	97	12,607	52,102	2
248	19,698	31	2,870	...	...	279	22,568	141	16,830	39,398	3
267	20,988	25	1,868	...	...	292	22,856	235	29,277	52,133	4
64	4,932	24	1,389	379	20,797	467	27,118	129	16,155	43,273	5
188	16,853	119	8,177	666	51,748	973	76,778	[2]†	1	76,779	6
329	28,375	444	46,254	624	64,005	1,397	138,634	45	8,746	147,380	7
...	...	...	...	1,424	151,414	1,424	151,414	78	14,725	166,139	8
...	...	...	...	1,093	83,594	1,093	83,594	[2]†	1	83,595	9
...	...	...	...	698	62,989	698	62,989	...	...	62,989	1910
...	...	...	...	500	45,129	500	45,129	...	...	45,129	1
...	...	...	...	495	55,220	495	55,220	...	...	55,220	2
...	...	...	...	651	79,738	651	79,738	...	...	79,738	3
...	...	...	...	484	72,142	484	72,142	...	...	72,142	4
...	...	...	...	363	35,649	363	35,649	...	...	35,649	5
...	...	...	...	429	41,391	429	41,391	...	...	41,391	6
...	...	...	...	463	49,101	463	49,101	...	...	49,101	7
...	...	...	...	383	45,288	383	45,288	...	...	45,288	8
...	...	...	...	415	76,952	415	76,952	...	...	76,952	9
...	...	...	...	318	47,269	318	47,269	...	...	47,269	1920
...	...	...	...	243	49,449	243	49,449	...	...	49,449	1921
...	...	...	...	67	6,485	67	6,485	...	...	6,485	1922
...	...	...	...	110	10,930	110	10,930	...	...	10,930	1923
...	...	...	...	131	15,095	131	15,095	...	...	15,095	1924
...	...	...	...	87	12,008	87	12,008	...	...	12,008	1925
...	...	...	...	108	15,392	108	15,392	...	...	15,392	1926
...	...	...	...	67	10,450	67	10,450	...	...	10,450	1927
...	...	...	...	77	13,316	77	13,316	...	...	13,316	1928
...	...	...	...	85	15,002	85	15,002	...	...	15,002	
...	...	...	...	...	...	15,122	1,459,020	867	117,214	1,576,234	Total

[3]† Weight not stated.

[2]† Probably the produce of Pilbara Goldfield and Greenbushes Mineral Field.

TABLE XXVI.—*Return of Ore and Minerals other than Go*

Year.	Silver.		‡ Lead.		‡ Lead and Silver-Lead.		Pig Lead.		Zinc Ingots and Concentrates.	
	State generally.		Northampton Mf.		State generally.		State generally.		State generally.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	ozs.	£	tons.	£	tons.	£	tons	£	tons	£
1850	...	...	5	55	...	...	...	...	...	...
1	...	...	...	...	...	...	...	...	...	...
2	...	...	...	...	...	...	...	...	...	...
3	...	...	[2]†	4	...	...	55	1,200	...	...
4	...	...	...	...	...	...	122	2,440	...	...
5	...	...	25	250	...	...	134	2,675	...	...
6	...	...	...	...	...	...	60	1,200	...	...
7	...	...	...	...	...	...	120	2,410	...	...
8	...	...	...	...	...	...	61	1,220	...	...
9	...	...	13	135	...	...	25	495	...	...
1860	...	...	98	985	...	...	...	...	...	...
1	...	...	79	790	...	...	...	...	...	...
2	...	...	9	90	...	...	...	...	...	...
3	...	...	230	2,300	...	...	...	...	...	...
4	...	...	80	800	...	...	...	...	...	...
5	...	...	703	8,436	...	...	...	...	...	...
6	...	...	273	3,282	...	...	...	...	...	...
7	...	...	902	10,824	...	...	[4]†3	50	...	...
8	...	...	1,100	13,206	...	...	...	...	...	...
9	...	...	699	8,394	...	...	...	...	...	...
1870	...	...	1,209	14,514	...	...	...	...	...	...
1	...	...	420	5,040	...	...	...	...	...	...
2	...	...	364	4,368	...	...	...	...	...	...
3	...	...	965	11,586	...	...	...	...	...	...
4	...	...	2,144	25,725	...	...	...	...	...	...
5	...	...	2,289	27,468	...	...	4	89	...	...
6	...	...	2,192	26,298	...	...	[4]†7	155	...	...
7	...	...	3,956	47,466	...	...	[4]†1	15	...	...
8	...	...	3,618	43,410	...	...	...	...	...	...
9	...	...	2,775	33,300	...	...	...	...	...	...
1880	...	...	1,921	15,368	...	...	[4]†5	89	...	...
1	...	...	1,401	11,204	...	...	[4]†1	20	...	...
2	...	...	1,794	14,348	...	...	...	...	...	...
3	...	...	1,038	7,266	...	...	...	...	...	...
4	...	...	696	4,872	...	...	...	...	...	...
5	...	...	465	3,255	...	...	...	...	...	...
6	...	...	611	4,277	...	...	...	...	...	...
7	...	...	471	4,710	...	...	[4]†6	120	...	...
8	...	...	532	5,320	...	...	[4]†2	40	...	...
9	...	...	250	2,500	...	...	...	...	...	...
1890	...	...	214	2,135	...	...	...	...	...	...
1	...	...	25	250	...	...	...	...	...	...
2	...	...	30	150	...	...	...	...	...	...
3	...	...	...	...	...	...	...	...	...	...
4	...	...	...	...	...	...	...	...	...	...
5	...	...	...	...	...	...	...	...	...	...
6	...	...	...	...	...	...	...	...	...	...
7	...	...	[2]†	4	...	...	[4]†1	11	...	...
8	...	...	5	33	...	...	...	...	...	...
9	...	...	16	96	...	...	77	1,077	...	...
1900	28,749	3,594	27	242	...	...	...	...	...	...
1	60,869	7,609	...	...	...	...	...	...	...	...
2	83,293	9,190	...	...	...	...	...	...	...	...
3	168,113	19,153	...	...	...	...	...	...	...	...
4	399,190	45,912	...	...	...	...	...	...	...	...
5	359,744	44,278	...	...	...	...	...	...	...	...
6	282,145	37,612	...	...	...	...	...	...	...	...
7	189,265	25,382	...	...	211	1,866	...	...	73	3,390
8	168,455	18,877	...	...	518	5,006	...	...	11	98
9	176,843	18,778	...	...	211	1,199	...	...	19	244
1910	176,139	18,777	248	1,433	...	...	...	...	12	147
1	169,043	18,333	1,549	15,002	...	...	...	...	12	189
2	165,371	19,725	1,868	22,270	...	...	...	...	14	217
3	188,020	23,420	3,169	59,002	...	...	...	...	...	...
4	193,057	23,227	3,554	46,285	...	...	...	...	22	379
5	222,159	24,295	...	...	2,883	39,032	13	302	7	143
6	173,012	22,258	...	...	428	12,033	3,523	74,930	14	630
7	222,075	38,339	...	...	22	593	4,661	139,940	...	...
8	109,830	22,711	...	...	282	3,045	5,489	163,880	...	...
9	223,332	55,342	...	...	248	3,704	1,780	48,462	...	...
1920	130,692	36,605	...	...	3,427	84,743	1,930	69,136	...	...
1921	116,151	18,658	...	...	...	...	2,156	48,863	...	...
1922	118,696	18,164	...	...	...	...	2,796	69,528	...	...
1923	109,005	16,036	...	...	3,172	43,416	20	609	...	...
1924	89,146	13,409	...	...	4,854	83,095	...	...	...	...
1925	81,226	11,661	...	...	4,664	103,300	...	...	...	...
1926	68,413	8,863	...	...	4,162	76,741	...	...	...	...
1927	49,895	5,829	...	...	1,413	24,592	...	...	...	...
1928	55,554	6,638	...	...	248	4,198	...	...	...	...
Total ...	4,577,482	632,675	44,032	508,748	26,743	486,563	23,052	628,956	184	5,437

[2]† Weight not stated. [4]† Estimated. ‡ Ore and Concentrates.

entered for EXPORT from 1850 to 1928, inclusive—continued.

Tungsten Ore.				Arsenical Ore.		Tantalite.		Non-Metallic Minerals.				Year.
Wolfram.		Scheelite.						Graphite.		Magnesite		
State generally.		State generally.		State generally.		State generally.		State generally.		State generally.		
Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity	Value.	
tons	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	1850
...	...	...	...	...	...	...	...	...	...	...	...	1
...	...	...	...	...	...	...	...	...	...	...	...	2
...	...	...	...	...	...	...	...	...	...	...	...	3
...	...	...	...	...	...	...	...	...	...	...	...	4
...	...	...	...	...	...	...	...	...	...	...	...	5
...	...	...	...	...	...	...	...	...	...	...	...	6
...	...	...	...	...	...	...	...	...	...	...	...	7
...	...	...	...	...	...	...	...	...	...	...	...	8
...	...	...	...	...	...	...	...	...	...	...	...	9
...	...	...	...	...	...	...	...	...	...	...	...	1860
...	...	...	...	...	...	...	...	...	...	...	...	1
...	...	...	...	...	...	...	...	...	...	...	...	2
...	...	...	...	...	...	...	...	...	...	...	...	3
...	...	...	...	...	...	...	...	...	...	...	...	4
...	...	...	...	...	...	...	...	...	...	...	...	5
...	...	...	...	...	...	...	...	...	...	...	...	6
...	...	...	...	...	...	...	...	...	...	...	...	7
...	...	...	...	...	...	...	...	...	...	...	...	8
...	...	...	...	...	...	...	...	...	...	...	...	9
...	...	...	...	...	...	...	...	...	...	...	...	1870
...	...	...	...	...	...	...	...	...	...	...	...	1
...	...	...	...	...	...	...	...	...	...	...	...	2
...	...	...	...	...	...	...	...	...	...	...	...	3
...	...	...	...	...	...	...	...	...	...	...	...	4
...	...	...	...	...	...	...	...	...	...	...	...	5
...	...	...	...	...	...	...	...	...	...	...	...	6
...	...	...	...	...	...	...	...	...	...	...	...	7
...	...	...	...	...	...	...	...	...	...	...	...	8
...	...	...	...	...	...	...	...	...	...	...	...	9
...	...	...	...	...	...	...	...	...	...	...	...	1880
...	...	...	...	...	...	...	...	...	...	...	...	1
...	...	...	...	...	...	...	...	...	...	...	...	2
...	...	...	...	...	...	...	...	...	...	...	...	3
...	...	...	...	...	...	...	...	...	...	...	...	4
...	...	...	...	...	...	...	...	...	...	...	...	5
...	...	...	...	...	...	...	...	...	...	...	...	6
...	...	...	...	...	...	...	...	...	...	...	...	7
...	...	...	...	...	...	...	...	...	...	...	...	8
...	...	...	...	...	...	...	...	...	...	...	...	9
...	...	...	...	...	...	...	...	...	...	...	...	1890
...	...	...	...	...	...	...	...	...	...	...	...	1
...	...	...	...	...	...	...	...	...	...	...	...	2
...	...	...	...	...	...	...	...	...	...	...	...	3
...	...	...	...	...	...	...	...	...	...	...	...	4
...	...	...	...	...	...	...	...	...	...	...	...	5
...	...	...	...	...	...	...	...	...	...	...	...	6
...	...	...	...	...	...	...	...	...	...	...	...	7
...	...	...	...	...	...	...	...	...	...	...	...	8
...	...	...	...	...	...	...	...	...	...	...	...	9
...	...	...	...	...	...	...	...	...	...	...	...	1900
...	...	...	...	...	...	...	...	...	...	...	...	1
...	...	...	...	...	...	...	...	1	6	...	...	2
...	...	...	...	...	...	...	...	...	...	...	...	3
...	...	...	...	...	...	...	...	...	...	...	...	4
...	...	...	...	...	...	...	...	...	...	...	...	5
...	...	...	...	...	...	18	5,729	...	...	...	...	6
...	...	...	...	...	...	...	...	...	...	...	...	7
...	...	4	140	...	...	...	...	...	...	...	...	8
...	...	...	...	...	...	[2]†	400	...	...	...	...	9
1	100	...	...	...	...	...	...	...	...	...	...	1910
2	190	...	...	...	...	...	...	...	...	...	...	1
9	826	...	...	...	...	...	...	...	...	...	...	2
...	...	...	...	...	...	...	...	...	...	...	...	3
1	86	...	...	...	...	...	...	...	...	...	...	4
½	40	...	...	...	...	...	...	7	40	...	...	5
¼	25	...	...	...	...	...	...	...	...	688	1,196	6
1	128	3	438	11	19	47	9,375	21	284	12	47	7
...	...	½	42	57	707	17	2,513	18	158	42	50	8
¼	31	5	720	679	2,564	...	...	5	75	62	225	9
½	15	6	772	...	...	¼	75	...	...	...	...	1920
...	...	2½	395	1,765	4,260	...	...	13	130	...	...	1921
...	...	...	...	7	16	...	...	...	...	...	...	1922
...	...	...	...	1,075	1,784	...	...	[2]†	3	...	...	1923
...	...	...	...	**	686	4½	688	...	...	2	8	1924
...	...	...	...	**	777	...	...	...	...	...	...	1925
...	...	...	...	**	1,045	5	1,010	...	...	...	...	1926
...	...	...	...	**	347	24½	5,751	...	...	...	...	1927
...	...	...	...	**	819	17	3,746	...	...	...	...	1928
...	...	...	...	**	401	11	2,749	...	...	...	...	
15	1,441	21	2,507	...	13,425	...	32,036	...	696	806	1,526	Total.

** Contained in Gold ore.

[2]† Weight not stated.

TABLE XXVI.—*Return of Ore and Minerals other than Gold*

YEAR.	NON-METALLIC MINERALS—*continued.*						MINERALS NOT ELSEWHERE INCLUDED.		Total Value of Minerals other than Gold exported to Date.	YEAR.
	ASBESTOS.		COAL.		MICA.					
	State generally.		Collie River Mf.		State generally.					
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.		
	tons.	£	tons.	£	tons.	£	tons	£	£	
1850	...	...	...	...	...	...	...	...	55	1850
1	...	...	...	...	...	...	...	...	...	1
2	...	...	...	...	...	...	...	...	...	2
3	...	...	...	...	...	...	...	...	1,211	3
4	...	...	...	...	...	...	...	...	2,440	4
5	...	...	...	...	...	...	...	...	2,951	5
6	...	...	...	...	...	...	...	...	2,218	6
7	...	...	...	...	...	...	...	...	4,330	7
8	...	...	...	...	...	...	...	...	10,751	8
9	...	...	...	...	...	...	...	...	14,752	9
1860	...	...	...	...	...	...	...	...	9,006	1860
1	...	...	...	...	...	...	...	...	7,129	1
2	...	...	...	...	...	...	...	...	12,626	2
3	...	...	...	...	...	...	...	...	14,508	3
4	...	...	...	...	...	...	...	...	18,016	4
5	...	...	...	...	...	...	...	...	21,726	5
6	...	...	...	...	...	...	...	...	11,644	6
7	...	...	...	...	...	...	...	...	15,929	7
8	...	...	...	...	...	...	...	...	14,451	8
9	...	...	...	...	...	...	...	...	10,719	9
1870	...	...	...	...	...	...	...	...	14,604	1870
1	...	...	...	...	...	...	...	...	5,040	1
2	...	...	...	...	...	...	...	...	4,368	2
3	...	...	...	...	...	...	...	...	12,434	3
4	...	...	...	...	...	...	...	...	26,723	4
5	...	...	...	...	...	...	...	...	30,628	5
6	...	...	...	...	...	...	...	...	30,638	6
7	...	...	...	...	...	...	...	...	48,284	7
8	...	...	...	...	...	...	...	...	43,545	8
9	...	...	...	...	...	...	...	...	33,300	9
1880	...	...	...	...	...	...	...	...	15,577	1880
1	...	...	...	...	...	...	...	...	11,224	1
2	...	...	...	...	...	...	...	...	14,371	2
3	...	...	...	...	...	...	...	...	7,341	3
4	...	...	...	...	...	...	...	...	6,642	4
5	...	...	...	...	...	...	...	...	5,048	5
6	...	...	...	...	...	...	...	...	8,012	6
7	...	...	...	...	...	...	...	...	5,175	7
8	...	...	...	...	...	...	...	...	6,848	8
9	...	...	...	...	...	...	...	...	4,704	9
Carried forward ...	...	...	...	...	...	...	...	...	508,968	...

entered for ***EXPORT*** *from* ***1850 to 1928****, inclusive*—continued.

Year.	Non-Metallic Minerals—*continued.*						Minerals not Elsewhere Included.		Total Value of Minerals other than Gold exported to Date.	Year.
	Asbestos. State generally.		Coal. Collie River Mf.		Mica. State generally.					
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.		
	tons.	£	tons.	£	tons	£	tons	£	£	
Brought forward	...	...	...	...	...	...	...	...	508,968	
1890	...	...	...	...	...	...	...	...	7,671	1890
1	...	...	...	...	...	...	...	...	14,912	1
2	...	...	...	...	[2]†	25	...	...	22,714	2
3	...	...	...	...	[2]†	4	...	...	11,744	3
4	...	...	...	...	...	...	...	...	15,274	4
5	...	...	...	...	[2]†	3	...	...	22,658	5
6	...	...	...	...	...	...	...	...	4,438	6
7	...	...	...	...	[2]†	209	...	...	4,532	7
8	...	...	1	1	...	...	...	...	7,060	8
9	...	...	[2]† 798	772	[2]†	50	...	...	66,611	9
1900	...	...	355	350	[2]†	3	5	85	95,261	1900
1	...	...	971	969	...	...	...	4	171,453	1
2	...	...	12	12	...	...	[6]†2	41	61,551	2
3	...	...	[5]† 110	127	...	...	[7]† 22	230	109,468	3
4	...	...	11	7	...	...	7	81	97,132	4
5	...	...	108	87	...	...	62	127	192,251	5
6	...	...	86	65	...	...	10	1,035	222,621	6
7	...	...	26 *1,447	28 1,138	...	...	[8]†96	1,447	402,906	7
8	...	...	[2]† 1,242	13 *9,612	11 7,747	[2]†	10	42	2,750	176,827	8
9	...	...	...	353 *85,647	183 93,781	...	...	[9]† 263	735	282,650	9
1910	...	...	...	3 *48,876	2 38,400	...	...	½	100	200,106	1910
1	...	...	...	*40,063	29,344	...	....	[10]†14	407	197,439	1
2	...	...	...	6 *42,602	6 30,721	...	...	[11]†	8	212,509	2
3	...	...	...	*54,228	39,125	...	...	5	17	336,155	3
4	...	...	...	*54,416	38,244	4	323	[12]† 9	635	182,996	4
5	...	...	...	1,667 *26,167	1,513 19,288	[2]†	26	[13]†	115	218,495	5
6	...	...	...	2,447 *37,590	1,857 28,387	[2]†	10	[14]†	713	265,043	6
7	...	...	...	*31,951	29,359	...	...	[15]†	440	343,167	7
8	...	...	1	25	*23,238	24,424	...	...	[16]† 5	97	360,895	8
9	...	...	36	752	*69,708	76,924	1	514	[17]†	116	244,050	9
1920	...	...	31	2,525	*78,788	104,665	[18]†	120	[19]†	223	377,416	1920
1921	...	...	141	6,205	*116.993	188,686	...	...	[20]†	257	293,771	1921
1922	...	...	143	5,746	*71,164	115,835	2	60	[21]†	1,083	243,512	1922
1923	...	...	71	3,830	5,313 *43,729	7,969 73,256	...	...	[22]†	303	226,996	1923
1924	...	...	32	1,586	*36,829	60,292	...	...	[23]† 20	160	212,003	1924
1925	...	...	23	687	66 *37,208	198 58,650	...	...	...	...	210,143	1925
1926	...	...	63	1,823	*50,986	82,810	4	8,328	[24]†	838	196,035	1926
1927	...	...	11	908	*39,089	62,297	4	536	[25]†	418	112,562	1927
1928	...	...	13	1,352	*26,194 28	42,224 26	...	...	[26]†	71	73,426	1928
Total	...	...	...	26,692	1,038,889	1,259,780	...	10,221	...	12,536	7,005,421	Total

* Bunker Coal. [2] †Weight not stated. [5] †4 cwts. [6] †Cobalt ore.

[7] †Antimony ore. [12] †Bismuth. [16] †Molybdenite. [18] †7 cwts.

[8] †Includes—

Antimony ore, 25 tons	=	£630
N.E.I., 71 tons ...	=	817
Total ...	...	£1,447

[9] †Includes—

Other Concentrates, 29 tons	=	£108
N.E.I., 234 tons ...	=	627
Total ...	...	£735

[10] †Includes—

Iron ore, 9 tons ...	=	£7
Ores, N.E.I., 5 tons	=	400
Total ...	...	£407

[11] †Includes—

Manganese, 2 tons	=	£4
N.E.I.	=	4
Total ...	...	£8

[13] †Includes—

Bismuth, 1 ton ...	=	£37
Fireclay, 12 tons ...	=	75
Manganese, 3 cwt.	=	3
Total ...	...	£115

[14] †Includes—

Antimony, 27 tons	=	£580
Bismuth, 4 cwt. ...	=	133
Total ...	...	£713

[15] †Includes—

Antimony, 12 tons	=	£258
Bismuth, 9cwt. ...	=	24
Molybdenite, 14 tons	=	158
Total ...	...	£440

[17] †Includes—

Bismuth, 1 cwt. ...	=	£15
Corundum, 1 ton ...	=	1
Molybdenite, 7 tons	=	100
Total ...	...	£116

[19] †Includes—

Antimony, 2½ tons	=	£45
Clay, 6 cwt. ...	=	6
Gadolinite, 1 ton ...	=	150
Iron Concentrates, 1 ton	=	17
Molybdenite, 10 cwt.	=	5
Total ...	...	£223

[20] †Includes—

Barytes, 2 cwt. ...	=	£18
Corundum, ¼ cwt.	=	2
Felspar, 1 ton ...	=	47
Jarosite, 12 cwt. ...	=	5
Manganese, 16 tons	=	145
Pottery Clay, 3½ tons	=	40
Total ...	...	£257

[21] †Includes—

Barytes, 19 tons ...	=	£73
Felspar, 60 tons ...	=	485
Gypsum, 2 tons ...	...	4
Molybdenite, 51 tons	...	505
Pottery clay, 1 ton	...	16
Total ...		£1,083

[22] †Includes—

Clay, 34 tons ...	=	£94
Iron Ore, 2 tons ...	=	9
Manganese, 22 tons	...	200
Total ...	...	£303

[23] †Manganese.

[24] †Includes—

Antimony, 4½ tons	...	£85
Felspar, 8½ tons ...	...	250
Manganese 82 tons	...	503
		£838

[25] †Includes—

Gypsum 2 cwts ...	=	£1
Manganese, 30 tons	...	303
Pottery Clay, 35 tons	...	114
Total ...	...	£418

[26] †Includes—

Iron, 1 ton... ...	...	£1
Sulphur** ...	...	70
Total ...	...	£71

**Contained in gold ore.

PART III.—ALL MINES.

TABLE XXVII.

MILLING AND CYANIDING PLANTS ERECTED IN THE RESPECTIVE GOLDFIELDS, DISTRICTS, AND MINERAL FIELDS ON THE 31ST DECEMBER, 1928, AND THE TOTAL VALUE OF MINING MACHINERY.

Mining Centre and Lease or Area.	Name of Mine, Company, or Works.	Milling.									Cyaniding.			Value of all Mining Machinery.
		Batteries.	Other Mills.											
		Number of Heads of Stampers.	Prospecting Mills.	Ball Mills.	Griffin Mills.	Huntington Mills.	Puddlers.	Other Crushers.	Flint Mills.	Grinding Pans.	Leaching Vats.	Agitating Vats.	Vacuum Filters and Presses.	
	PILBARA GOLDFIELD.													
	MARBLE BAR DISTRICT.													
Bamboo Creek.														
G.M.L. (795)	Bulletin	10	...	...	...	...	...	...	...	...	...	...	...	...
⋀	State Battery, Bamboo Creek	5	...	...	...	...	...	...	...	1	5	...	...	...
Lalla Rookh.														
R.C. 112	Lalla Rookh	10	...	...	...	...	...	...	...	...	5	...	...	...
Marble Bar.														
M.A. 37	Ironclad	10	...	...	...	...	...	...	...	...	...	...	...	...
G.M.L. (694)	Jo Jo	5	...	...	...	1	...	...	...	1	...	...	...	...
⋀	State Battery, Marble Bar	5	...	...	...	...	...	...	...	1	...	...	...	...
	Total	**45**	...	...	...	**1**	...	...	...	**3**	**10**	...	...	**£11,295**
	NULLAGINE DISTRICT.													
Eastern Creek.														
M.A. 11L	Doherty's Reward	10	...	...	...	...	...	...	...	...	4	...	...	...
G.M.L. 219L	Shamrock	3	...	...	...	...	...	...	...	...	3	...	...	...
20-Mile Sandy.														
⋀	State Battery, 20-Mile Sandy	5	...	...	...	...	...	...	...	...	...	...	...	...
	Total	**18**	...	...	...	...	...	...	...	...	**7**	...	...	**£1,881**
	PEAK HILL GOLDFIELD.													
Mount Egerton.														
⋀	State Battery, Mount Egerton	5	...	...	...	...	...	...	...	...	...	...	...	...
Peak Hill.														
T.A. 6P	Wind Power Cyanide Works	...	...	...	...	...	...	...	...	...	6	...	...	...
⋀	State Battery, Peak Hill	5	...	...	...	...	...	...	...	1	3	...	...	...
	Total	**10**	...	...	...	...	...	...	...	**1**	**9**	...	...	**£3,147**
	EAST MURCHISON GOLDFIELD.													
	LAWLERS DISTRICT.													
Kathleen Valley.														
G.M.L. (382)	Yellow Aster	...	...	...	...	...	...	...	...	...	2	...	...	...
Lawlers.														
M.A. 32	Great Eastern	5	...	...	...	...	...	...	...	1	6	...	...	...
M.A. 11	Sands Retreatment Works	...	...	...	...	...	...	...	...	...	4	...	...	...
G.M.L. (1234)	Vivian Gem	5	...	...	...	...	...	...	...	...	...	...	...	...
G.M.L. 1236	Waroonga G.M. Co., Ltd.	10	...	...	...	...	...	1	...	...	...	...	...	...
Sir Samuel.														
⋀	State Battery, Sir Samuel	5	...	...	...	...	...	...	...	...	4	...	...	...
	Total	**25**	...	...	...	...	...	**1**	...	**1**	**16**	...	...	**£7,200**
	WILUNA DISTRICT.													
Corboy's Find.														
G.M.L. 404J	Toscana Battery	3	...	...	...	...	...	...	...	...	...	...	...	...
G.M.L. 359J	Corboy's Reward North	5	...	...	...	...	...	...	...	...	4	...	...	...
Mt. Keith.														
⋀	State Battery, Mount Keith	5	...	...	...	...	...	...	...	...	...	...	...	...
Wiluna.														
⋀	State Battery, Wiluna	10	...	...	...	...	...	1	...	...	6	...	...	...
	Total	**23**	...	...	...	...	...	**1**	...	...	**10**	...	...	**£59,767**
	BLACK RANGE DISTRICT.													
Sandstone.														
⋀	State Battery, Sandstone	10	...	...	...	...	...	...	...	...	6	...	...	...
Youanmi.														
⋀	State Battery, Youanmi	5	...	...	...	...	...	...	...	...	5	...	...	...
	Total	**15**	...	...	...	...	...	...	...	...	**11**	...	...	**£5,508**
	MURCHISON GOLDFIELD.													
	CUE DISTRICT.													
Cue.														
⋀	State Battery, Cue	5	...	...	...	...	...	...	...	1	5	...	...	...
Reedy's Find.														
G.M.L. 1977	Mararoa G.M. Co., N.L.	5	...	...	...	...	...	...	...	...	9	...	...	...
Tuckanarra.														
⋀	State Battery, Tuckanarra	10	...	...	...	...	...	...	...	...	3	...	...	...
	Total	**20**	...	...	...	...	...	...	...	**1**	**17**	...	...	**£3,760**
	MEEKATHARRA DISTRICT.													
Holden's Find.														
G.M.L. 1271N	Waterloo G.M. Co., N.L.	5	...	...	...	...	...	...	...	1	...	...	...	...
Meekatharra.														
G.M.L. 477N	Fenian	15	...	...	...	...	...	...	...	4	...	...	...	...
G.M.L. 475N	Ingliston Consols Extended	15	...	...	...	...	...	...	...	3	...	...	...	...
G.M.L. 1531N	Ingliston G.M. Co., N.L.	10	...	...	...	...	...	...	...	...	...	...	...	...
G.M.L. 1529N	Prohibition G.M. Co., N.L.	10	...	...	...	...	...	...	...	...	4	...	...	...
⋀	State Battery, Meekatharra	5	...	...	...	...	...	...	...	1	5	...	...	...
	Total	**60**	...	...	...	...	...	...	...	**9**	**9**	...	...	**£46,143**

TABLE XXVII.—*Milling and Cyaniding Plants erected in the respective Goldfields, Districts, etc.*—continued.

Mining Centre and Lease or Area.	Name of Mine, Company, or Works.	Milling.									Cyaniding.			Value of all Mining Machinery.
		Batteries.	Other Mills.											
		Number of Heads of Stampers.	Prospecting Mills.	Ball Mills.	Griffin Mills.	Huntington Mills.	Puddlers.	Other Crushers.	Flint Mills.	Grinding Pans.	Leaching Vats.	Agitating Vats.	Vacuum Filters and Presses.	
	MURCHISON GOLDFIELD—*continued.*													
	DAY DAWN DISTRICT.													
Lake Austin. G.M.L. 571D	Mainland Consols	3	...	...	...	...	...	...	...	...	...	...	...	...
G.M.L. 1D	South Fingall	...	...	...	...	...	...	...	...	...	6	...	...	...
	Total	**3**	...	...	...	...	...	...	...	...	**6**	...	...	**£1,800**
	MT. MAGNET DISTRICT.													
Lennonville. G.M.L. 964M	Empress	5	...	...	...	...	...	...	...	1	3	...	...	...
Mt. Magnet. G.M.L. 1231M	Hill Crest	...	...	...	...	1	...	...	...	2	...	...	...	...
G.M.L. 1215M	Hill 60	5	...	...	...	...	...	...	...	...	5	...	...	...
G.M.L. 1075M	New Havelock	5	...	...	...	...	...	...	...	1	3	...	...	...
↑	State Battery, Boogardie	5	...	...	...	...	...	...	...	1	5	...	...	...
	Total	**20**	...	...	...	**1**	...	...	...	**5**	**16**	...	...	**£9,973**
	YALGOO GOLDFIELD.													
Field's Find. M.A. 23	Brown's Reward	5	...	...	...	...	...	...	...	...	6	...	...	...
Goodingnow. ↑ *Messenger's Patch.*	State Battery, Payne's Find	5	...	...	...	...	...	...	...	1	3	...	...	...
G.M.L. 880 *Noongal.*	Brilliant G.M. Co., N.L.	10	...	...	...	...	...	...	...	2	...	...	...	...
G.M.L. 953 *Warriedar.*	Revival	5	...	...	...	...	...	...	...	...	...	...	...	...
↑ *Yalgoo.*	State Battery, Warriedar	5	...	...	...	...	...	...	...	1	6	...	...	...
P.A. 752	Moxon	...	1	...	...	...	...	...	...	...	...	...	...	...
	Total	**30**	**1**	...	...	...	...	...	...	**4**	**15**	...	...	**£16,375**
	MT. MARGARET GOLDFIELD.													
	MT. MORGANS DISTRICT.													
Linden. ↑ G.M.L. 341F	State Battery, Linden	10	...	...	...	...	...	...	...	1	6	...	...	...
G.M.L. 5F	Torquay	5	...	...	...	...	...	...	...	1	6	...	...	...
	Westralia Mt. Morgans Mines, N.L.	10	...	...	...	...	1	...	...	3	...	6	1	...
	Total	**25**	...	...	...	...	**1**	...	...	**5**	**12**	**6**	**1**	**£15,492**
	MT MALCOLM DISTRICT.													
Lake Darlot. ↑ *Leonora.*	State Battery, Lake Darlot	10	...	...	...	...	...	...	...	...	...	...	...	...
G.M.L.190C,etc.	Sons of Gwalia, Ltd.	30	...	...	...	...	...	...	4	...	...	4	1	...
↑ *Mt. Clifton.*	State Battery, Leonora	10	...	...	...	...	...	...	...	2	6	...	...	...
G.M.L. 1329C *Pig Well.*	Victory No. 1	5	...	...	...	...	...	...	...	...	...	...	...	...
G.M.L. 1547C	Starlight	10	...	...	...	...	...	...	...	...	...	...	...	...
	Total	**65**	...	...	...	...	...	...	**4**	**2**	**6**	**4**	**1**	**£288,583**
	MT. MARGARET DISTRICT													
Erlistoun. G.M.L. 2113T	Baneygo North	·5	...	...	...	...	...	...	...	1	...	...	...	...
G.M.L. 2141T	King of Creation	5	...	...	...	...	...	...	...	...	...	...	...	...
Laverton. G.M.L. 715T	Lancefield Treatment Syndicate	...	...	...	...	...	...	...	...	...	8	...	...	...
G.M.L. (1807T)	Mary Mac G.M. Co., N.L.	10	...	...	...	...	...	...	...	4	3	1	...	...
↑	State Battery, Laverton	10	...	...	...	...	...	...	...	1	5	...	...	...
	Total	**30**	...	...	...	...	...	...	...	**6**	**16**	**1**	...	**£5,110**
	NORTH COOLGARDIE GOLDFIELD.													
	MENZIES DISTRICT.													
Comet Vale. G.M.L. 5217Z	Sand Queen Gladsome Mines, N.L.	10	...	...	...	...	...	1	...	3	6	...	...	...
Menzies. M.A. 65	Lady Harriet	5	...	...	...	...	...	...	...	...	2	...	...	...
Mt. Ida. ↑	State Battery, Mount Ida	5	...	...	...	...	...	...	...	...	...	...	...	...
G.M.L. 5481Z	Unexpected South	5	...	...	...	...	...	...	...	1	...	...	...	...
	Total	**25**	...	...	...	...	...	**1**	...	**4**	**8**	...	...	**£18,729**
	ULARRING DISTRICT.													
Mulline. ↑	State Battery, Mulline	10	...	...	...	...	...	...	...	...	...	...	...	...
G.M.L. 998U	Riverina Proprietary, N.L.	10	...	...	...	...	...	...	...	2	6	...	...	...
	Total	**20**	...	...	...	...	...	...	...	**2**	**6**	...	...	**£10,486**

TABLE XXVII.—*Milling and Cyaniding Plants erected in the respective Goldfields, Districts, etc.*—continued.

Mining Centre and Lease or Area.	Name of Mine, Company, or Works.	MILLING.									CYANIDING.			Value of all Mining Machinery.
		Batteries.	Other Mills.											
		Number of Heads of Stampers.	Prospecting Mills.	Ball Mills.	Griffin Mills.	Huntington Mills.	Puddlers.	Other Crushers.	Flint Mills.	Grinding Pans.	Leaching Va's.	Agitating Vats.	Vacuum Filters and Presses.	
	NORTH COOLGARDIE GOLDFIELD—*contd.*													
	NIAGARA DISTRICT.													
Niagara.														
⋀	State Battery, Niagara	10	...	...	...	...	...	...	...	...	...	...	...	...
	Total	**10**	...	...	...	...	...	...	...	...	...	...	...	£1,656
	YERILLA DISTRICT.													
Edjudina.														
G.M.L. 1011E	Neta	10	...	...	...	...	...	...	...	...	3	...	...	...
Yarri.														
⋀	State Battery, Yarri	10	...	...	...	...	...	...	...	1	5	...	...	...
	Total	**20**	...	...	...	...	...	...	...	1	**8**	...	...	£2,988
	BROAD ARROW GOLDFIELD.													
Bardoc.														
G.M.L. 1833W	Zoroastrian	5	...	...	...	...	...	...	...	...	...	...	...	...
Siberia.														
G.M.L. 1336W	Associated Northern Blocks (W.A.), Ltd. ...	...	...	1	1	2	...	5	...	10	...	7	3	...
G.M.L. 1371W	Gimlet South	10	...	...	...	...	...	...	...	...	...	...	...	...
G.M.L. 1289W	Lady Evelyn	5	...	...	...	...	...	...	...	...	...	...	...	...
⋀	State Battery, Ora Banda	5	...	...	...	...	...	...	...	1	5	...	...	...
⋀	State Battery, Siberia	5	...	...	...	...	...	...	...	...	...	...	...	...
	Total	**30**	...	**1**	**1**	**2**	...	**5**	...	**11**	**5**	**7**	**3**	£61,299
	NORTH-EAST COOLGARDIE GOLDFIELD.													
	KANOWNA DISTRICT.													
Gordon.														
G.M.L. 1467X	Sirdar	...	...	...	...	1	...	...	...	1	4	...	...	...
G.M.L. 1389X	Golden Valley	5	...	...	...	...	...	...	...	1	...	...	...	...
	Total	**5**	...	...	...	**1**	...	...	...	**2**	**4**	...	...	£2,150
	KURNALPI DISTRICT.													
Kurnalpi.														
M.A. 7K	Success Battery	5	...	...	...	...	...	...	...	...	...	...	...	...
Mulgabbie.														
M.A. 4K	Simmon's Battery	...	1	...	...	...	...	...	...	...	...	...	...	...
	Total	**5**	**1**	...	...	...	...	...	...	...	...	...	...	£250
	EAST COOLGARDIE GOLDFIELD.													
	EAST COOLGARDIE DISTRICT.													
Boulder.														
G.M.L. 38E, etc.	Associated G.Ms. of W.A., Ltd.	...	...	7	...	...	...	1	...	20	...	6	7	...
G.M.L. 66E	Boulder Perseverance, Ltd.	...	...	8	...	...	...	4	2	17	...	24	13	...
G.M.L. 351E	Golden Horseshoe Estates, Co., Ltd. ...	100	...	1	...	...	3	6	15	5	20	22	14	...
M.A. 71E	Great Boulder No. 1, Ltd.	10	...	...	...	...	...	...	...	...	2	...	...	...
G.M.L. 16E	Great Boulder Proprietary G.Ms., Ltd. ...	...	1	6	...	...	2	4	...	20	...	22	7	...
G.M.L. 31E	Lake View and Star, Ltd.	10	...	9	...	...	...	...	3	2	15	26	5	...
G.M.L. 410E	North Kalgurli (1912), Ltd.	70	...	...	9	...	1	8	3	20	...	...	3	...
G.M.L. 1208E	South Kalgurli Consolidated, Ltd.	...	...	4	...	...	...	...	1	6	...	6	6	...
T.A. 75E	Fraser's Treatment Works	...	...	...	...	...	...	...	...	...	8	...	...	...
Hampton Plains														
Block 50, P.P.L. 9	Hampton Celebration, W.A., Ltd.	10	...	...	...	...	...	1	1	...	...	6	2	...
Block 48, P.P.L. 1	Hopeful Syndicate, Ltd.	10	...	...	...	...	...	...	...	1	...	2	...	...
Kalgoorlie.														
G.M.L. 4547E	Hannan's Reward	5	...	...	...	...	...	...	...	1	5	2	...	...
Wombola.														
G.M.L. 4766E	Great Hope	...	...	...	...	1	...	...	...	1	3	...	...	...
	Total	**215**	**1**	**35**	**9**	**1**	**6**	**24**	**25**	**93**	**53**	**116**	**57**	£668,971
	BULONG DISTRICT.													
Bulong.														
G.M.L. 1191Y	Sweet Nell	5	...	...	...	...	...	...	...	...	3	...	...	...
	Total	**5**	...	...	...	...	...	...	...	...	**3**	...	...	£1 000

TABLE XXVII.—*Milling and Cyaniding Plants erected in the respective Goldfields, Districts, etc.*—continued.

Mining Centre and Lease or Area.	Name of Mine, Company, or Works.	Milling.									Cyaniding.			Value of all Mining Machinery.
		Batteries.	Other Mills.											
		Number of Heads of Stampers.	Prospecting Mills.	Ball Mills.	Griffin Mills.	Huntington Mills.	Puddlers.	Other Crushers.	Flint Mills.	Grinding Pans.	Leaching Vats.	Agitating Vats.	Vacuum Filters and Presses.	
	COOLGARDIE GOLDFIELD.													
	COOLGARDIE DISTRICT.													
Coolgardie.														
G.M.L. 4567	Griffith's Gold Mine	10	...	...	...	...	...	...	...	...	6	...	...	...
⋀	State Battery, Coolgardie	10	...	...	...	...	...	...	...	...	7	...	...	...
M.A. 82	Reform Battery	5	...	...	...	...	...	...	...	...	3	...	...	...
St. Ives.														
G.M.L. 4720	Ives Reward G.Ms., N.L.	10	...	...	...	...	...	...	...	3	...	...	...	...
G.M.L. 4732	Ives Reward Junction	...	...	...	...	1	...	...	...	...	4	...	...	...
⋀	State Battery, St. Ives	5	...	...	...	...	...	...	...	1	5	...	...	...
M.A. 280H	Imperial Battery	5	...	...	...	...	...	...	...	...	2	...	...	...
	Total	**45**	...	...	...	**1**	...	...	...	**4**	**27**	...	...	**£24,609**
	KUNANALLING DISTRICT.													
Carbine.														
G.M.L. 338	Carbine	10	...	...	...	...	...	...	...	2	...	...	...	...
25-Mile.														
G.M.L. 696S	Blue Bell	5	...	...	...	...	...	...	...	...	6	...	...	...
G.M.L. 645S	Star of Fremantle	10	...	...	...	...	...	...	...	...	2	...	...	...
	Total	**25**	...	...	...	...	...	...	...	**2**	**8**	...	...	**£5,670**
	YILGARN GOLDFIELD.													
Bullfinch.														
G.M.L. 3345	Copperhead	5	...	...	...	...	...	...	...	...	...	...	...	...
Golden Valley.														
G.M.L. 2994	Radio	5	...	...	...	...	...	...	...	...	3	...	...	...
G.M.L. 3248	Radio Deeps	5	...	...	...	...	...	...	...	1	3	...	...	...
Greenmount.														
M.A. 25	Transvaal	10	...	...	...	...	...	...	...	...	...	...	...	...
Marvel Loch.														
M.A. 23	Howlett's Battery	5	...	...	...	...	...	...	...	...	4	...	...	...
G.M.L. 852	May Queen	5	...	...	...	...	...	...	...	...	...	...	...	...
(G.M.L. 3281)	Resurrection	...	...	...	...	...	...	...	...	...	3	...	...	...
Parker's Range.														
G.M.L. 2801	Scots Greys	5	...	...	...	...	...	...	...	...	...	...	...	...
G.M.L. 724	Spring Hill	10	...	...	...	...	...	...	...	1	4	...	...	...
Westonia.														
G.M.L. 3308	Consolidated	10	...	...	...	...	...	...	...	...	...	...	...	...
G.M.L. 3349	Edna May Central	...	...	...	...	...	...	...	...	...	8	...	...	...
P.A. 1801	Recovery Battery	5	...	...	...	...	...	...	...	...	...	...	...	...
	Total.	**65**	...	...	...	...	...	...	...	**2**	**25**	...	...	**£16 199**
	DUNDAS GOLDFIELD.													
Norseman.														
G.M.L. 1291	Mararoa No. 1	10	...	...	...	...	...	...	...	...	7	...	...	...
M.A. 17	Rawlings & Bullen	10	...	...	...	...	...	...	...	...	4	...	...	...
⋀	State Battery, Norseman	5	...	...	...	...	...	...	...	1	6	...	...	...
	Total	**25**	...	...	...	...	...	...	...	**1**	**17**	...	...	**£8,573**
	PHILLIPS RIVER GOLDFIELD.													
Kundip.														
M.A. 6	Gem	5	...	...	...	...	...	...	...	...	...	...	...	...
G.M.L. (151)	Gem Consolidated	5	...	...	...	...	...	...	...	...	...	...	...	...
M.L. 52	Harbour View	10	...	...	...	...	...	...	...	...	...	...	...	...
T.A. 6	Two Boys	10	...	...	...	...	...	...	...	...	...	...	...	...
P.A. 202	Cherighan	...	...	...	...	...	...	...	...	...	4	...	...	...
	Total	**30**	...	...	...	...	...	...	...	...	**4**	...	...	**£2,400**

TABLE XXVII.—*Milling and Cyaniding Plants erected in the respective Goldfields, Districts, etc.*—continued.

GOLDFIELD.	DISTRICT.	MILLING.									CYANIDING.			Value of all Mining Machinery.
		Batteries.	Other Mills.											
		Number of Heads of Stampers.	Prospecting Mills.	Ball Mills.	Griffin Mills.	Huntington Mills.	Puddlers.	Other Crushers.	Flint Mills.	Grinding Pans.	Leaching Vats.	Agitating Vats.	Vacuum Filters and Presses.	
	GOLD MINING.													£
Pilbara	Marble Bar	45	...	...	...	1	...	...	...	3	10	...	...	11,295
	Nullagine	18	...	...	...	...	...	...	...	...	7	...	...	1,881
Peak Hill	... ...	10	...	...	...	...	...	...	...	1	9	...	...	3,147
East Murchison	Lawlers	25	...	...	...	...	...	1	...	1	16	...	...	7,200
	Wiluna	23	...	...	...	...	...	1	...	...	10	...	...	59,767
	Black Range	15	...	...	...	...	...	...	...	...	11	...	...	5,503
Murchison ...	Cue	20	...	...	...	...	...	...	...	1	17	...	...	3,760
	Meekatharra	60	...	...	...	...	...	...	...	9	9	...	...	46,143
	Day Dawn	3	...	...	...	...	...	...	...	...	6	...	...	1,800
	Mt. Magnet	20	...	...	...	1	...	...	...	5	16	...	...	9,973
Yalgoo	... ...	30	1	...	...	...	...	...	...	4	15	...	...	16,375
Mt. Margaret ...	Mt. Morgans	25	...	...	...	...	1	...	...	5	12	6	1	15,492
	Mt. Malcolm	65	...	...	...	...	...	...	4	2	6	4	1	288,583
	Mt. Margaret	30	...	...	...	...	...	...	...	6	16	1	...	5,110
North Coolgardie	Menzies	25	...	...	...	...	...	1	...	4	8	...	...	18,729
	Ularring	20	...	...	...	...	...	...	...	2	6	...	...	10,486
	Niagara	10	...	...	...	...	...	...	...	...	...	...	...	1,656
	Yerilla	20	...	...	...	...	...	...	...	1	8	...	...	2,988
Broad Arrow	... ...	30	...	1	1	2	...	5	...	11	5	7	3	61,299
North-East Coolgardie	Kanowna	5	...	...	...	1	...	...	...	2	4	...	...	2,150
	Kurnalpi	5	1	...	...	...	...	...	...	...	...	...	...	250
East Coolgardie	East Coolgardie	215	1	35	9	1	6	24	25	93	53	116	57	668,971
	Bulong	5	...	...	...	...	...	...	...	...	3	...	...	1,000
Coolgardie ...	Coolgardie	45	...	...	...	1	...	...	...	4	27	...	...	24,609
	Kunanalling	25	...	...	...	...	...	...	...	2	8	...	...	5,670
Yilgarn	... ...	65	...	...	...	...	...	...	...	2	25	...	...	16,199
Dundas	... ...	25	...	...	...	...	...	...	...	1	17	...	...	8,573
Phillips River	... ...	30	...	...	...	...	...	...	...	...	4	...	...	2,400
	Total, Gold Mining Machinery ...	**914**	**3**	**36**	**10**	**7**	**7**	**32**	**29**	**159**	**328**	**134**	**62**	**£1,301,009**
	LEAD MINING.													
Northampton M.F. ...	... ...	...	...	...	...	...	...	9	...	...	...	...	...	49,153
	Total, Lead Mining Machinery ...	...	...	...	...	...	...	**9**	...	...	...	...	...	**49,153**
	TIN MINING.													
Pilbara	Marble Bar	...	...	...	...	...	1	2	...	...	...	...	...	2,512
Greenbushes	... ...	...	...	...	...	...	1	2	...	...	...	...	...	12,691
	Total, Tin Mining Machinery ...	...	...	...	...	...	**2**	**4**	...	...	...	...	...	**15,203**
	COPPER MINING.													
West Pilbara	... ...	...	...	...	...	...	...	5	2	1	...	...	...	48,600
Phillips River	... ...	...	...	5	...	...	...	10	2	...	...	3	1	61,100
	Total, Copper Mining Machinery	...	...	**5**	...	...	...	**15**	**4**	**1**	...	**3**	**1**	**109,700**
	COAL MINING.													
Collie	... ...	...	...	...	...	...	...	...	...	...	...	...	...	94,443
	Total, Coal Mining Machinery ...	...	...	...	...	...	...	...	...	...	...	...	...	**94,443**
	ASBESTOS MINING.													
Pilbara	Nullagine	...	...	...	...	...	...	1	...	...	...	...	...	2,228
	Total, Asbestos Mining Machinery	...	...	...	...	...	...	**1**	...	...	...	...	...	**2,228**
Total, Machinery other than Gold Mining		...	...	5	...	...	2	29	4	1	...	3	1	270,727
Total, all Mining Machinery		**914**	**3**	**41**	**10**	**7**	**9**	**61**	**33**	**160**	**328**	**137**	**63**	**£1,571,736**

APPENDIX.

ROYAL MINT, PERTH BRANCH.

Subject to the Regulations, any person may deposit gold at the Mint in his own name. Those who cannot attend personally for the purpose may send the gold by an agent, under Police escort, or by Post.

Arrangements can be made for the insurance of gold sent by post. Particulars upon application to the Mint.

A circular can be obtained from the Deputy Master of the Mint giving all necessary information for intending depositors, Coining Regulations, etc., etc.

Forms for use in connection with gold sent to the Mint by post can be obtained at the Mint.

Charges for Assaying, Refining, and Coinage.

Gross weight of Deposit in ounces.	Mint Charge.	Gross weight of Deposit in ounces.	Mint Charge.	Gross weight of Deposit in ounces.	Mint Charge.
Up to and including—	£ s. d.	Up to and including—	£ s. d.	Up to and including—	£ s. d.
24	0 5 0	400	4 3 4	1,300	10 4 2
30	0 6 3	410	4 5 5	1,400	10 16 8
40	0 8 4	420	4 7 6	1,500	11 9 2
50	0 10 5	430	4 9 7	1,600	12 1 8
60	0 12 6	440	4 11 8	1,700	12 14 2
70	0 14 7	450	4 13 9	1,800	13 6 8
80	0 16 8	460	4 15 10	1,900	13 19 2
90	0 18 9	470	4 17 11	2,000	14 11 8
100	1 0 10	480	5 0 0	2,100	15 4 2
110	1 2 11	490	5 2 1	2,200	15 16 8
120	1 5 0	500	5 4 2	2,300	16 9 2
130	1 7 1	520	5 6 8	2,400	17 1 8
140	1 9 2	540	5 9 2	2,500	17 14 2
150	1 11 3	560	5 11 8	2,600	18 6 8
160	1 13 4	580	5 14 2	2,700	18 19 2
170	1 15 5	600	5 16 8	2,800	19 11 8
180	1 17 6	620	5 19 2	2,900	20 4 2
190	1 19 7	640	6 1 8	3,000	20 16 8
200	2 1 8	660	6 4 2	3,100	21 9 2
210	2 3 9	680	6 6 8	3,200	22 1 8
220	2 5 10	700	6 9 2	3,300	22 14 2
230	2 7 11	720	6 11 8	3,400	23 6 8
240	2 10 0	740	6 14 2	3,500	23 19 2
250	2 12 1	760	6 16 8	3,600	24 11 8
260	2 14 2	780	6 19 2	3,700	25 4 2
270	2 16 3	800	7 1 8	3,800	25 16 8
280	2 18 4	820	7 4 2	3,900	26 9 2
290	3 0 5	840	7 6 8	4,000	27 1 8
300	3 2 6	860	7 9 2	4,100	27 14 2
310	3 4 7	880	7 11 8	4,200	28 6 8
320	3 6 8	900	7 14 2	4,300	28 19 2
330	3 8 9	920	7 16 8	4,400	29 11 8
340	3 10 10	940	7 19 2	4,500	30 4 2
350	3 12 11	960	8 1 8	4,600	30 16 8
360	3 15 0	980	8 4 2	4,700	31 9 2
370	3 17 1	1,000	8 6 8	4,800	32 1 8
380	3 19 2	1,100	8 19 2	4,900	32 14 2
390	4 1 3	1,200	9 11 8	5,000	33 6 8

For every additional 100ozs. the charge is increased by 12s. 6d.

NOTE.—Additional charges are collected when base metals in a deposit exceed 2 per cent. of its weight.

The following table illustrates the operation of these charges in case of gold of the value of £3 17s. 10½d. an ounce:—

Weight of Deposit	Rate of Charge per ounce.	Amount of Charge.	Net Value of Deposit.
ozs.	d.	£ s. d.	£ s. d.
50	2.5	0 10 5	194 3 4
100	2.5	1 0 10	388 6 8
600	2.3	5 16 8	2,330 8 4
1,000	2.0	8 6 8	3,885 8 4
5,000	1.6	33 6 8	19,435 8 4
10,000	1.55	64 11 8	38,872 18 4

NOTE.—A proportion of silver in deposits of gold is paid for by the Mint as follows:—

In deposits under 1,000ozs. gross: all silver in excess of 8 per cent. of the weight of the deposit after melting.
" from 1,000 " to 5,000 " " 6 " " " " "
" " 5,000 " " 10,000 " " 5 " " " " "
" " 10,000 " upwards " " 4 " " " " "

The rate at which payment for silver is made is liable to fluctuation.

RATES FOR CARRIAGE OF GOLD ON GOVERNMENT RAILWAYS.

	Distance not over—									
	10 miles.	25 miles.	50 miles.	100 miles.	150 miles.	200 miles.	250 miles.	300 miles.	400 miles.	500 miles.
Bullion or unmanufactured Gold, per 100 ozs. ...	s. d. 3 9	s. d. 4 6	s. d. 5 3	s. d. 6 9	s. d. 8 3	s. d. 9 9	s. d. 11 3	s. d. 12 9	s. d. 15 0	s. d. 17 3

1s. 6d. per 100ozs. for every additional 100 miles or part thereof.

Consignments of Gold Bullion in lots exceeding in the aggregate 30,000 ozs. despatched on any one day will be allowed a reduction of 33⅓ per cent. with a minimum charge as for 30,000 ozs. Consignors may combine to make up the required quantity, but each consignment must be charged for separately.

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, at the mine.

By Authority: FRED. WM. SIMPSON, Government Printer, Perth.