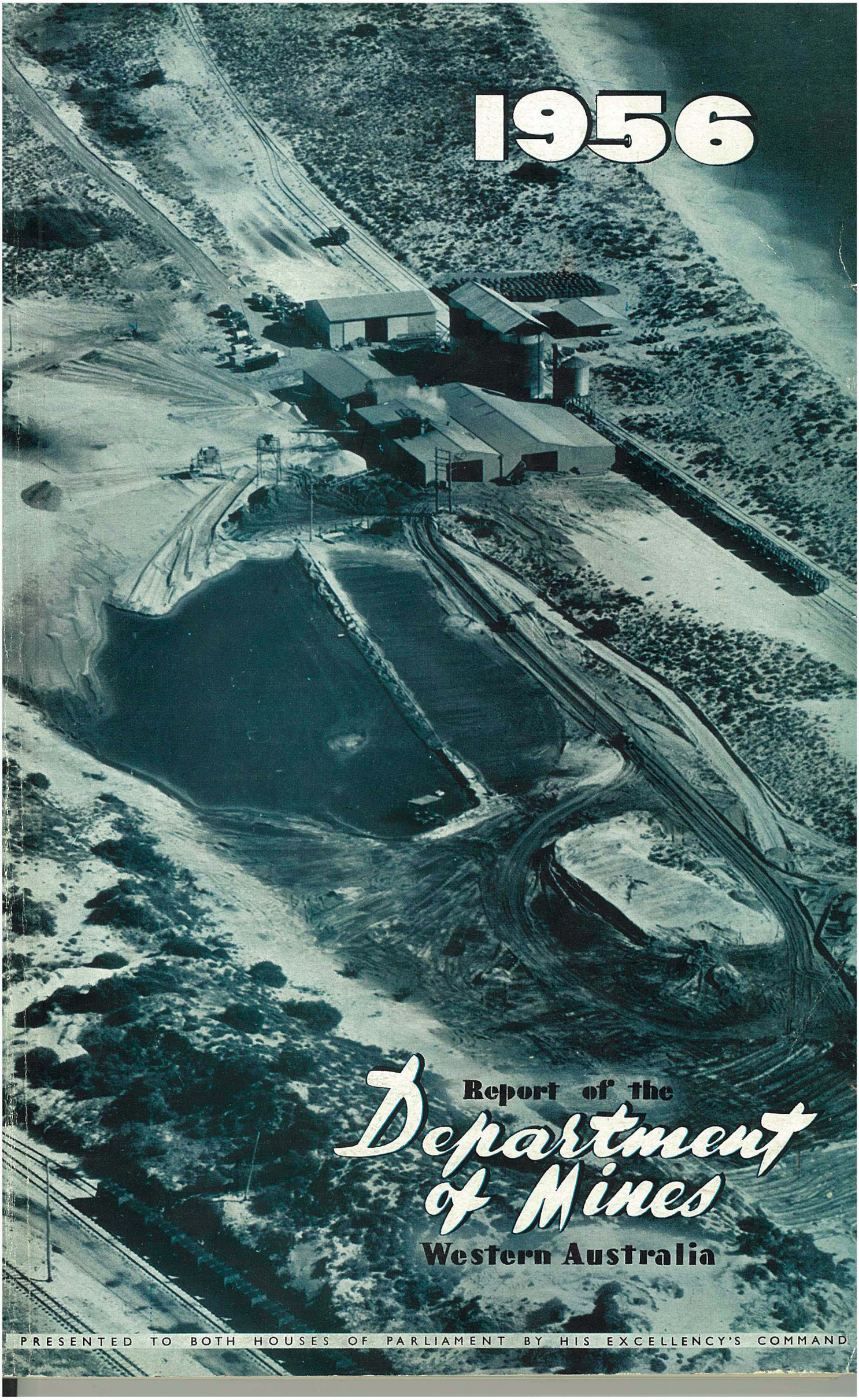


1956

Report of the Department of Mines

Western Australia

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

COVER PICTURE

The cover picture for 1956 shows the production site and plant at Koombana Bay, Bunbury, from which the first shipment of Ilmenite Concentrates was obtained during the year.

The Mineral Beach Sand Industry is a welcome addition to the list of minerals mined in this State and its development will be followed with interest.

Ilmenite is the principal mineral content of our new industry, and on account of its purity is ideally suited for the manufacture of paint pigment.

Other mineral contents of the sands are Rutile, Zircon and Monazite.

WESTERN AUSTRALIA — 1958

REPORT

OF THE

Department of Mines

FOR THE

YEAR 1956

PERTH:
By Authority: ALEX. B. DAVIES, Government Printer
1958
8224/5/57—625

To the Hon. Minister for Mines.

Sir,

I have the honour to submit the Annual Report of the Department of Mines of the State of Western Australia for the year 1956, together with reports from the officers controlling Sub-Departments, and Comparative Tables furnishing statistics relative to the Mining Industry.

I have the honour to be, Sir,

Your obedient servant,

A. H. TELFER,

Under Secretary for Mines.

Perth, April, 1957.

TABLE OF CONTENTS

STATE OF WESTERN AUSTRALIA

Report of the Department of Mines for the Year 1956

DIVISION I

The Honourable Minister for Mines:

I have the honour to submit for your information, a report on the mining industry for the year 1956.

The estimated value of the mineral output of the State for the year was £8,298,718 (calculating gold at £4 4s. 11·45d. per fine ounce), a decrease of £995,273 in value compared with the preceding 12 months. The estimated value of the exchange premium paid to gold producers by the Mint amounted to £A9,242,661 added to which, the overseas gold sales premium of £A12,154 received by the Gold Producers' Association Limited from sales of West Australian gold from July, 1955, to July, 1956, brought the gross value of all minerals to £A19,521,032, an increase of £627,871 over the previous year, and the second highest annual value on record. Such overall increase being occasioned by a new record value figure returned from the greatly expanded mining of minerals other than gold and coal.

In comparison with last year the value of the gold and coal yields dropped 3·56 and 9·44 per cent. respectively, whilst that of other minerals rose by 52·87 per cent., thus topping the 1955 grand total for all minerals by 3·32 per cent.

The estimated value of the gold received at the Perth Branch of the Royal Mint and exported in gold-bearing material was £A12,693,427, but with the additional overseas gold sales premium mentioned above, totalled £A12,705,581 (and equalled 65·086 per cent. of the value of all minerals). (See footnote to Table 1 (a), Part II.)

Other minerals realised: Coal, £2,797,506; asbestos, £826,076; manganese, £648,956; lead ores and concentrates, £643,253; pyrites, £420,052; iron ore (exported), £323,923; iron ore (pig), £278,846; tin, £208,273; tanto-columbite, £127,664; cupreous ore (fertiliser), £113,442; chromite, £97,526; silver, £90,973; beryl, £57,112; talc, £54,438; clays, £33,507; gypsum, £20,928; felspar, £17,718; ilmenite, £15,150; copper ore, £12,742; bentonite, £5,658; barytes, £5,187; glass-sand, £5,154; ochre, £4,349; glauconite, £3,360; magnesite, £1,978; antimony, £742; dolomite, £690; Fuller's earth, £201; graphite, £37; and vermiculite, £9.

Dividends paid by mining companies amounted to £2,199,083, an increase of £149,962 when compared with the previous year (see Table 6, Part II).

To the end of 1956, the total amount distributed by gold mining companies was £55,773,752.

To the same date the progressive value of the mineral production of the State amounted to £308,562,408, of which gold accounted for £247,001,104 (based on the normal value of £4 4s. 11·45d. per fine ounce); but the premium on the sale of gold during years 1920-1924, increasing exchange premium from 1930, payments under the Gold Bounty Act, 1930, plus additional premiums from overseas sales distributed during 1952 to 1956, increase the total value of gold and mineral production by £142,225,759, making a gross progressive value of £A450,788,167.

GOLD.

The quantity of gold reported as being received at the Perth Branch of the Royal Mint (810,048·68 fine ounces), together with that contained in gold-bearing material exported for treatment (2,331·10 fine ounces), totalled 812,379·78 fine ounces, which was 29,625·45 fine ounces less than the previous year (vide Table 1 (a) of Part II).

The variation between the two annual totals mentioned above is principally due to the fact that the gold reported as being received at the Mint and exported for treatment, is not all necessarily produced during the calendar year under review, a certain quantity being always in the transitory stage from the producer at the end of the year. The former total is accepted as the official production of the State on account of its realised monetary value, whilst the latter is utilised mainly in tracing the gold back to its source, i.e., individual mine production, to which its respective ore tonnage can be applied.

The calculated average value of the ore treated in the State as a whole, decreased slightly from 24·752 shillings per ton in 1955 to 24·094 shillings per ton in 1956, calculating gold at the old rate of £4 4s. 11·45d. per fine ounce, but the exchange premium rate of 267·84 per cent. would more than treble this estimate. For East Coolgardie Goldfield (which produced 58·34 per cent. of the State's gold yield), the calculated average value of the ore treated decreased from 21·613 shillings to 20·850 shillings per ton. The estimates for Murchison (Hill 50 G.M. N.L.), Mt. Margaret (Sons of Gwalia Ltd.), Coolgardie (New Coolgardie Groups of G.M.K. (Aust.) Pty. Ltd.), Dundas (Central Norseman Gold Corporation N.L.), Yilgarn (Great Western Cons. N.L.) were 66·067s. (60·560s.); 21·027s. (21·238s.); 42·393s. (48·012s.); 46·996s. (50·717s.) and 15·898s. (13·240s.), respectively. Figures for 1955 being shown in parenthesis.

The tonnage of ore reported to have been treated in 1956, viz., 2,870,273 tons, was 5,225 tons in excess of the previous year, and constituted 66·88 per cent. of the State record tonnage established in 1940.

The following tonnage increases were reported from the respective goldfields:—Kimberley 40, East Murchison 359, Mt. Margaret 5,624, Broad Arrow 1,442, North-East Coolgardie 12, East Coolgardie 13,474, Yilgarn 21,873, Dundas 713, and Phillips River 6; those fields showing a reduction in tonnage being Pilbara 3,401, Ashburton 15, Peak Hill 252, Murchison 14,677, North Coolgardie 17,226, and Coolgardie 2,723.

Output from the East Coolgardie Goldfield exceeded that of the previous year by 13,474 tons; the 26,700 tons increase by Gold Mines of Kalgoorlie

(Aust.) Pty. Ltd. being nullified by a correspondingly lower output from the three companies merging with it during the year, due principally to plant re-arrangement. The Great Boulder Pty. G.Ms. Ltd., North Kalgurli (1912) Ltd., and Lake View and Star Ltd. each showed a slight improvement. There being now only four major companies operating on the Golden Mile.

Even though Hill 50 G.M. N.L. reported an increase of 2,500 tons, the Murchison Goldfield showed a regression of 14,700 tons. The difference representing the final tonnage treated by Big Bell Mines prior to closure in January, 1955.

Closure of the Callion Leases by Gold Mines of Kalgoorlie after absorbing the New Coolgardie Gold Mines during the year, caused the loss of 17,000 tons sustained by the North Coolgardie Goldfield.

Great Western Consolidated N.L. were responsible for the 21,000 ton increase in the Yilgarn Goldfield, whilst Sons of Gwalia Ltd. were similarly responsible for the 5,600 ton improvement in the Mt. Margaret Goldfield.

Although the quantity of ore treated in the State was slightly in excess of the previous year, the average grade, which was a shade lower, caused a loss in gold production of 20,709 fine ounces.

Such slight strengthening of the ore output, despite attendant difficulties brought about by major company mergers on the Golden Mile and consequent plant re-arrangements, was really an encouraging feature, which, added to the active drilling campaign and development programmes being carried out by the Government and certain major companies, would appear to brighten the future prospects of the industry.

West Australian gold included in sales on open dollar markets by the Gold Producers' Association Ltd. between July, 1955, and July, 1956, totalled 396,781·94 fine ounces; the extra premiums received therefrom in excess of Mint value, amounted to £A12,154, an overall average of 7·351 pence per fine ounce. This amount, less expenses, was distributed to the producer members during the year and approximated 6·434 pence per fine ounce.

Subsidy payments made by the Commonwealth Government during the year under the Gold Mining Industry Assistance Act, 1954, totalled £A484,357, of which £A465,097 went to large producers and £A19,260 to small producers in this State.

PART II.—MINERALS.

This year the value of the production of minerals other than gold and coal was the highest on record. Keen world competition for the purchase of many of the lighter minerals has been reflected in the increased activity in the search for minerals which hitherto have created no great interest in this State. Prices have been at a reasonably good level which has encouraged the search for and production of economic minerals.

Production of titanium has commenced at Capel and Bunbury where treatment plants have been erected, and the mineral is now being exported from the Port of Bunbury. Many other deposits are being investigated and it is probable that further deposits at Yoganup, Capel and Wonnerup will be opened up within the next 12 months.

There has been a revival of mining for copper in the Ravensthorpe and Pilbara Fields. At Ravensthorpe a large plant has been installed by Ravensthorpe Copper Mines N.L. and the Government is assisting in the provision of houses, roads and water supply. In the Pilbara a large company has taken an option over the "Copper Hills" deposit, which is to be thoroughly tested by diamond drilling.

Production has continued in the north-western fields of asbestos, iron, manganese, chrome, copper, lead, tin and ochres. In the more southern fields pyrites, gypsum, clays, felspar, talc, lead, tin and copper have been produced.

The search for nickel has been continued during the year by Southwestern Mining Ltd. on their reservation on the eastern boundary of the State, and a great deal of geological and exploratory work been accomplished.

COAL.

Coal production at Collie showed a further small decline this year, the production for 1956 being 830,005 tons as against 903,792 tons for 1955. Of the total output 74.87 per cent. was from deep mines, 25·13 per cent. from open cuts.

The consumption of coal for the year by all consumers was 829,985 tons. Of this, the State Electricity Commission used 433,927 tons, the Railways Commission 298,276 tons, private consumers 61,585 tons, and Kalgoorlie Electricity and Power Corporation used 36,197 tons.

COMPARATIVE MINERAL STATISTICS.

	1955.	1956.	Variation.
Gold—			
Reported to Department :			
Ore (tons)	2,865,048	**2,870,273**	+ 5,225
Gold (fine ozs.)	834,326	**813,617**	— 20,709
Average grade (dwts. per ton)	5·824	**5·668**	— 0·156 dwt.
Men Employed	5,845	**5,628**	— 217
Dividends (£A)	2,049,121	**2,199,083**	+ 149,962
Mint and Export :			
Gold (fine ozs.)	842,005	**812,380**	— 29,625
Estimated Value (£A)	*13,175,559	***12,705,581**	— 469,978
Coal—			
Reported to Department :			
Tons	903,792	**830,007**	— 73,785
Value (£A)	3,089,311	**†2,797,506**	— 291,805
Men Employed	1,386	**1,219**	— 167
Other Minerals—			
Reported to Department :			
Value (£A)	2,628,291	**§4,017,945**	+ 1,389,654
‡Men Employed	850	**920**	+ 70
Total All Minerals—			
Value (£A)	18,893,161	**19,521,032**	+ 627,871
‡Men Employed	8,081	**7,767**	— 314

* Including Overseas Gold Sales Premium by G.P.A. † Incomplete. ‡ Excluding Oil Search which engaged an average of :—445 men in the field during 1955 and 353 men in the field during 1956. § Highest annual value of Minerals other than gold and coal on record.

A feature of this year's production has been the increase in output from deep mines as against that from the open cuts. It is interesting to note that the deep mined output is a record in the history of the coalfield and that no less than 88·5 per cent. of the deep mined coal was produced and conveyed by mechanical means. This is the highest percentage of mechanically produced coal of any coalfield in Australia.

OIL.

There was no cessation in the search for oil which continued vigorously again this year. West Australian Petroleum Pty. Limited have carried out extensive exploration and drilling programmes at Rough Range, Dirk Hartog Island, in the vicinity of Carnarvon and in the Kimberleys.

Associated Kimberley Oil Fields, N.L., have been actively searching for oil on their Licenses to Prospect and a deep drill is being put down at the Sisters on License to Prospect No. 17H.

TABLE 1.

Quantity and Value of Minerals, other than Gold and Silver, produced during Years 1955 *and* 1956.

Description of Minerals.	1955.		1956.		Increase or Decrease for year compared with 1955.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Tons.	£A.	Tons.	£A.	Tons.	£A.
Antimony Conc. (*a*)	203·88	230	78·44	742	— 125·44	+ 512
Asbestos—						
Chrysotile	274·58	15,997	761·10	25,366	+ 486·52	+ 9,369
Crocidolite	4,342·42	486,032	7,285·97	800,710	+ 2,943·55	+ 314,678
Barytes	10·00	70	927·10	5,187	+ 917·10	+ 5,117
Bentonite	646·94	2,591	1,403·54	5,658	+ 756·60	+ 3,067
Beryl Ore	198·63	34,430	310·19	57,113	+ 111·56	+ 22,683
Chromite	....	....	6,096·20	97,526	+ 6,096·20	+ 97,526
Clays—	34,924·32	25,445	18,314·00	15,208	— 16,610·32	— 10,237
Cement Clay	6,912·00	6,868	9,437·00	9,939	+ 2,525·00	+ 3,071
Fireclay	76·00	380	2,090·00	8,360	+ 2,014·00	+ 7,980
White Clay						
Coal	903,792·22	3,089,311	830,006·65	2,797,506	— 73,785·57	— 291,805
Corundum	9·15	275	....	....	— 9·15	— 275
Copper Ore	12·12	1,001	212·23	12,742	+ 200·11	+ 11,741
Cupreous Ore (Fertiliser)	7,730·78	101,731	7,713·31	113,443	— 17·47	+ 11,712
Dolomite	81·00	324	171·00	690	+ 90·00	+ 366
Emery	8·15	245	....	....	— 8·15	— 245
Felspar	3,565·00	16,660	3,781·00	17,719	+ 216·00	+ 1,059
Fergusonite	0·13	226	....	....	— 0·13	— 226
Fullers Earth	10·76	54	40·13	201	+ 29·37	+ 147
Glass Sand	6,758·98	4,801	7,343·17	5,154	+ 584·19	+ 353
Glauconite	196·50	7,407	85·00	3,360	— 111·50	— 4,047
Graphite	110·00	990	5·10	37	— 104·90	— 953
Gypsum	39,946·00	30,336	27,121·00	20,928	— 12,825·00	— 9,408
Iron Ore (for Pig)	17,302·88	220,558	19,853·60	278,846	+ 2,540·72	+ 58,288
Iron Ore (Exported)	496,882·00	492,741	327,815·00	323,923	— 169,067·00	— 168,818
Lead / Silver-Lead	1,415·96	95,191	7,612·89	643,253	+ 6,196·93	+ 548,062
Magnesite	....	....	803·55	1,978	+ 803·55	+ 1,978
Manganese	37,490·66	423,830	57,323·14	648,956	+ 19,822·48	+ 225,126
Mineral Beach Sands (Ilmenite)	....	....	3,392·40	15,150	+ 3,293·40	+ 15,150
Ochre—						
Red	345·19	3,913	368·93	3,595	+ 23·74	— 318
Yellow	....	....	75·45	755	+ 75·45	+ 755
Pyrites	49,485·00	397,269	60,968·98	420,052	+ 11,483·98	+ 22,783
Spodumene	3·89	57	....	....	— 3·89	— 57
Talc	2,586·81	37,767	4,455·57	54,438	+ 1,868·76	+ 16,671
Tanto-Columbite	12·98	25,762	71·27	127,664	+ 58·29	+ 101,902
Tin	179·72	94,912	358·35	208,273	+ 178·63	+ 113,361
Tungsten—Scheelite (lb.)	17,365·00	7,147	....	....	— 17,365·00	— 6,417
Vermiculite	....	....	1·04	9	+ 1·04	+ 9
Total	....	5,624,821	....	6,724,481	....	+ 1,099,660

TABLE 1 (a).—*Quantity and Value of Gold and Silver exported and minted during Years* 1955 *and* 1956.

	Fine ozs.	£A.	Fine ozs.	£A.	Fine ozs.	£A.
Gold (Mint and Export)	842,005·23	(*b*)13,175,559	812,379·78	(*b*)12,705,581	— 29,625·45	— 468,978
Silver (Mint and Export)	235,794·73	92,781	217,247·01	90,973	— 18,547·72	— 1,808
Total	....	13,268,340	....	12,796,554	....	— 470,786
Grand Total, All Minerals	....	18,893,161	....	19,521,035	....	+ 627,874

(*a*) By-product from Gold Mining. (*b*) Including Overseas Gold Sales Premium.

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.
	£	£	
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
1929	16,660,742	1,802,709	10·82
1930	19,016,639	6,370,396	33·49
1931	14,266,650	4,333,421	30·37
1932	16,771,465	5,657,870	33·74
1933	18,098,214	5,328,869	29·44
1934	16,784,705	5,759,324	34·31
1935	17,611,547	5,698,721	32·36
1936	19,564,716	7,130,381	36·45
1937	21,594,942	9,026,313	41·80
1938	24,220,864	10,417,458	43·01
1939	23,244,509	11,969,562	51·49
1940	25,800,562	12,480,721	48·37
1941	24,536,777	12,411,316	50·58
1942	20,681,284	8,476,622	40·99
1943	18,014,340	6,539,295	36·30
1944	19,453,001	(*a*) 1,282,867	6·59
1945	20,170,624	205,587	1·02
1946	26,342,125	211,890	0·80
1947	42,389,125	4,162,892	9·82
1948	57,779,996	342,646	0·59
1949	58,197,775	465,124	0·80
1950	78,804,864	531,245	0·67
1951	115,880,457	7,479,601	6·45
1952	101,620,138	7,952,834	7·82
1953	106,678,014	13,239,076	12·41
1954	79,955,207	5,342,462	6·68
1955	113,044,633	17,145,741	15·17
1956	142,852,512	9,531,471	6·67
Total since 1902	1,554,923,160	306,536,016	19·71

† Including Ships' Stores. (*a*) Full value of gold movement by Commonwealth Treasury from 1944 not available.

Comparative Statistical Diagrams

showing:

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 1956

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

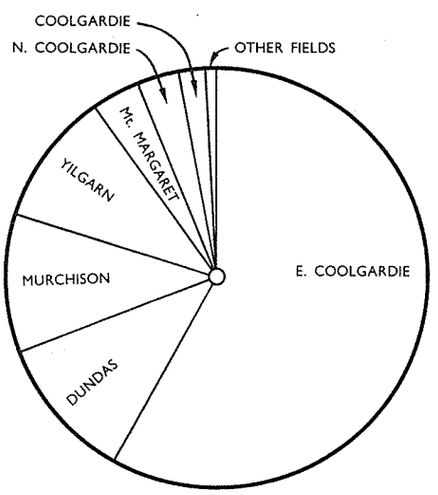


Fig. 2 Gold produced from various Goldfields as given by the Export and Mint Returns

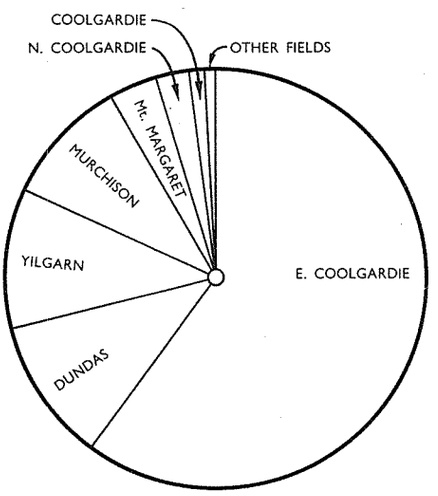


Fig. 3 Value of Gold and other Minerals

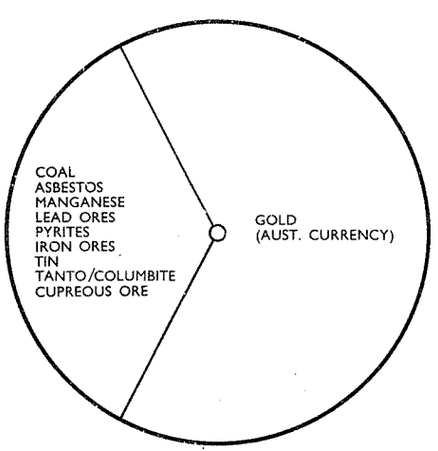


Fig. 4 Value of Minerals other than Gold

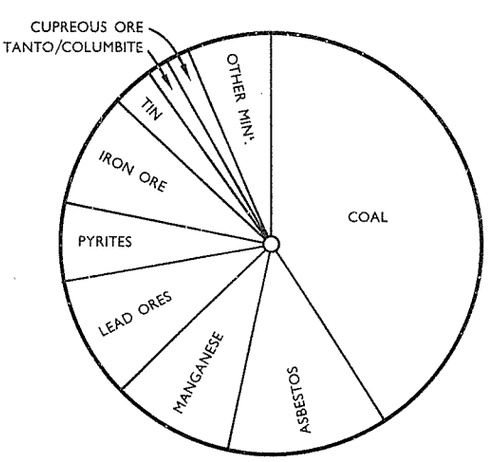


Fig. 5 Areas of land leased for Goldmining on various Goldfields

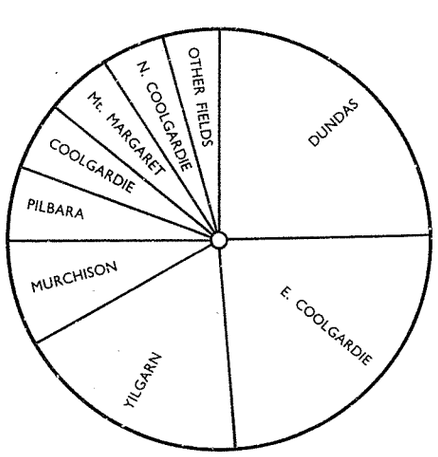


Fig. 6 Output of Gold in the States of Australia and the Dominion of New Zealand

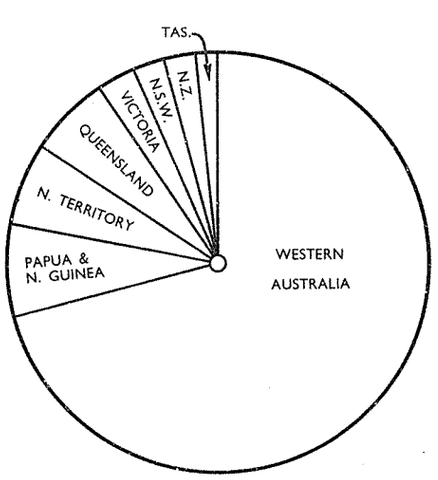
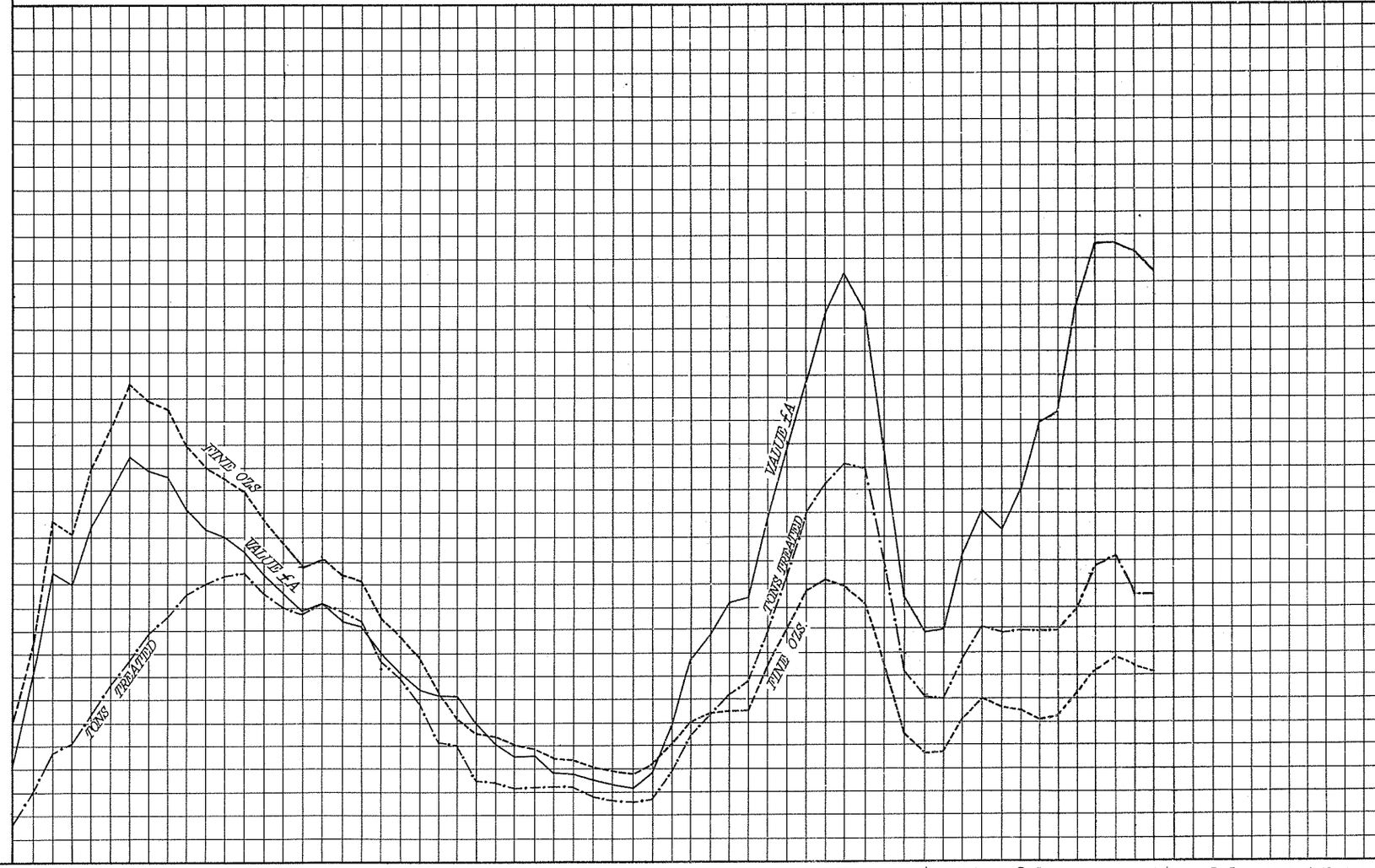


DIAGRAM OF GOLD OUTPUT

Showing Tonnage Treated (as reported to Mines Dept.); the Total Output of Gold Bullion, Concentrates etc., entered for export and received at the Perth Mint, and the Estimated Value thereof, in Australian Currency.



TONS TREATED	FINE OUNCES	VALUE £A
9,000,000	3,600,000	18,000,000
	3,400,000	17,000,000
8,000,000	3,200,000	16,000,000
	3,000,000	15,000,000
7,000,000	2,800,000	14,000,000
	2,600,000	13,000,000
6,000,000	2,400,000	12,000,000
	2,200,000	11,000,000
5,000,000	2,000,000	10,000,000
	1,800,000	9,000,000
4,000,000	1,600,000	8,000,000
	1,400,000	7,000,000
3,000,000	1,200,000	6,000,000
	1,000,000	5,000,000
2,000,000	800,000	4,000,000
	600,000	3,000,000
1,000,000	400,000	2,000,000
	200,000	1,000,000

YEAR

1897 1898 1899 1900 1901 1902 1903 1904 1905 1906 1907 1908 1909 1910 1911 1912 1913 1914 1915 1916 1917 1918 1919 1920 1921 1922 1923 1924 1925 1926 1927 1928 1929 1930 1931 1932 1933 1934 1935 1936 1937 1938 1939 1940 1941 1942 1943 1944 1945 1946 1947 1948 1949 1950 1951 1952 1953 1954 1955 1956 1957 1958 1959 1960 1961 1962 1963 1964 1965 1966 1967 1968

VALUE £A	FINE OUNCES	TONS TREATED
18,000,000	3,600,000	9,000,000
17,000,000	3,400,000	
16,000,000	3,200,000	8,000,000
15,000,000	3,000,000	
14,000,000	2,800,000	7,000,000
13,000,000	2,600,000	
12,000,000	2,400,000	6,000,000
11,000,000	2,200,000	
10,000,000	2,000,000	5,000,000
9,000,000	1,800,000	
8,000,000	1,600,000	4,000,000
7,000,000	1,400,000	
6,000,000	1,200,000	3,000,000
5,000,000	1,000,000	
4,000,000	800,000	2,000,000
3,000,000	600,000	
2,000,000	400,000	1,000,000
1,000,000	200,000	

YEAR

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 yield of Gold per ton of ore treated.

Goldfield.	Reported Yield.		Percentage for each Goldfield.		Average Value per ton of Ore Treated, (Gold at £4 4s. 11.45d. per fine oz.).	
	1955.	1956.	1955.	1956.	1955.	1956.
	Fine ozs.	Fine ozs.	%	%	Shillings.	Shillings.
1. Kimberley	192	179	·023	·022	....	253·725
2. West Kimberley	....	....	....	....	....	....
3. Pilbara	3,873	2,074	·464	·255	63·764	102·981
4. West Pilbara	29	1	·004	....	....	....
5. Ashburton	19	1	·003	....	107·666	....
6. Gascoyne	....	....	....	....	....	....
7. Peak Hill	112	16	·014	·002	32·162	30·581
8. East Murchison	134	272	·016	·033	96·525	48·518
9. Murchison	89,146	85,914	10·680	10·560	60·560	66·067
10. Yalgoo	12	....	·002	....	....	....
11. Mt. Margaret	28,671	29,775	3·436	3·660	21·238	21·027
12. North Coolgardie	35,918	27,646	4·306	3·398	47·079	46·420
13. Broad Arrow	2,735	1,957	·328	·240	42·056	23·871
14. North East Coolgardie	369	105	·044	·013	60·288	16·837
15. East Coolgardie	489,040	474,683	58·610	58·343	21·613	20·850
16. Coolgardie	21,591	17,705	2·588	2·176	48·012	42·393
17. Yilgarn	66,710	84,187	7·996	10·347	13·240	15·898
18. Dundas	95,718	89,089	11·470	10·950	50·717	46·996
19. Phillips River	3	1	....	....	....	6·842
20. Outside Proclaimed Goldfields	54	12	·007	·001	....	....
Totals and Averages	834,326	813,617	100·000	100·000	24·752	24·094

The total yield of the State is shown in Table 1, being the amount of the gold received at the Royal Mint, the gold exported in bullion and concentrates, (and alluvial and other gold not reported to the Mines Department).

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

TABLE 4.

Average Quantities of Gold Ore raised and treated, and Gold produced therefrom, per man employed on the several Goldfields of the State, during 1955 *and* 1956.

Goldfield.	1955.				1956.			
	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 underground.	Per man employed above and underground.	Per man employed underground.	Per man employed above and underground.	Per man employed underground.	Per man employed above and underground.	Per man employed underground.	Per man employed above and underground.
	Tons.	Tons.	Fine ozs.	Fine ozs.	Tons.	Tons.	Fine ozs.	Fine ozs.
1. Kimberley	....	....	....	....	....	15·00	....	44·75
2. West Kimberley	....	....	....	....	....	....	....	....
3. Pilbara	166·54	68·84	124·93	51·64	76·61	30·38	90·17	35·76
4. West Pilbara	....	....	....	....	....	....	....	....
5. Ashburton	....	....	....	....	....	....	....	....
6. Gascoyne	....	....	....	....	....	....	....	....
7. Peak Hill	74·00	26·91	28·00	10·18	14·67	5·50	5·33	2·00
8. East Murchison	23·60	7·87	26·80	8·93	68·11	23·84	38·86	13·60
9. Murchison	846·00	350·72	602·34	249·71	713·10	326·05	554·28	253·43
10. Yalgoo	....	....	....	....	....	....	....	....
11. Mt. Margaret	651·95	345·61	162·90	86·36	640·26	356·12	158·38	88·09
12. North Coolgardie	491·27	259·39	272·10	143·67	512·07	250·64	297·27	145·51
13. Broad Arrow	104·30	48·49	51·60	23·99	204·99	84·99	57·56	23·86
14. North-East Coolgardie	65·00	26·00	46·13	18·45	133·19	48·43	26·25	9·55
15. East Coolgardie	1,144·53	576·04	291·27	146·59	1,130·34	593·78	277·27	145·65
16. Coolgardie	269·18	133·18	152·05	75·23	286·29	159·91	142·78	79·75
17. Yilgarn	1,413·37	684·11	220·17	106·57	1,253·83	644·88	234·50	120·61
18. Dundas	706·68	398·06	421·67	237·51	756·48	420·71	418·26	232·61
19. Phillips River	....	....	....	....	....	3·23	....	0·50
20. Outside Proclaimed Goldfields	....	....	....	....	....	....	....	....
Total Averages	983·87	490·17	286·51	142·74	983·64	510·00	278·82	144·56

TABLE 5.

Output of Gold from the several States of Australia, the Northern Territory, Papua, and Mandated Territory of New Guinea, and the Dominion of New Zealand, during 1956.

State.	Output of Gold.	Value.*	Percentage of Total.	
			Output of Commonwealth.	Output of Australasia.
	Fine ozs.	£	%	%
Western Australia	812,380	3,450,766	72·427	70·783
Victoria	38,846	165,095	3·463	3·385
New South Wales	28,800	122,400	2·567	2·509
Queensland	70,294	298,750	6·268	6·125
Tasmania	16,533	70,265	1·474	1·440
South Australia	....	....	....	....
Territory of Papua and New Guinea	79,376	337,348	7·077	6·916
Northern Territory	75,421	320,539	6·724	6·571
New Zealand	26,063	110,768	....	2·271
	1,147,713	4,875,931	100·000	100·000

* Par Value (£4 4s. 11·45d. per fine ounce.)

TABLE 6.

Dividends, etc., paid by Western Australian Mining Companies during 1956, *and the Total to date.*

(Mainly compiled from information supplied to the Government Statistician's Office by the Chamber of Mines of Western Australia.)

Goldfield.	Name of Company.	Dividends Paid.	
		1956.	Grand Total to end of 1956.
		£	£
Pilbara	Various Companies	....	26,513
Peak Hill	do. do.	....	199,305
East Murchison	do. do.	....	1,914,053
Murchison	Hill 50 Gold Mine, N.L.	900,000	2,790,626
	Various Companies	....	2,764,945
Mt. Margaret	Sons of Gwalia, Ltd.	....	2,075,050
	Various Companies	....	958,286
North Coolgardie	Moonlight Wiluna G.M's., Ltd.	15,000	15,000
	Various Companies	....	712,551
Broad Arrow	do. do.	....	92,500
North-East Coolgardie	do. do.	....	129,493
East Coolgardie	Boulder Perseverance, Ltd.	....	(*a*) 2,719,884
	Golden Horseshoe (New), Ltd.	....	(*b*) 4,107,399
	Gold Mines of Kalgoorlie (Aust.), Ltd.	301,896	1,665,032
	Great Boulder Proprietary G.M's., Ltd.	156,250	8,059,400
	Kalgoorlie Enterprise Mines, Ltd.	....	287,375
	Lake View and Star, Ltd.	350,000	7,618,250
	North Kalgurli (1912), Ltd.	85,937	2,072,810
	South Kalgurli Consolidated, Ltd.	....	1,234,098
	Various Companies	....	11,128,894
Coolgardie	New Coolgardie G.M., N.L.	....	21,300
	Various Companies	....	388,700
Yilgarn	do. do.	....	(*d*) 1,205,556
Dundas	Central Norseman Gold Corporation, N.L.	390,000	2,827,500
	Various Companies	....	786,162
	Totals	2,199,083	55,800,682

(*a*) Also £45,091 in bonuses and profit-sharing notes in years 1935–36. (*b*) Also £55,000 Capital returned in year 1932 and £42,000 in bonuses and profit-sharing notes in year 1934. (*c*) Also £75,000 in bonuses and profit-sharing notes and £93,750 Capital returned in years 1932–35. (*d*) Also £67,725 Capital returned in 1948 by Edna May (W.A.) Amalgamated, N.L.

TABLE 7.

Quantity and Value of Minerals, other than Gold and Silver, reported to the Mines Department during 1956.

Goldfield, District or Mineral Field.	1956.		Increase or Decrease as compared with 1955.	
	Quantity.	Value.	Quantity.	Value.
	Tons.	£A.	Tons.	£A.
ANTIMONY ORE AND CONCENTRATES—				
Pilbara	78·44	742	— 125·44	+ 512
ASBESTOS (CHRYSOTILE)—				
West Pilbara	493·85	19,754	+ 235·72	+ 4,103
Pilbara	267·25	5,612	+ 250·80	+ 5,266
ASBESTOS (CROCIDOLITE)—				
West Pilbara	7,285·97	800,710	+ 7,285·97	+ 314,678
BARYTES—				
Murchison	426·10	2,031	+ 426·10	+ 2,031
Outside Proclaimed Goldfields	501·00	3,156	+ 491·00	+ 3,086
BENTONITE—				
Outside Proclaimed Goldfields	1,403·54	5,658	+ 756·60	+ 3,067
BERYL—				
Pilbara	239·27	43,753	+ 66·13	+ 14,041
Gascoyne	50·11	9,603	+ 39·03	+ 7,608
Coolgardie	20·81	3,757	+ 9·34	+ 1,572
Murchison	....	....	— 0·61	— 99
Yalgoo	....	....	— 2·33	— 439
CLAYS (CEMENT CLAY, FIRECLAY, BALL CLAYS)				
Outside Proclaimed Goldfields	29,841·00	33,507	— 12,071·32	+ 814
COAL—				
Collie	830,006·65	2,797,506	— 73,785·57	— 291,805
CORUNDUM—				
West Kimberley	....	....	— 9·15	— 275
COPPER ORE AND CONCENTRATES—				
Peak Hill	79·08	8,444	+ 79·08	+ 8,444
East Murchison	100·59	2,131	+ 100·59	+ 2,131
Pilbara	22·71	1,058	+ 22·18	+ 924
Phillips River	6·46	770	+ 6·46	+ 770
Outside Proclaimed Goldfields	3·39	340	+ 3·39	+ 340
Murchison	....	....	— 11·59	— 867
CUPREOUS ORE AND CONCENTRATES—				
Pilbara	1,853·12	42,972	+ 995·95	+ 19,104
West Pilbara	2,331·23	18,418	— 996·13	— 5,563
East Murchison	411·43	7,261	— 284·15	— 6,823
Peak Hill	2,443·12	37,839	+ 645·27	+ 7,780
Murchison	524·93	4,589	— 271·46	— 2,783
Mt. Margaret	81·67	807	— 51·33	+ 208
Broad Arrow	5·54	11	— 1·51	+ 11
Yilgarn	26·60	212	+ 26·60	+ 212
Phillips River	32·48	1,259	— 20·02	+ 113
Ashburton	2·00	53	— 11·95	— 88
Outside Proclaimed Goldfield	1·19	22	— 16·66	— 171
Yalgoo	....	....	— 10·29	— 102
Northampton	....	....	— 21·79	— 186
CHROMITE—				
Peak Hill	6,096·20	97,526	+ 6,096·20	+ 97,526
DOLOMITE—				
Murchison	171·00	690	+ 90·00	+ 366
EMERY—				
West Kimberley	....	....	— 8·15	— 245
FELSPAR—				
Coolgardie	3,773·00	17,686	+ 208·00	+ 1,026
Outside Proclaimed Goldfield	8·00	32	+ 8·00	+ 32
FERGUSONITE—				
Pilbara	....	....	— 0·13	— 226
FULLER'S EARTH—				
Outside Proclaimed Goldfield	40·13	201	+ 29·37	+ 147
GLASS SAND—				
Outside Proclaimed Goldfield	7,343·17	5,154	+ 584·19	+ 353

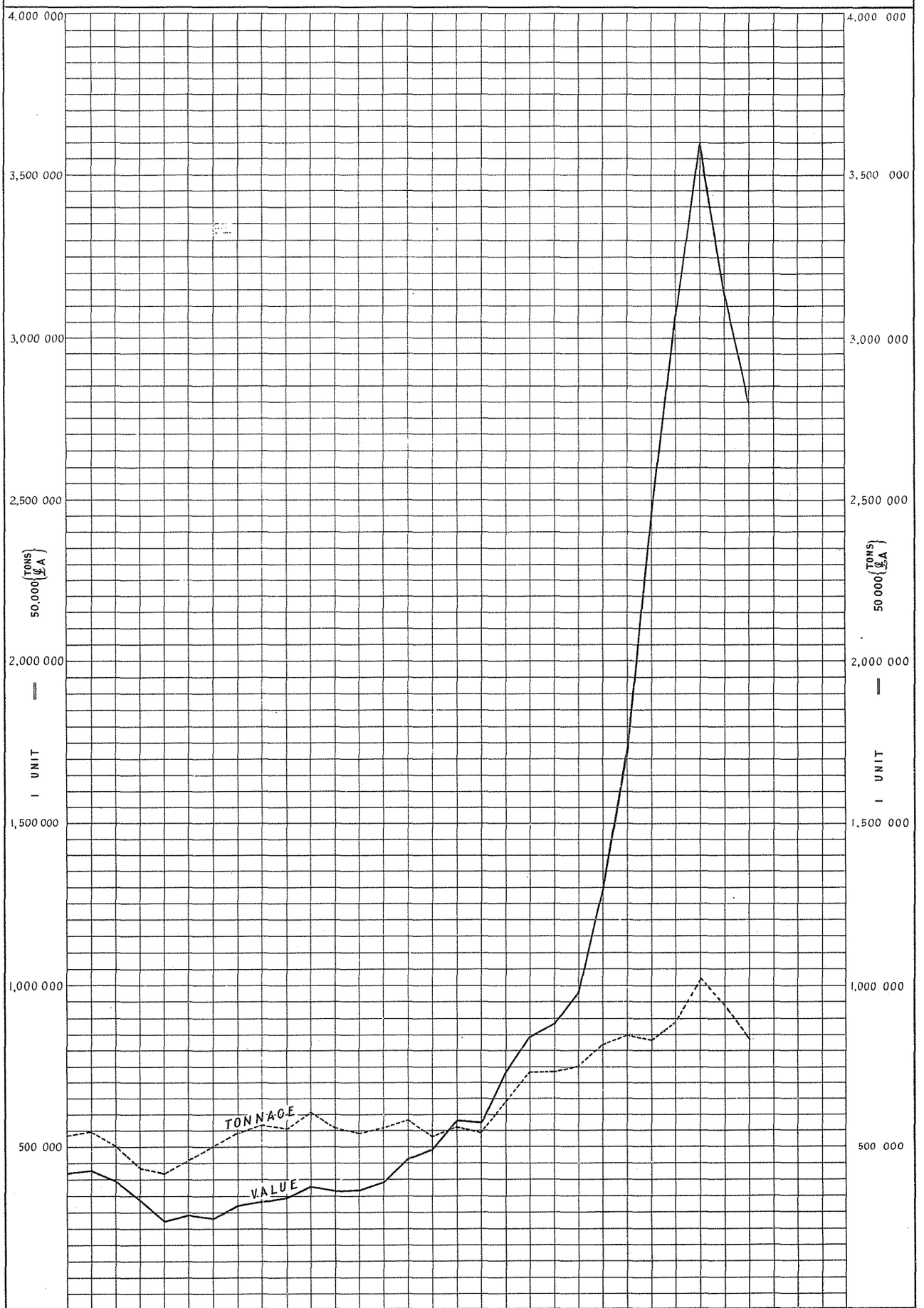
TABLE 7—*continued.*

Quantity and Value of Minerals, other than Gold and Silver, reported to the Mines Department during 1956–*continued.*

Goldfield, District or Mineral Field.	1956.		Increase or Decrease as compared with 1955.	
	Quantity.	Value.	Quantity.	Value.
	Tons.	£A.	Tons.	£A.
GLAUCONITE—				
Outside Proclaimed Goldfield	85·00	3,360	— 111·50	— 4,047
GYPSUM—				
Yilgarn	21,389·00	16,164	—17,418·00	— 13,247
Outside Proclaimed Goldfield	5,732·00	4,764	+ 4,602·00	+ 3,844
Dundas	....	....	— 9·00	— 5
GRAPHITE—				
Outside Proclaimed Goldfield	5·10	37	— 104·90	— 953
IRON ORE (for pig)—				
Yilgarn	19,853·60	278,846	+ 2,976·78	+ 62,073
Outside Proclaimed Goldfield	....	....	— 426·06	— 3,786
IRON ORE (export)—				
West Kimberley	327,815·00	323,923	—169,067·00	— 168,818
LEAD ORE AND CONCENTRATES—				
Northampton	4,955·43	552,322	+ 5,261·71	+ 483,009
SILVER/LEAD ORE AND CONCENTRATES—				
Ashburton	116·92	11,751	+ 140·28	+ 10,759
Gascoyne	5·69	631	+ 7·60	+ 631
Pilbara	750·60	78,549	+ 787·34	+ 53,662
MANGANESE—				
Peak Hill	49,797·89	546,797	+ 19,901·23	+ 218,113
Pilbara	7,525·25	102,159	— 68·75	+ 7,013
MAGNESITE—				
East Coolgardie	358·35	810	+ 358·35	+ 810
Coolagrdie	445·20	1,168	+ 445·20	+ 1,168
MINERAL BEACH SANDS (ILMENITE)				
Outside Proclaimed Goldfield	3,293·40	15,150	+ 3,293·40	+ 15,150
OCHRE (Red)				
Murchison	368·93	3,595	+ 65·34	+ 599
West Pilbara	....	....	— 41·60	— 917
OCHRE (Yellow)—				
Murchison	75·45	755	+ 75·45	+ 755
PYRITES ORE AND CONCENTRATES—				
Dundas	48,426·00	362,949	— 1,059·00	— 34,320
East Coolgardie	12,542·98	57,103	+ 12,542·98	+ 57,103
SPODUMENE—				
Phillips River	....	....	— 3·89	57
TALC—				
East Coolgardie	77·12	388	+ 50·29	+ 268
Outside Proclaimed Goldfield	4,378·45	54,050	+ 1,818·47	+ 16,403
TANTO/COLUMBITE ORE AND CONCENTRATES—	lb.			
Coolgardie	3,306·00	4,390	+ 3,085·00	+ 4,139
Phillips River	772·00	1,473	+ 137·00	— 84
Pilbara	87,925·00	88,134	+ 64,311·00	+ 66,924
Greenbushes	67,652·00	33,667	+ 65,265·00	+ 30,921
TIN—				
Pilbara	227·12	136,965	+ 167·10	+ 103,709
Greenbushes	131·17	71,273	+ 11·60	+ 9,696
Murchison	0·06	35	+ 0·06	+ 35
West Kimberley	....	....	— 0·13	— 79
TUNGSTEN (SCHEELITE)—				
Mt. Margaret	....	....	— 1,861·00	— 582
North Coolgardie	....	....	—12,796·00	— 6,009
Coolgardie	....	....	— 2,708·00	— 826
VERMICULITE—				
East Coolgardie	1·04	9	+ 1·04	+ 9

GRAPH OF COAL OUTPUT

Showing Quantities and Values as reported to Mines Dept.



YEAR	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	YEAR
VALUE £A	420145	426706	394758	336178	270630	289806	278704	318013	331665	340444	375083	362811	364500	389278	461495	489721	583075	572896	730104	840249	880236	972245	1,287749	1,716788	2,457286	3,073073	3,588818	3,132074	2,787,606					VALUE £A
TONS	528420	544719	501425	432400	415719	458399	500343	537188	565075	553510	604793	557536	539427	556574	581176	531846	568322	543363	642287	730506	732938	750534	814351	848475	830461	886182	1010343	903782	830,006					TONS

GRAPH OF TREND IN COAL OUTPUT

Showing Comparison of Annual Tonnages and Percentages
between Deep and Open Cut Mining

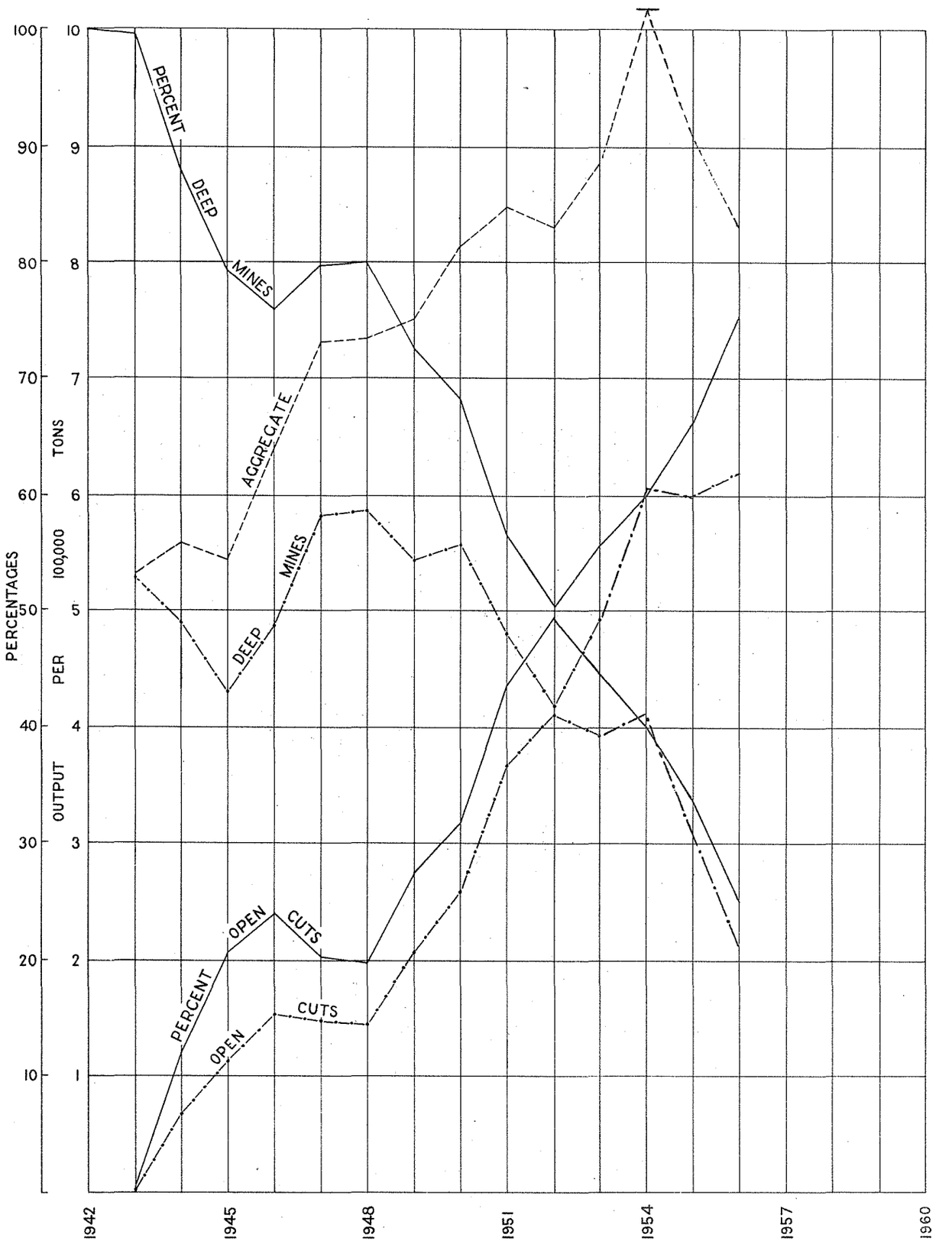


TABLE 8.

Total Coal output from Collie Coalfield during 1955 *and* 1956, *estimated Value thereof, Number of Men employed, and Output per Man as reported Monthly.*

Year.	Total. Output.	Estimated Value.	Men Employed.			Output per Man Employed.		
			Above ground.	Under ground.	Above and under ground.	Above ground.	Under ground.	Above and under ground.
	Tons.	£A.	No.	No.	No.	Tons.	Tons.	Tons.
Deep Mining—								
1955	599,662	2,041,971	365	804	1,169	1,643	746	513
1956	621,465	2,088,368	300	776	1,076	2,071	801	577
Open Cut Mining—								
1955	304,130	1,047,340	217	....	217	1,401	....	1,401
1956	208,542	709,138	143	....	143	1,458	....	1,458
Totals—								
1955	903,792	3,089,311	582	804	1,386	1,553	1,124	652
1956	830,007	2,797,506	443	776	1,219	1,874	1,069	681

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

TABLE 9.

Total Number and Acreage of Leases, Mineral Claims, Dredging Claims and Prospecting Areas held for Mining on the 31*st December,* 1955 *and* 1956.

Leases and Other Holdings.	1955.		1956.	
	No.	Acreage.	No.	Acreage.
Gold Mining Leases on Crown Lands	1,258	23,142	1,150	20,831
Gold Mining Leases on Private Property	26	590	40	908
Mineral Leases on Crown Lands	253	43,306	248	42,330
Mineral Leases on Private Property	20	2,108	21	2,135
Dredging Claims—Gold	11	780	1	20
Dredging Claims—Mineral	119	7,931	105	7,722
Mineral Claims	469	33,121	443	32,018
Prospecting Areas	*441	7,508	†479	8,243
Totals	2,597	118,486	2,487	114,207

* Includes 75 Prospecting Areas for Minerals of a total of 1,551 acres.

† Includes 63 Prospecting Areas for Minerals of a total of 1,236 acres.

PART IV.–MEN EMPLOYED.

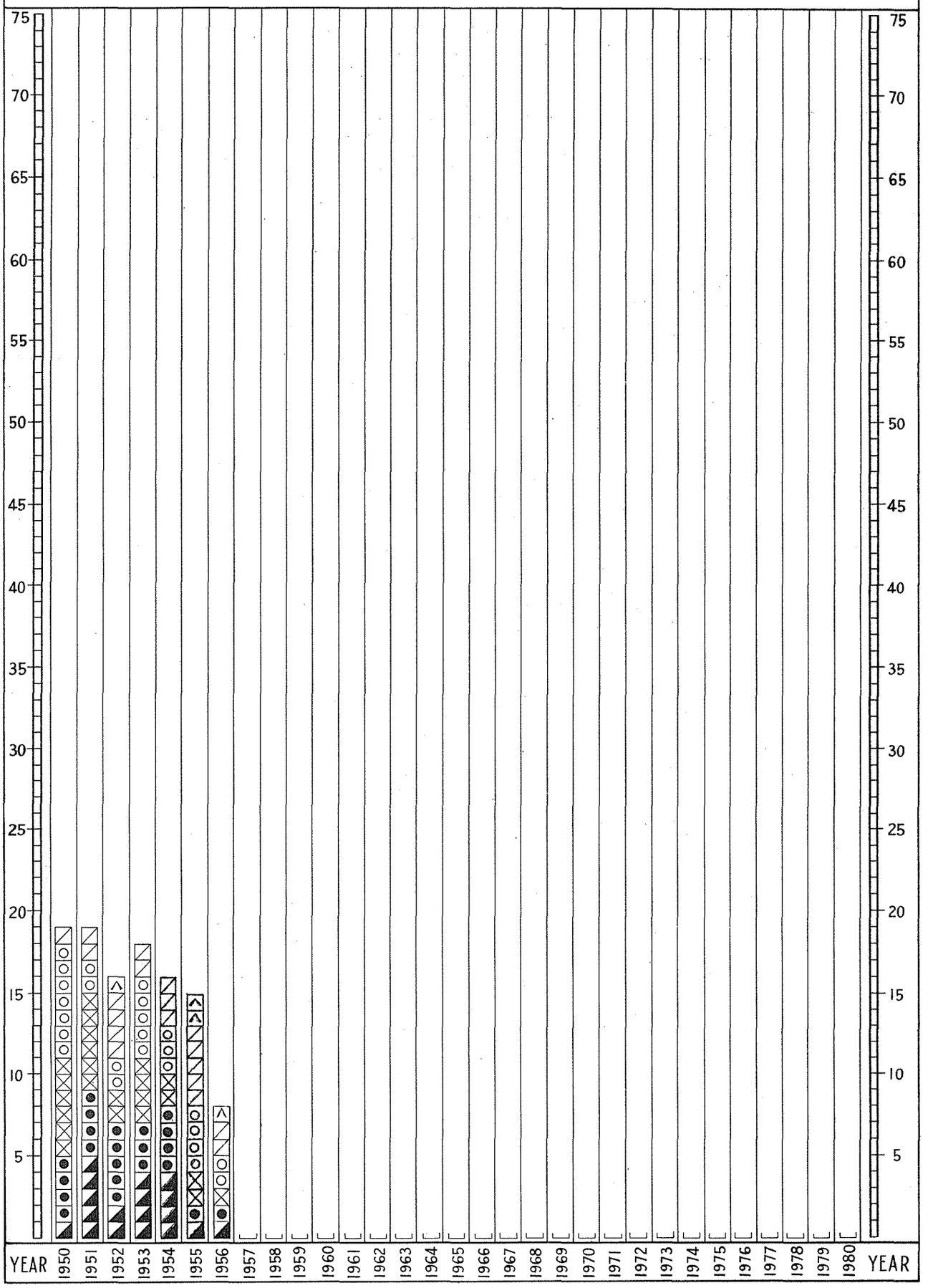
TABLE 10.

Average number of Men reported as engaged in Mining during 1955 *and* 1956.

Goldfield.	District.	Total. 1955.	Total. 1956.
Kimberley		3	4
West Kimberley		....	....
Pilbara	Marble Bar	33	35
	Nullagine	42	23
West Pilbara		....	....
Ashburton		2	....
Gascoyne		....	....
Peak Hill		11	8
East Murchison	Lawlers	7	8
	Wiluna	5	4
	Black Range	3	8
Murchison	Cue	100	51
	Meekatharra	30	24
	Day Dawn	14	14
	Mt. Magnet	213	150
Yalgoo		10	12
Mt. Margaret	Mt. Morgans	15	14
	Mt. Malcolm	266	279
	Mt. Margaret	51	45
North Coolgardie	Ularring	77	43
	Niagara	7	7
	Yerilla	37	29
	Menzies	129	111
Broad Arrow		114	82
North-East Coolgardie	Kanowna	19	10
	Kurnalpi	1	1
East Coolgardie	East Coolgardie	3,327	3,253
	Bulong	9	6
Coolgardie	Coolgardie	274	203
	Kunanalling	13	19
Yilgarn		626	698
Dundas		403	383
Phillips River		2	2
State Generally		2	2
Total, Gold Mining		5,845	5,628
Minerals Other than Gold—			
Asbestos		221	236
Barytes		1	2
Bentonite		2	2
Beryl		40	27
Chromite		....	5
Clays		10	10
Coal		1,386	1,219
Copper		....	2
Cupreous Ore (Fertiliser)		65	89
Dolomite		1	....
Felspar		12	12
Glass Sand		4	4
Glauconite		2	4
Gypsum		17	14
Iron Ore		115	120
Lead		108	161
Manganese		13	24
Ochre		2	2
Pyrites		128	125
Talc		5	5
Tanto-Columbite		19	6
Tin		85	64
Titanium (Ilmenite)		....	6
Total, Other Minerals		2,236	2,139

DIAGRAM OF ACCIDENTS

Showing the number of deaths arranged in six classes in the Mines and Quarries of Western Australia



PART V.—ACCIDENTS.

TABLE 11.

MEN EMPLOYED IN MINES KILLED AND INJURED IN MINING ACCIDENTS DURING 1955 AND 1956.

A.—*According to Locality of Accident.*

Goldfield.	Killed.		Injured.		Total Killed and Injured.	
	1955.	1956.	1955.	1956.	1955.	1956.
1. Kimberley	....	....	....	....	....	....
2. West Kimberley	....	....	5	5	5	5
3. Pilbara	....	1	1	....	1	1
4. West Pilbara	....	....	17	24	17	24
5. Ashburton	....	....	....	....	....	....
6. Gascoyne	....	....	....	....	....	....
7. Peak Hill	....	1	....	1	....	2
8. East Murchison	....	....	....	....	....	....
9. Murchison	....	....	15	13	15	13
10. Yalgoo	....	....	....	....	....	....
11. Mount Margaret	1	2	25	31	26	33
12. North Coolgardie	1	1	16	11	17	12
13. North-East Coolgardie	....	....	....	....	....	....
14. Broad Arrow	....	....	....	....	....	....
15. East Coolgardie	6	2	359	330	365	332
16. Coolgardie	....	....	15	7	15	7
17. Yilgarn	1	1	34	37	35	38
18. Dundas	2	....	35	25	37	25
19. Phillips River	....	....	1	....	1	....
Mining Districts—						
Northampton	1	....	11	11	12	11
Greenbushes	....	....	....	....	....	....
Collie	1	1	152	150	153	151
South-West	2	....	10	12	12	12
Total	15	9	696	657	711	666

From the above table it will be seen that the number of fatal accidents for the year 1956 was nine as against 15 in 1955. The number injured showed a decrease of 39. These accidents are classified according to their causes in the reports of the State Mining Engineer, Division II, and the Chief Coal Mining Engineer, Division X.

B.—*According to Causes of Accidents.*

Cause.	1955.		1956.		Comparison with 1954.	
	Fatal.	Serious.	Fatal.	Serious.	Fatal.	Serious.
1. Explosives	1 (*a*)	5 (*b*)	1 (*e*)	5	....	....
2. Falls of Ground	1 (*a*)	34 (*c*)	1	48	....	+ 14
3. In Shafts	2	20	1	15	— 1	— 5
4. Miscellaneous Underground	4	451	2	429	— 2	— 22
5. Surface	5	186 (*d*)	3	160 (*f*)	— 2	— 26
6. Fumes	2	....	1	....	— 1	....
Totals	15	696	9	657	— 6	— 39

(*a*) Accident occurred in a quarry. (*b*) Includes one serious accident in a quarry. (*c*) Includes three serious accidents in quarries. (*d*) Includes six serious accidents in quarries. (*e*) Includes one serious accident in a quarry. (*f*) Includes 11 serious accidents in quarries.

(2)—8224.

PART VI.—STATE AID TO MINING.

(a) State Batteries.

The number of State Batteries existing at the end of the year was 21, including Northampton Base Metal Plant. There were no leased mills.

From inception to the end of 1956 gold, tin tungsten and lead ores to the value of £16,408,377, including gold premium estimated at £5,667,590, have been put through the State Batteries.

During the year 35,740·50 tons of ore were crushed for 15,597 ounces of bullion, estimated to contain 13,218 ounces of fine gold, an average of 7 dwts. 10 grs. of gold per ton of ore. The average value of sands before cyanidation was 3 dwts. 14 grs., making the average head value 11 dwts.; 2,822 ozs. of fine gold were produced from cyanide plants giving a total estimated production for the year of 16,040 ozs. of fine gold, which realised £251,130, including Gold Producers' Premium. In addition 3,732 tons of lead ore were treated as well as 95 tons of columbite.

The total of 35,740·50 tons of ore crushed this year was a decrease of 6,467 tons from last year. The reduction was due to low prospecting activity early in the year. From May to the end of the year there was much more ore for crushing. Partly as a result of the lower tonnage crushed, the cost per ton increased from 53s. 10d. in 1955 to 62s. 9d. this year. Maintenance of plants was again high, and rises in wages and particularly salaries contributed considerably to the increased cost per ton.

At the Northampton Battery operating costs decreased from 75s. 8d. per ton in 1955 to 51s. 3d. per ton in 1956, mainly as a result of improvements made to the plant in 1955. From the 3,648·50 tons of lead ore crushed 516·64 tons of concentrate were produced, having an estimated content of 374·42 tons of lead. 1·50 tons of tantalite ore were treated for a recovery of 22 lb. of concentrates.

The Coolgardie Battery treated 90·50 tons of columbite ore giving a production of 900 lb. of concentrates.

Prospecting Scheme.—There were 91 prospectors approved for assistance on the Prospecting Scheme throughout the year. Expenditure was £11,197 12s. 6d. and refunds amounted to £1,751 2s. 5d. Assisted prospectors reported crushing 2,969·25 tons of ore for a return of 737 ozs. 9 dwts.

Drilling Programme.—The Department's drilling programme has continued throughout the year with six drills operating; two in the Pilbara, two in the Murchison, one in the Peak Hill Goldfields and one in the Coolgardie Goldfield. Very good results were obtained in the Pilbara and Bamboo Creek and it is hoped that this field may again become an active producer as a result. At Blue Spec early results were successful but subsequent operations were disappointing.

The deep drill at Day Dawn successfully intersected the mineralised zone at 3,786 feet and a diversion hole is being drilled from the original hole to intersect the ore-body at a higher horizon.

(b) Geological Survey of Western Australia.

The principal work of the Geological Survey Branch for the year 1956 is covered by the following reports, previously, but not now, published in Division IV of this Report.

The Search for Oil in Western Australia.

Note on Groundwater Prospects West of Watheroo.

Report on a Copper Prospect, Temp. Res. 1219H, 5 miles West of Jimble Bar—Peak Hill G.F.

Report on Radioactivity near Corrigin, S.W. Div.

Report on Water Supply Problem at Lorna Glen Station, 86 miles E.N.E. of Wiluna.

Report on Mineral Claim 330 for Lead, Coongan Siding, Pilbara G.F.

Report on Examination of the Collie Coal Field Sediments for Radioactivity.

Report on an examination of some Middle Jurassic Limestone, near Geraldton.

Report on the use of the Failing Drill on Stratigraphic and Water Drilling in the Abba River Area, Busselton, W.A. Abba River Bores Nos. 1, 2, 3.

Summary Progress Report on Reconnaissance Survey of Portion of the Pilbara G.F.

Report on Exploratory Diamond Drilling of "Sunshine Reward Amalgamated" G.M., Edwards' Find, Yilgarn G.F. D.D.H. No. EF2—Site A.

Report on Exploratory Diamond Drilling of "Sunshine Reward Amalgamated" G.M., Edwards' Find, Yilgarn G.F. D.D.H. No. EF3—Site B.

Report on Exploratory Diamond Drilling of "Sunshine Reward Amalgamated" G.M., Edwards' Find, Yilgarn G.F. D.D.H. No. EF4—Site C.

Summary Report on Exploratory Drilling for Gold, Mt. Magnet, Murchison G.F.

Exploratory Drilling for Gold, Mt. Magnet, Murchison G.F.

- D.D.H. No. 1—Site MM2—G.M.L. 1527, "Eclipse."
- D.D.H. No. 2—Site MM4 late G.M.L. 548M, "Golden Stream."
- D.D.H. No. 3—Site MM6 late G.M.L. 1408M, "Boomer."
- D.D.H. No. 4—Site MM7 late G.M.L. 1408M, "Boomer."
- D.D.H. No. 5—Site MM4A late G.M.L. 548M, "Golden Stream."
- D.D.H. No. 6—Site MM5 late G.M.L. 548M, "Golden Stream."

Report on Diamond Drilling of "Great Fingall" Quartz Reef in Depth.

Reports on Exploratory Diamond Drilling of Abandoned Gold Shows, Cue, Murchison G.F.:

- D.D.H. No. M3—Site B1—G.M.L. 203, "Cue No. 1" G.M.
- D.D.H. No. M4—Site B2—G.M.L. 203, "Cue No. 1" G.M.
- D.D.H No. M5—Site B3—G.M.L. 203, "Cue No. 1" G.M.
- D.D.H. No. M6—Site C1—1148, 1884, "Light of Asia" G.M.
- D.D.H. No. M7—Site C1—1148, 1884, "Light of Asia" G.M.
- D.D.H. No. M8—Site C1—1148, 1884, "Light of Asia" G.M.

Report on Bamboo Creek Mining Centre, Pilbara G.F.

Exploratory Diamond Drilling for Gold, Bamboo Creek, Pilbara G.F.

- D.D.H. No. 8—Site B8 — "Bamboo Queen."
- D.D.H. No. 9—Site B7—"Perseverance."
- D.D.H. No. 10—Site B9—"Perseverance."
- D.D.H. No. 11—Site B9—"Perseverance."
- D.D.H. No. 12—Site B10—"Kitchener."
- D.D.H. No. 13—Site B11—"South Perseverance."
- D.D.H. No. 14—Site B12—"Kitchener."
- D.D.H. No. 15—Site B4—"Kitchener."

Summary Report on Underground Exploratory Drilling, "Comet" G.M., G.M.L. 927, Pilbara G.F.

During the year the following publications were issued or were awaiting publication:

Issued:

Annual Progress Report of the Geological Survey of Western Australia for 1953.

Compiled and awaiting publication:

Mineral Resources of W.A. Bulletin No. 6—Gypsum, by L. E. de la Hunty, B.Sc., and G. H. Low, B.Sc.

Miscellaneous Bulletin Series, Bulletin No. 109—Annual Progress Reports, 1954.

Bulletin Series, Bulletin No. 110—The Geology of the Phillips River Goldfield, W.A., by J. Sofoulis, B.Sc.

Bulletin No. 111—The Exploratory Diamond Drilling of the Koolyanobbing Iron Ore Deposits for Pyrite, by H. A. Ellis, B.Sc., A.O.S.M.

Officers of the Geological Survey have rendered varied types of practical assistance to individuals, syndicates and companies, as well as other Government Departments who have been concerned with the exploration of mineral and water resources in all parts of the State.

PART VII.—INSPECTION OF MACHINERY.

The number of useful boilers registered at the end of the year total 7,476 against 7,227 for the preceding year, showing an increase of 249 boilers after all adjustments.

Of the 7,476 useful boilers, 3,140 were out of use at the end of the year; 3,597 thorough and 723 working inspections were made and 3,601 certificates were issued.

Permanent condemnations total 60 and temporary condemnations nine; five boilers were transferred beyond the jurisdiction of the Act.

The total number of machinery groups registered was 37,592 against 36,677 for the previous year, showing an increase of 915.

Inspections made total 30,533 and 7,044 certificates were granted.

Total miles travelled for the year were 90,925 against 90,232 miles for the previous year, showing increase of 693. The average miles travelled per inspection were 2·61 as against 2·83 miles per inspection for the previous year.

Three hundred and eighty-six applications for engine drivers' and boiler attendants' certificates were received and dealt with, and 329 certificates all classes were granted as follows:—

Winding Competency (including certificates issued under Regulation 40 and Section 60)	9
First Class Competency (including Certificates issued under Regulations 40 and 45, and Sections 60 and 63)	25
Second Class Competency (including certificates issued under Regulation 40 and Section 60)	24
Third Class Competency (including certificates issued under Regulations 40 and 45 and Sections 60 and 63 of the Act)	33
Locomotive Competency (including certificates issued under Regulation 40 and Section 60)	2
Internal Combustion Competency (including certificates issued under Regulation 40 and Section 60)	28
Crane and Hoist Competency (including certificates issued under Regulations 40 and Section 60)	98
Boiler Attendant's Competency (including certificates issued under Regulations 40 and Section 60)	103
Copies	7
Total	329

Revenue from all sources during the year was £16,094 6s. 10d. as against £14,628 4s. previous year, showing an increase of £1,466 2s. 10d.

Expenditure for the year was £32,553 15s. 1d. against £29,079 19s. 2d. for the previous year, showing an increase of £3,473 15s. 11d.

PART VIII.—GOVERNMENT CHEMICAL LABORATORIES.

The total number of samples registered for analysis, chemical and mineral examinations, industrial and general investigation during the year was 20,001. These were allocated to the various Divisions according to the specialised nature of the work undertaken by each Division:—

The major activities of the Agriculture, Forestry and Water Supply Division continued to be the chemical work required by the Department of Agriculture, and the examination of water samples from the Metropolitan, Town and Country Water Supplies and from primary producers.

This year 6,502 samples were received in this Division as against 4,549 last year. This is the highest ever received in the Division. The increase over last year was mainly due to an increase of 1,613 samples of tobacco leaf.

The routine examination of existing water supplies to cities and towns was continued and samples were analysed from the Canning, Churchman's Brook and Victoria Reservoirs, the Wungong pipehead dam and the Mt. Eliza Reservoir. Existing or prospective water supplies for 21 country communities were examined.

Analyses were carried out of fertilisers and manures of feeding stuffs and pastures, and in connection with plant nutrition.

The variety of work undertaken by the Food, Drugs, Toxicology and Industrial Hygiene Division and the scope of its activities were much the same as those of the previous year, although the total number of samples examined, 11,747, was a decrease of 1,547 on the number for 1955. This was due largely to the reduction in the number of samples collected in connection with sewer corrosion research in collaboration with the Metropolitan Water Supply, Sewerage and Drainage Department.

The major portion of the activities of this Division consists of chemical work undertaken for the Departments of Public Health, Police, Agriculture, Public Works, Metropolitan Water Supply and for the Milk Board and Goernment Tender Board. In addition miscellaneous examinations were performed for other Government instrumentalities and the general public.

In the Fuel Technology Division a major portion of the time of the Division has been given to sampling and analysis of coal, char briquettes, tar and liquor for the Department of Industrial Development, Bureau of Investigation and Research Pilot Plant, for production of bricoke from Collie coal at Welshpool.

Liaison has been maintained with development of deep mine and open cut working faces at Collie and samples have been taken regularly.

Work was also done in connection with the utilisation of sawdust as a boiler fuel, dust emission from sources other than sawdust burning and domestic heating. A number of bricks, clays and refractories were examined.

The Unit Process Plant for the Industrial Chemistry Division was completed in May with the installation of the 40 gallon kettle and the painting of the building.

Work in this Division has been of two types, viz., consultative and short term investigations. The consultative work was of a varied nature and it is pleasing to record the active co-operation of manufacturers and suppliers.

One thousand and nineteen samples were received by Mineralogy, Mineral Technology and Geochemistry Division during the year. The main sources of samples were as follows: general public 665 (free 456, pay 209); State Batteries Branch 217; Geological Survey Branch 112.

Six hundred and sixty two samples of metallic ores and minerals were received for identification and/or assay. These included 51 samples of copper ores; 96 samples of iron ore; 10 samples of lead ore and in addition 32 samples of concentrates and tailings; 54 samples of manganese ore.

There were 165 samples of gold tailings from State Batteries for assay. Of these, 35 were umpire assays, the remainder being checks on battery assays. Twelve balance riders for State Batteries were checked for accuracy against standard National Physics Laboratory riders. In addition to samples from State Batteries, 79 samples of ores and tailings were received from prospectors for gold assays.

Heavy sands were again very much to the fore and one hundred and seven samples were received, reflecting the increasing interest in the ilmenite resources of the State. Samples were mainly from coastal areas ranging from Carnarvon to Esperance, though high grade samples were also received from the vicinity of Dumbleyung. In most cases, both the nature and the percentage composition of the heavy mineral fraction were determined.

At the request of the Department of Industrial Development information was collected on the economic and technical aspects of the production of titanium metal and titanium pigment. Some work was also done for the Director of Navigation and as a guide to shipping companies expecting to handle the product.

Some samples were forwarded for examination for radioactivity and fourteen of these showed radioactivity, one from Nullagine, assaying 0·35 per cent. uranium oxide.

Sixty-three samples of "non-metallic" economic minerals were examined. Over half of these were in connection with lime production.

PART IX.—SCHOOL OF MINES.

(a) Kalgoorlie.

The total number of enrolments during 1956 was 365, an increase of 18 by comparison with the previous year. The School could accommodate more students, and openings could be found in industry for more graduates. No students held Mines Department Scholarships in 1956. Seven students holding Chamber of Mines Scholarships attended the School—four full time and three part time. G. M. Sainsbury completed all the requirements of the Associateship Course in Mining and thus became the first Chamber of Mines Scholarship holder to complete an Associateship Course.

The School continued as in previous years to provide a number of services to the public, other than its teaching activities. These included work done in the Kalgoorlie Metallurgical Laboratory, free assays and mineral determinations for prospectors, accommodation for Junior and Leaving examinations and for meetings of various professional bodies and other societies. During the year 393 samples were received from prospectors and others for assay and for mineral examination.

(b) Norseman.

The total number of enrolments was 62, an increase of two on the previous year.

Reg Dawson Scholarships were awarded to D. A. Stewart and S. J. Bastow, based on work done during 1956.

The additions and alterations referred to in the Annual Report for 1955 were completed in time for the opening of the School in 1956. The buildings and grounds are now in very good conditions, and are generally very satisfactory indeed.

(c) Bullfinch.

The total number of enrolments during 1956 was 41, a decrease of 15 by comparison with 1955.

Mr. V. J. Tie resigned from the position of officer-in-charge on 7th December in order to return to New Zealand.

The Country Club Prize was awarded for 1956 to B. H. Harris. Because of an unforseen difficulty the Club is unable to continue awarding this prize.

A portion of the verandah at the east end of the building was enclosed and lined to provide an additional class room and the building is now adequate for present requirements.

PART X.—EXPLOSIVES.

The total amount of explosives imported into the State during 1956 was 125,694 cases compared with 109,340 in 1955. Practitcally all this explosive was of Australian manufacture.

Tests were made of all shipments received at Woodman's Point Explosives Reserve before they were permitted to be distributed. All South-West licensed retailers and magazines, including those supplying collieries, were inspected, and although metropolitan and near-country centres could not be completely covered, various localities were visited to determine suitable magazine sites. This latter service, an essential part of the Branch's work, is being increasingly sought by users.

The usual watch was exercised as to ships' gear, slings, unloading platforms, roller conveyors and vehicles of all kinds for conveyance of explosives. Movements of ordnance at the Fremantle wharves again called for personal attention until, toward the end of the year, several such operations took place from the naval jetty south of Woodman's Point. If this portends a step in the direction of excluding explosives from the harbour it will mark progress toward safety.

Fireworks which were imported were generally found satisfactory, but some new lines were not acceptable here pending discussion of the subject at the 1957 Explosives Conference.

The advisability of holding "bonfire night" earlier than the traditional November 5th celebrations has been under discussion by local authorities from districts of severe fire hazard. The related subject of prohibiting firework sales during summer also came into prominence. The W.A. Fire Brigade Board and the Explosive Branch align in principle with these views, but realise that unless considerable notice of impending changes were given, there would be trade and other difficulties.

At Woodman's Point Reserve, agreement has been reached with the Fremantle Harbour Trust to share costs of a four inch pipe-line connecting the main in Cockburn Road with the jetty. Several hydrants, three smaller outlets and branches to the heat testing laboratory and other consuming points are to be installed. These will furnish adequate means for fire fighting and watering ships.

PART XI.—MINER'S PHTHISIS ACT AND MINE WORKERS RELIEF ACT.

The State Public Health Department, under arrangements with this Department, continued the periodical examination of mine workers, the work being carried on continuously by the Kalgoorlie District Hospital and a mobile X-ray unit, visited the Yilgarn, Coolgardie, Dundas and Phillips River

Goldfields. In addition, a radiographer travelled by air and examined miners at Wittenoom Gorge and Yampi.

The examinations under the Mine Workers' Relief Act during the year totalled 5,067 as compared with 5,043 for 1955, an increase of 24.

Compensation paid under the Miners' Phthisis Act during the year totalled £17,644 0s. 10d., a decrease of £1,184 14s. 2d. on the previous year, which can be attributed to the death of some of the beneficiaries and the attainment of the age of 16 years by some dependent children.

The number of beneficiaries under the Act on 31st December, 1956, was 158, being 15 ex-miners and 143 widows.

PART XII.—CHIEF COAL MINING ENGINEER'S BRANCH.

The aggregate output of coal for the year was 830,005 tons, as compared with 903,791 tons for the previous year. This represents a decrease of 73,786 tons. Of the total output 621,464 tons or 74·87 per cent. was deep mined coal and 208,541 tons or 25·13 per cent. open cut coal. The respective outputs for the previous year were 599,667 tons or 66·35 per cent. deep mined coal and 304,124 tons or 33·65 per cent. of open cut coal.

The total value of coal produced was £2,797,506 at an average cost of 67s. 5d. per ton as compared with 69s. 4d. per ton for the previous year.

Of the total output of deep mined coal, 236,308 tons or 38·02 per cent. was produced from only two deep mines, viz., the Co-operative and the Neath mines. As both mines are only in a partial state of development, one can visualise their ultimate production when their development is complete.

In view of the circumstances existing during the year the progress made in the most important mines was satisfactory.

It was a difficult year for all concerned, but in spite of this, the output of the deep mines during the year was the highest on record. Much deep mined output was lost due to a shortage of wagons and some short-time working by a few of the mines due to inadequate demand.

Having regard to the circumstances mentioned and the production of the deep mines, during the period under review, it is not difficult to visualise that in the near future the deep mines can produce all of the State requirements.

CHIEF DRAFTSMAN'S BRANCH.

Work is continuing on the compilation of the Department's plans on the Transverse Mercator Projection within the National Mapping Grid. This will make the Department's plans an integral part of the Commonwealth mapping scheme. In this connection close liaison is being maintained with the Lands Department to ensure that no duplication occurs.

Three contract surveyors are employed on the survey of mining tenements and as a result it has been possible to keep the working plans well up to date.

The preparation of plans and figures for the reports and bulletins of the Geological Surveys has been maintained and every effort is being made to facilitate their publication.

Many enquiries from the public have been satisfactorily dealt with and in all cases plans have been supplied where required.

AMERICAN AND CANADIAN VISIT.

I would like to record a reference to our trip to the United States of America and Canada, which took place between July to November, 1956.

This visit was authorised by the State Government for the purpose of enabling us to—

(a) study the operations of the American and Canadian oil industries,

(b) further the prospects of marketing our minerals in America,

(c) study the uses and production of coal and other minerals,

(d) endeavour to interest capital in both countries in our industrial possibilities,

(e) generally to advertise our State and its products and opportunities.

We were received in very kindly fashion in both countries, and learned a great deal in regard to those matters in which we were interested and, I think, were also successful in interesting a number of people in the prospects of Western Australia.

We were greatly impressed with the high degree of industrial achievement in the United States, the amazing expansion taking place, particularly on its Western Coast, and also with the development of Canada. Since the discovery of its large oil reservoirs, it has progressed rapidly and its future seems assured.

The mining and oil industries in both countries are of major importance and we found them to be highly mechanised and efficient.

STAFF.

Once again, I would like to take this opportunity of publicly thanking all members of the staff for the loyal and efficient way in which they have carried out their duties.

It is with regret that I have to record the death of Mr. C. R. Le Mesurier on the 3rd December, 1955. Mr. Le Mesurier was Deputy Government Mineralogist and was a most experienced and valued officer of the Government Chemical Laboratories.

Another very severe loss has just occurred in the death of Mr. J. C. Hood, Director of our Laboratories, who died of a heart attack on the 20th May of this year. Mr. Hood was an officer of long standing in the Department, and one who had only recently realised his great ambition—that of leading the Laboratories. He was held in high repute both professionally and personally throughout the Public Service.

In this summary of the various activities, I have commented only on the principal items. Divisions II to XI of this publication contain the detailed reports of the responsible officers.

(Sgd.) A. H. TELFER,
Under Secretary for Mines.

Department of Mines,

DIVISION II

Report of the State Mining Engineer for the Year 1956

Under Secretary for Mines:

I have the honour to submit for the information of the Hon. the Minister for Mines the Annual Report for this branch, compiled by the Assistant State Mining Engineer.

Workmen's Inspector J. Gillespie, who has held office at Cue for 11 years retired in November last.

There has been a pleasing decline in the accident rate and the number of fatal accidents—eight for the year—is the smallest for a long time.

It has been discovered that the carbon monoxide content in the fumes from explosives is higher than formerly and this matter is being investigated.

Aluminium Therapy continues but there is yet no evidence of any decisive change.

There was a slight increase in the amount of gold bearing ore treated and a slight decline in the average grade as compared with the previous year. The gold recovered declined from 834,326 fine ounces to 813,617 fine ounces.

The output per man increased from 490·09 tons to 511·45 tons.

The rising commodity and labour costs are being met by improvements in technology and increased efficiency and there is little change in the overall position.

The Callion mine at Davyhurst has been closed and the life of the Surprise-Barbara and Bayleys groups at Coolgardie is limited.

Sons of Gwalia, despite the heavy setback caused by the collapse of the shaft, has recovered its position and reports some good developments.

Another small but rich mine, the Hill 50 Eclipse in the Mount Magnet area, promises to develop into a steady producer.

Encouraging results have been obtained from the diamond drilling programme at Bamboo Creek and Great Fingall.

The output of crocidolite asbestos by Australian Blue Asbestos at Wittenoom has almost doubled last year's production and the prospects for this industry are brighter than at any previous period.

The development of the copper deposits at Ravensthorpe is proceeding and the first shipment of copper ore will leave during the coming year.

The usage of iron for charcoal iron shows a slight increase and with the erection of a second furnace at Wundowie there will be a further increase.

Manganese exports were increased to a total of 57,000 tons and some notable discoveries of ore have been made.

Pyrites output shows an increase.

Good progress has been made with the process for roasting and cyaniding pyritic gold concentrates from Kalgoorlie.

The output of talc was almost 4,500 tons, showing a very big increase above the figures for the previous year.

The first shipment of ilmenite from the deposits in the South West was made during the year.

The development of our latent mineral resources indicates a new phase in the development of the State which will be greatly accelerated as secondary industries to utilise these minerals are established.

E. E. BRISBANE,
State Mining Engineer.

STATE MINING ENGINEER.

Mining activities in the State during the year 1956 are described in this report, which is based on information supplied by the Statistician and Inspectors of Mines.

STAFF.

Workmen's Inspector J. Gillespie of Cue retired in November after 11 years with the Department. Messrs. J. Kelly and A. H. McGillivray were re-elected as Workmen's Inspectors of Mines at the elections held in July.

ACCIDENTS.

Fatal and serious accidents in metal mines and quarries reported to the Department are shown below. The corresponding figures for 1955 are shown in brackets.

There were 8 (14) fatal and 507 (544) serious accidents.

In gold mines there were 5 (11) fatal and 453 (492) serious accidents. The number of men employed in such mines was 5,628 (5,846). The accident rate per 1,000 men was thus 0·89 (1·88) for fatal accidents and 80·49 (84·16) for serious accidents.

One man was killed in a quarry accident at a manganese mine and another was electrocuted at a lead mine. A State Battery employee was fatally injured at Yarri when he fell on to a concrete pedestal.

A classification of serious accidents showing the nature of the injuries is given in Table "A."

Oil well drilling companies employing 353 men in the field reported 15 serious and 32 minor accidents during the year.

TABLE A.

SERIOUS ACCIDENTS FOR 1956.

Class of Accident.	West Kimberley.	Pilbara.	West Pilbara.	Peak Hill.	Murchison.	Northampton.	Mt. Margaret.	North Coolgardie.	East Coolgardie.	Coolgardie.	Yilgarn.	Dundas.	South-West.	TOTAL
Major Injuries—Exclusive of Fatal—														
Fractures—														
Head	....	....	....	....	....	....	....	....	1	....	1	....	....	2
Shoulder	....	....	....	....	....	....	....	....	....	....	2	....	....	2
Arm	1	....	2	....	1	1	....	....	2	....	2	....	....	9
Hand	....	....	....	....	....	....	4	....	6	....	2	2	....	14
Spine	....	....	1	....	....	....	....	....	....	....	....	....	....	1
Rib	....	....	3	....	....	....	....	2	2	1	....	....	....	8
Pelvis	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Thigh	....	....	1	....	....	....	....	....	....	....	....	....	....	1
Leg	1	....	....	1	1	2	....	....	8	....	....	....	....	13
Ankle	....	....	....	....	....	....	1	....	4	2	....	....	....	7
Foot	....	....	....	....	....	1	4	1	6	....	1	....	1	14
Amputations—														
Arm	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Hand	....	....	....	....	....	....	....	....	....	....	1	....	....	1
Finger	....	....	....	....	1	....	1	....	3	....	....	1	....	6
Leg	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Foot	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Toe	....	....	....	....	....	....	....	....	1	....	....	....	....	1
Loss of Eye	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Serious Internal	....	....	....	....	....	....	....	....	1	....	1	....	....	2
Hernia	....	....	....	....	....	....	1	1	2	....	2	....	....	6
Dislocations	....	....	1	....	....	....	....	....	....	....	1	....	....	2
Other Major	....	....	....	....	....	....	2	....	6	....	1	....	1	10
Total Major	2	....	8	1	3	5	13	3	42	3	14	3	2	99
Minor Injuries—														
Fractures—														
Finger	1	....	....	....	1	....	4	....	12	....	....	1	....	19
Toe	....	....	....	....	....	....	1	1	3	....	....	2	....	7
Head	1	....	....	....	....	....	....	....	6	....	....	....	....	7
Eyes	....	....	....	....	....	2	3	....	5	....	2	1	....	13
Shoulder	....	....	....	....	....	....	....	....	4	....	....	2	....	6
Arm	....	....	1	....	....	....	....	1	16	3	3	1	....	25
Hand	1	....	3	....	2	1	2	2	63	....	4	3	3	84
Back	....	....	1	....	1	1	2	1	54	1	6	4	3	74
Rib	....	....	....	....	....	....	1	....	9	....	....	....	....	10
Leg	....	....	4	....	2	1	5	1	48	....	3	5	2	71
Foot	....	....	2	....	2	....	....	....	36	....	1	2	1	44
Other Minor	....	....	5	....	2	1	....	2	32	....	4	1	1	48
Total Minor	3	....	16	....	10	6	18	8	288	4	23	22	10	408
Grand Total	5	....	24	1	13	11	31	11	330	7	37	25	12	507

There were no accidents during the year under review in the following Goldfields :—

Ashburton.	East Murchison.	Greenbushes	North East Coolgardie	Yalgoo.
Broad Arrow.	Gascoyne.	Kimberley.	Phillips River	

Table "B" shows the fatal, serious, and minor accidents reported and the number of men employed classified according to mineral mined.

TABLE B.

(Minerals other than Coal and Oil.)

Mineral.	Men Employed.	Accidents.		
		Fatal.	Injured.	
			Serious.	Minor.
Asbestos	236	....	24	85
Copper	91	....	....	....
Gold	5,628	6	453	1,798
Iron Ore (for Pig)	10	....	....	....
Iron Ore (for Export)	110	....	5	5
Lead, Silver, Zinc	161	1	11	38
Pyrite	125	....	1	21
Tin, Wolfram, Tantalum	70	....	....	....
Other Minerals	1,336	1	1	1
Rock Quarries	327	....	12	19
Total	8,094	8	507	1,967

Accidents classified according to causes for the various districts are shown in Table "C."

TABLE C.

Fatal and Serious Accidents showing Causes and Districts.

(Minerals other than Coal and Oil)

District	Explosives.		Falls of Ground.		Shafts.		Fumes.		Miscellaneous Underground.		Surface.		Total.	
	Fatal.	Serious.	Fatal.	Serious.	Fatal.	Serious.	Fatal.	Serious.	Fatal.	Serious.	Fatal.	Serious.	Fatal.	Serious.
Kimberley	....	....	....	....	....	....	....	....	....	....	....	....	....	....
West Kimberley	....	....	....	....	....	....	....	....	....	....	....	5	....	5
Pilbara	....	....	....	....	....	....	....	....	....	....	1	....	1	....
West Pilbara	....	....	....	1	....	....	....	....	....	10	....	13	....	24
Ashburton	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Peak Hill	1	....	....	....	....	....	....	....	....	....	....	1	1	1
Gascoyne	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Murchison	....	....	....	....	....	....	....	....	....	6	....	7	....	13
East Murchison	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Yalgoo	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Northampton	....	....	....	1	....	3	....	....	....	4	....	3	....	11
Mt. Margaret	....	1	1	4	....	1	....	....	1	13	....	12	2	31
North Coolgardie	....	....	....	3	....	....	....	....	....	6	1	2	1	11
Broad Arrow	....	....	....	....	....	....	....	....	....	....	....	....	....	....
North-East Coolgardie	....	....	....	....	....	....	....	....	....	....	....	....	....	....
East Coolgardie	....	3	....	26	1	7	....	....	1	218	....	76	2	330
Coolgardie	....	....	....	....	....	....	....	....	....	7	....	....	....	7
Yilgarn	....	....	....	2	....	1	1	....	....	25	....	9	1	37
Dundas	....	....	....	2	....	3	....	....	....	17	....	3	....	25
Phillips River	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Greenbushes	....	....	....	....	....	....	....	....	....	....	....	....	....	....
South-West	....	1	....	....	....	....	....	....	....	....	....	11	....	12
Totals for 1956	1	5	1	39	1	15	1	....	2	306	2	142	8	507
Totals for 1955	1	5	1	30	2	20	2	....	4	342	4	147	14	544

FATAL ACCIDENTS

A brief description of fatal accidents reported during the year is given below.

Name and Occupation.	Date.	Mine.	Details and Remarks.
Byrne, Donald Vincent (Timberman)	Collapsed 11–2–56 Died 13–2–56	Chaffers, Lake View & Star, Ltd., Fimiston	Suffered a heart attack brought about by excessive strain when carrying out normal shaft maintenance.
De Rubies, Ernesto (Machine Miner)	Injured 2–3–56 Died 6–3–56	Sons of Gwalia, Gwalia	Struck by a fall of earth whilst barring down on the No. 26 level 1065 H.W. lode.
Berrigan, James John (Miner)	17–3–56	Manganese Quarry Horseshoe, W.A. Ores Pty., Ltd.	An unexplained explosion inflicted severe penetrating injuries to head and chest. After a number of sand blasts had been fired the deceased went to inspect a previously missed hole which exploded while he was near it.
Cooke, Leslie Martin (Machine Miner)	27–3–56	Sunshine Reward Edwards Find	Died as a result of poisonous and irritant fumes inhaled at the 300 ft. level whilst he was bogging out a recently fired drive cut.
Tamburrino, Guiseppe (Locomotive Driver)	11–4–56	Sons of Gwalia, Gwalia	Crushed between the electric battery locomotive and a chute on the No. 27 level when he inadvertently reversed the motor.
Trinidad, Kenneth Laurence (Hoist Driver)	3–5–56	Ragged Hills Lead Mine	Electrocuted whilst using an electric drill. The earth conductor at the 3 pin plug top of the flexible cable was in contact with a live bare conductor.
Marr, William Robert John (Engine Driver)	Injured 3–7–56 Died 4–7–56	State Battery, Yarri	Suffered head injuries when he fell on a concrete pedestal. He was removing a moving belt from a pulley by means of a wooden lever when he was thrown off balance and fell.
Regalini, Andrea (Stope Preparation)	27–7–56	Edwards Shaft, Great Boulder Pty. G.M. Ltd.	Death was due to asphyxia and was accidental following a fall on the 2350 ft. level.

WINDING MACHINERY ACCIDENTS.

Twenty-one accidents involving winding machinery were reported during the year and are briefly as follows:—

Fatal.—Nil.

Overwinds (8).—An overwind occurred at Hamilton Shaft on the 6th April when a loaded skip at the 1,300 level took charge as steam was admitted to the engine and the brakes released. The opposite skip which was in the tipping position was raised to the thimble and suspended by the safety hook.

Errors of judgment accounted for two overwinds.

On three occasions skips were overwound when the drivers failed to reverse the engines after tipping the skips of ore.

Two overwinds were brought about by the drivers attempting to land the opposite cages at levels below which they were geared.

Cages Hung Up (6).—On the 4th January at the New North Boulder shaft the winder driver attempted to lower the cage without first lifting the "Bull" chain clear. About 30 feet of rope was let out before he stopped the engine.

Bouncing of a skip in the Ivanhoe Shaft was considered to be the cause of the grippers acting. Approximately 1,600 feet of rope was coiled on top of the skip before the accident was noticed. The rope was recovered undamaged and was cut and reshod.

A loose piece of timber caused the cage in the North Paringa shaft to hang up on the 3rd June.

A cage was jammed at the 1,100 foot level in the South Paringa Shaft on the 4th July when rock fell from a drive which had just broken through to the shaft at the 1,050 foot level. Arrangements were made to pull the men early but no instructions were given to gear in the cages above the break through point.

Gripper release chains stretching in service are thought to have been the cause of a cage hanging up in the right hand compartment of the South Paringa Shaft on the 23rd October.

A kibble was wedged in the Morning Star Mine when insecurely held steel in the kibble fouled a shaft centre at the 200 ft. level.

Derailments (1).—On the 3rd April the Sons of Gwalia north skip, coming up full of ore from the No. 36 bin, was derailed just below the No. 1 level. The skip was pulled through to the tip before being stopped as the shaft alarm did not operate. The derailment was caused by the line spreading.

Mechanical Failures (5).—A circumferential crack approximately 3ft. 6in. long was discovered at the base of the cross head trunk of the Edwards Shaft winder on the 28th March. The crack was 2in. to 3in. above an old crack which had been repaired by plating. Both these cracks were repaired by the "Metalock" process. On the 10th April it was noticed that the crank pin had moved in the right hand disc of the same winder. Further investigation showed that the disc was cracked around the crank pin boss, and on one side almost through the boss to the pin hole. The disc was removed and replaced by a spare. Whilst the disc was off the shaft it was noticed that the bed plate was cracked for approximately 18 inches in the right hand side of the left hand cast box section. A repair was effected by fitting two x 1½in. tie bolts through the bed plate. The crack was also chain studded.

On the 7th November an overwind occurred at Chaffers Shaft, through the failure of the left hand brake. At the time of the accident ore was being hauled from the 2,400 foot level. The driver had used the brake several times to ease the speed of the skip before it got to the surface, but when he applied it just before the tipping position it failed to work. By the time the right hand brake was applied it was too late. Investigation showed that a small key had worked out of the lever and arm controlling steam to the left hand brake and it failed to operate.

About a quarter of the drum flange broke from the winder of the Copperhead mine on the 20th April whilst ore was being hoisted. The rope did not leave the drum and the winder was stopped. Cracks were also found in the other drum. The drums were repaired and changed.

At approximately 7 p.m. on the 21st May the rope, in the east compartment of the Hill 50 G.M. (N.L.) main shaft, broke 40 feet above the cage. The rope failed as the cage carrying a truck of ore was being lifted off the chairing device at the 820 foot level. No person was injured and very little damage resulted. The breakage was caused through corrosion of the wires surrounding the hemp core. There was no external evidence of the condition. Both ropes were replaced after the accident.

Miscellaneous (1).—When mullock was being hauled from the No. 25 level of the Victoria Shaft of Gold Mines of Kalgoorlie on the 20th February, the platman neglected to lower the truck retaining bridle and the upper deck truck fouled the shaft. The truck, cage and some shaft timbering were damaged. The rope was cut and reshod. The shaft was out of operation for two days.

PROSECUTIONS.

It was found necessary to prosecute two persons during the year. Both were successfully conducted by Departmental officers.

A mine manager was prosecuted for employing an uncertificated locomotive driver. The prosecution was only instigated after several warnings had been given.

A machine miner was prosecuted for boring in a butt. He had been engaged in the dangerous practice of attempting to deepen his previously fired "burn."

SUNDAY LABOUR PERMITS.

Four permits to employ Sunday labour were granted during the year.

Central Norseman Gold Corporation (N.L.) was granted permits to employ labour on two Sundays for the purpose of stripping the No. 16 level platt and ore bin at the Regent Shaft.

A permit was granted for one Sunday for the purpose of cutting a new platt at the No. 5 level of Frazer's Shaft.

Permission was given to the Protheroe Lead Mine to employ two drillers for one Sunday.

AUTHORISED MINE SURVEYORS.

The Survey Board issued eight certificates during the year.

CERTIFICATES OF EXEMPTION (Section 46).

Thirteen certificates were issued as compared with six in 1955.

PERMITS TO FIRE OUTSIDE PRESCRIBED TIMES (Regulation 51).

Eight permits were issued.

Lake View and Star Ltd. were issued with three permits relative to surface winzes on the Associated and Hannans Star leases.

Firing was permitted outside the prescribed times at the Mt. Charlotte open cut as no other work was being carried out on the lease.

Central Norseman Gold Corporation was granted permits as follows:—

(a) For Crown Shaft sinking—no connections to other workings.

(b) 29 level, South Drive, Regent Shaft. This was a very isolated position and there was no interference with other ventilation or workings.

Protheroe Lead Mine was granted two permits for prospecting shaft operations.

PERMITS TO RISE (Regulation 64).

Forty-two permits were granted and these covered 53 rises, totalling 5,287 feet.

It is interesting to note that both at the Copperhead mine and at Great Boulder Pty. rising gigs are used wherever possible. The Sons of Gwalia rise on boreholes where possible.

ADMINISTRATIVE.

Mines Regulation Act.—Approval was given in July for the reprinting of the Mines Regulation Act and Regulations.

The last paragraph of Section 8 was deleted, so as to allow all mine workers to vote at elections for workmen's inspectors of mines.

A subregulation was added to Regulation 105 to prohibit the lowering of men or materials by the brake alone and prohibiting persons from entering a cage or skip suspended by the brake alone.

Mining Act.—Regulation 145A has been added to give the holder of a license to treat tailings the right of entry on a mining tenement other than a lease, provided the licensee does not interfere with the mining operations of the holder of the mining tenement.

VENTILATION.

Dust counts and temperature readings were taken during the course of inspections carried out at all major metalliferous mines during the past year. Generally, dust counts and temperatures underground and in the crushing sections have been reasonable.

Results of dust counts taken during the year are tabulated below—

Dust Samples from	No. of Samples.	Samples giving over 1,000 p.p.c.c.	Average Count.
Development	525	1	152
Stoping	877	7	191
Levels	84	3	215
Surface	129	3	197
Totals	1,615	14	180

The average dust count was slightly lower than those recorded in previous years. The use of air-water sprays in places where a considerable amount of secondary blasting takes place is becoming more general. One mine is installing exhaust systems on main grizzlies consisting of a fan drawing from below the grizzly and exhausting the dust laden air through cylindrical flannel bag type filters.

The dust nuisance created underground during the summer months by sand fill for the rill stopes of the Lake View and Star has been partially overcome by spraying water on the area where the fill is obtained and the enclosing of sand passes at transfer points. Strict control is necessary to ensure that the fill is not overwet as it would then tend to hang up in the sand pass system.

A depressed diamond drill hole from the 2,600 foot level of the Enterprise Mine encountered a flow of gas at 1,136 feet. A sample of the gas was collected and an air free analysis indicated that the gas composition was 16·2 per cent. ethane and 83·8 per cent. methane. The hole was sealed and the drilling chamber and adjacent dead ends well ventilated to remove any residual gas. During 1951 a similar gas flow was met with in a depressed drill hole from the 2,650 level of Hamilton Shaft.

As a direct result of a fatal fuming accident in 1955 an investigation was initiated by this branch into the cause of the high carbon monoxide concentrations in development headings after firing. Inspector Faichney's report on this investigation is quoted below.

"On the 29th December, 1955, a trucker was fatally overcome by fumes which he inhaled when he entered a chinaman chute. The chute was beneath a rise from which intermediate driving was proceeding about 25 feet above the level. The intermediate drive cuts had been detonated at about 3·15 p.m. and the trucker was found lying on the broken dirt at about 6 p.m. It was estimated that the trucker became fumed between 5·30 p.m. and 5·45 p.m. To test for the quantity of carbon monoxide fume which could be present, conditions similar to that existing at the time of the fatality were recreated on 5th January, 1956. This was done by firing development ends again. Samples of the fume were collected at times ranging from one hour to one and three-quarter hours after detonation and gave the following results:—

Time	CO %	CO_2 %	Ratio CO : CO_2
1 hour after detonation	1.38	3.26	1 : 2.4
1¼ " " "	0.83	2.19	1 : 2.5
1¾ " " "	0.63	1.67	1 : 2.7

"After these alarming results it was decided to carry out further tests, having due regard to the possibilities of the creation of excess carbon monoxide by the burning of wooden spacers. (Wooden spacers were used in the firing of the intermediate drive cuts at the scene of the fatality.) These tests were conducted during 23rd February-16th March and the standard explosives for these goldfields used. Drive cuts using 60 per cent. A.N. gelignite and semigel only, and cuts using these explosives with spacers of wood and ceramic material, were detonated and samples of the fume collected by Proto men.

"These resulted—

Explosive.	CO.	CO_2.	Ratio $CO:CO_2$	O_2.
	%	%	%	%
60% A.N. Gelignite....	0·92	4·21	1 : 4·6	18·62
60% A.N. Gel.-wooden spacers	0·67	1·96	1 : 2·9	19·67
60% A.N. Gel.—ceramic spacers	0·81	2·71	1 : 3·35	19·39
Semigel	0·42	1·24	1 : 2·95	19·77
Semigel—wooden spacers	0·46	1·38	1 : 3·0	19·78
Semigel—ceramic spacers	0·51	1·57	1 : 3·1	19·68

"The belief that the carbon monoxide was being created by the burning of wooden spacers seems to be shattered by the above results, but the percentage of the gas was shown to be alarmingly high, and the ratio of carbon monoxide to carbon dioxide very unsatisfactory.

"In November of this year, representatives of Nobels (Aust.) Ltd. visited Kalgoorlie and brought with them explosives of the 60 per cent. A.N. gelignite and semigel types both standard and varied, for testing purposes. In the results tabulated below the Special A is standard and Specials B and C are varied, one having increased oxygen, and the other barytes added.

Explosive.	CO.	CO_2.	Ratio $CO:CO_2$	O_2.
	%	%	%	%
60% A.N. Gel. Special A.	0·50	2·08	1 : 4·1	19·54
60% A.N. Gel. Special B.	0·44	1·59	1 : 3·6	19·91
60% A.N. Gel. Special C.	0·72	3·54	1 : 4·9	18·91
Semigel Special A.	0·26	0·95	1 : 3·7	20·10
Semigel Special B.	0·31	1·05	1 : 3·4	20·04
Semigel Special C.	0·23	1·06	1 : 4·6	20·12
60% A.N. Gel. Special A. (portion of wrapper and wax removed)*	0·27	2·27	1 : 8·4	19·65
60% A.N. Gel. Special A. (no tamping used)	0·88	3·50	1 : 4·0	18·77
60% A.N. Gel. Special A. (possible excess tamping)	0·71	2·44	1 : 3·4	19·30

"Of these results that marked with an asterisk seems to have the best possibilities for minimising the percentage of carbon monoxide. All other results, particularly the CO : CO_2 ratios, are similar to previous testing and indicate something being amiss with the oxygen balance during or immediately after detonation. However this one favourable result will need further examination and testing, and it is hoped this will be carried out during or early in 1957. I believe that the explosive manufacturing company either have a more suitable wrapper for the plug or are in the process of preparing one."

ALUMINIUM THERAPY.

Dr. Robson, of McIntyre Research Foundation, visited the State during April and inspected changerooms where aluminium powder is dispersed for aluminium therapy treatment. He was satisfied with the methods used for dispersing the aluminium powder but emphasised that a high air pressure was desirable to effectively break up the aggregates of aluminium oxide when the powder is ejected into the changeroom.

At the close of the year twenty-five changerooms were in use for the treatment. The number of men reported as taking treatment was 2,757, as compared with 2,672 last year. These figures represent 47·5 per cent. and 41·3 per cent. respectively of the total cases examined by the laboratory. The number of underground workers receiving treatment was 2,608 or 81·2 per cent. of the total of 3,211 underground workers. During the previous year 2,544 or 76·6 per cent. of the total of 3,322 underground workers examined were receiving treatment.

GOLD MINING.

The ore treated during the year amounted to 2,870,273 tons as compared with 2,865,048 tons in the previous year.

The gold recovered was 813,617 fine ounces as compared with the previous year's total of 834,326 fine ounces.

Average grade of ore mined was slightly lower at 5·67 dwts. per ton as against 5·82 dwts. per ton for the previous year.

The calculated value of the gold produced was £12,724,923, which includes £12,154 distributed by the Gold Producers' Association from the sale of 396,782 fine ounces of gold at an average premium of 7·35d. per fine ounce. The Mint value of gold throughout the year was £15 12s. 6d. per fine ounce.

There was a reduction in the labour force in the industry from 5,846 in 1955 to 5,612 in 1956. Average production of ore per man for the year was 511·45 tons, valued at 88·66 shillings per ton as compared with 490·09 tons valued at 91·13 shillings per ton for 1955. Gold recovery per man amounted to 144·98 fine ounces as compared with 142·72 fine ounces in the previous year.

Statistics relating to the gold mining industry are tabulated as follows:—

Table "D"—Gold Production Statistics.

Table "E"—Classification of Gold Output for 1956 by Goldfields (see page 29).

Table "F"—Classification of Gold Output, 1952-1956 (see page 30).

Table "G"—Mines that have produced 5,000 ounces and upwards during the last five years (see page 31).

Table "H"—Development Footages (see page 32).

TABLE D.

Gold Production Statistics.

Year.	Tons Treated. (2,240 lb.)	Total Gold Yield.	Estimated Value of Yield.	Value of Yield per ton.	Number of Men Employed.	Average Value of Gold per oz.	Average Yield per ton of ore.
	tons.	fine ozs.	£A.	shillings A.		shillings A.	dwts.
1929 ...	628,400	372,064	1,580,426	50·30	4,108	84·96	11·84
1930 ...	645,344	419,767	1,874,484	58·09	4,284	89·33	13·01
1931 ...	982,163	518,045	3,042,019	61·94	5,961	117·44	10·55
1932 ...	1,327,021	599,421	4,358,989	65·70	8,695	145·44	9·03
1933 ...	1,588,979	636,928	4,884,112	61·48	9,900	153·36	8·01
1934 ...	1,772,931	639,871	5,461,004	61·60	12,523	170·69	7·22
1935 ...	1,909,832	646,150	5,676,679	59·45	14,708	175·71	6·77
1936 ...	2,492,034	852,422	7,427,687	59·61	15,698	174·27	6·84
1937 ...	3,039,608	1,007,289	8,797,662	57·99	16,174	174·68	6·64
1938 ...	3,759,720	1,172,950	10,409,928	53·38	15,374	177·50	6·24
1939 ...	4,095,257	1,188,286	11,594,221	56·62	15,216	195·14	5·80
1940 ...	4,291,709	1,154,843	12,306,816	57·35	14,594	213·15	5·38
1941 ...	4,210,774	1,105,477	11,811,989	56·10	13,105	213·70	5·25
1942 ...	3,225,704	845,772	8,840,642	54·81	8,123	209·04	5·24
1943 ...	2,051,011	531,747	5,556,736	54·185	5,079	209·00	5·185
1944 ...	1,777,128	472,588	5,966,451	55·89	4,614	210·18	5·32
1945 ...	1,736,952	469,906	5,025,039	57·86	4,818	213·87	5·41
1946 ...	2,194,477	618,607	6,657,762	60·70	6,961	215·25	5·64
1947 ...	2,507,306	701,752	7,552,611	60·25	7,649	215·25	5·59
1948	2,447,545	662,714	7,132,748	58.28	7,178	215.25	5.42
1949	2,468,297	649,572	7,977,200	64.64	6,800	245.62	5.26
1950	2,463,423	608,633	9,428,745	76·55	7,080	309·83	4·94
1951	2,471,679	648,245	10,042,392	81·26	6,766	309·83	5·25
1952	2,626,612	727,468	11,809,047	89·92	6,394	324·66	5·54
1953	3,169,875	823,331	13,290,100	83·85	6,359	322·837	5·20
1954	3,240,378	861,992	13,492,209	83·27	6,128	313·04	5·32
1955	2,865,048	834,326	13,055,574	91·13	5,845	312·96	5·82
1956	2,870,273	813,617	12,724,923	88·67	5,612	312·80	5·67

TABLE E.

Classification of Gold Output for 1956 by Goldfields.

Goldfield.	Unclassified Sundry Claims, Alluvial, etc.	Under 100 ozs.		100–500 ozs.		500–1,000 ozs.		1,000–5,000 ozs.		5,000–10,000 ozs.		10,000–20,000 ozs.		20,000–50,000 ozs.		50,000–100,000 ozs.		Over 100,000 ozs.		Total Fine Ozs.
		No. of Producers.	Gold.	No. of Producers.	Gold.	No. of Producers.	Gold.	No. of Producers.	Gold.	No. of Producers.	Gold.	No. of Producers.	Gold.	No. of Producers.	Gold.	No. of Producers.	Gold.	No. of Producers.	Gold.	
	Fine ozs.		Fine ozs.		Fine ozs.		Fine ozs.		Fine ozs.		Fine ozs.		Fine ozs.		Fine ozs.		Fine ozs.		Fine ozs.	
Kimberley	144	1	35	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	179
West Kimberley	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Pilbara	260	11	167	3	675	1	972	....	....	....	....	....	....	....	....	....	....	....	....	2,074
West Pilbara	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1
Ashburton	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1
Peak Hill	....	1	16	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	16
Gascoyne	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Murchison	500	18	447	5	1,247	....	....	....	....	....	....	....	....	....	...	1	83,720	....	....	85,914
East Murchison	165	4	107	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	272
Yalgoo	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Mt. Margaret	103	3	33	4	824	....	....	1	1,440	....	....	....	....	1	27,376	....	....	....	....	29,776
North Coolgardie	435	18	426	4	1,110	1	547	3	7,954	....	....	1	17,174	....	....	....	....	....	....	27,646
Broad Arrow	320	9	290	7	1,347	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1,957
North-East Coolgardie	67	3	38	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	105
East Coolgardie	285	19	533	2	370	2	1,720	1	2,724	1	5,003	3	46,568	....	....	2	128,165	2	289,315	474,683
Coolgardie	381	8	271	3	944	....	....	....	....	2	16,109	....	....	....	....	....	....	....	....	17,705
Yilgarn	265	14	501	5	1,300	1	559	2	5,283	....	....	....	....	....	....	1	76,279	....	....	84,187
Dundas	22	2	28	....	....	....	....	....	....	....	....	....	....	....	....	1	89,039	....	....	89,089
Phillips River	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1
State Generally	11	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	11
Totals	2,960	112	2,893	33	7,817	5	3,798	7	17,401	3	21,112	4	63,742	1	27,376	5	377,203	2	289,315	813,617

TABLE F.

Classification of Gold Output, 1952–1956.

Range of Output.	1956.			1955.			1954.			1953.			1952.		
	No. of Producers.	Production.	Percentage of Total.	No. of Producers.	Production.	Percentage of Total.	No. of Producers.	Production.	Percentage of Total.	No. of Producers.	Production.	Percentage of Total.	No. of Producers.	Production.	Percentage of Total.
Fine ozs.		Fine ozs.			Fine ozs.			Fine ozs.			Fine ozs.			Fine ozs.	
Over 100,000	2	289,315	35·5	2	280,878	33·6	2	275,139	31·9	2	272,467	33·2	1	146,256	20·1
50,000–100,000	5	377,203	46·3	5	368,426	44·1	6	387,840	45·1	5	296,444	36·0	4	293,217	40·3
40,000– 50,000	....	....	....	....	....	....	....	....	....	1	41,799	5·1	1	47,286	6·5
30,000– 40,000	....	....	....	....	....	....	1	31,150	3·6	1	33,677	4·1	1	30,578	4·2
20,000– 30,000	1	27,376	3·4	3	68,600	8·2	4	69,964	8·1	2	49,699	6·0	1	23,616	3·3
10,000– 20,000	4	63,742	7·8	4	68,958	8·3	3	44,664	5·2	4	64,358	7·8	6	104,197	14·3
5,000– 10,000	3	21,112	2·6	2	12,282	1·5	3	22,798	2·6	2	18,142	2·2	4	29,537	4·1
4,000– 5,000	1	4,045	0·5	....	....	....	....	....	....	1	4,636	0·6	....	....	....
3,000– 4,000	1	3,906	0·5	1	3,454	0·4	....	....	....	1	3,795	0·5	2	7,290	1·1
2,000– 3,000	2	5,376	0·7	1	2,451	0·3	....	....	....	1	2,703	0·3	3	6,735	0·9
1,000– 2,000	3	4,074	0·5	5	7,233	0·9	5	7,641	0·9	6	7,685	0·9	5	6,869	0·9
500– 1,000	5	3,798	0·5	8	5,579	0·7	14	9,666	1·1	12	7,894	0·9	14	9,704	1·3
100– 500	33	7,817	0·9	39	9,119	1·1	22	4,611	0·5	54	12,378	1·5	56	13,293	1·8
Under 100	112	2,893	0·4	121	3,414	0·4	149	4,280	0·5	184	3,988	0·5	177	5,081	0·7
Sundry Claims, etc.	....	2,960	0·4	....	3,932	0·5	....	4,239	0·5	....	3,666	0·4	....	3,808	0·5
Totals	172	813,617	100·0	191	834,326	100·0	209	861,992	100·0	276	823,331	100·0	275	727,467	100·0

TABLE G.

Mines that have Produced 5,000 ounces and upwards during the last Five Years.

Mine.	1956.			1955.			1954.			1953.			1952.		
	Tons Treated.	Fine ozs.	Dwt. per ton.	Tons Treated.	Fine ozs.	Dwt. per ton.	Tons Treated.	Fine ozs.	Dwt. per ton.	Tons Treated.	Fine ozs.	Dwt. per ton.	Tons Treated.	Fine ozs.	Dwt. per ton.
Big Bell Mines, Ltd.	....	481	....	14,691	5,675	7·73	405,684	59,985	2·96	402,906	54,142	2·69	400,563	53,610	2·68
Blue Spec Mining Co., N.L.	....	972	....	3,388	2,451	14·47	6,614	1,006	3·05	2,297	3,795	33·04	6,819	6,494	19·05
Boulder Perseverance, Ltd.	122,397	18,354	3·00	126,251	25,046	3·97	133,800	31,150	4·66	136,257	33,677	4·94	131,840	30,578	4·64
Callion (New Coolgardie G.M. N.L.)	8,305	4,045	9·74	26,922	13,037	9·69	30,974	15,385	9·93	29,926	16,023	10·71	25,214	14,697	11·66
Central Norseman Gold Corporation, N.L.	160,961	89,039	11·06	160,224	95,700	11·95	157,877	83,396	10·56	155,451	73,869	9·50	158,447	78,241	9·88
Gold Mines of Kalgoorlie (Aust.), Ltd.	222,456	61,217	5·50	195,732	52,552	5·37	209,311	60,370	5·77	191,292	57,184	5·98	171,659	47,286	5·51
Great Boulder Pty. Gold Mines, Ltd.	428,571	122,313	5·71	423,879	114,560	5·41	417,874	107,670	5·15	409,814	106,775	5·21	376,564	96,111	5·10
Great Western Consolidated, N.L.	444,185	76,279	3·43	423,012	62,136	2·94	445,864	55,330	2·48	392,508	50,192	2·56	30,143	2,134	1·42
Haoma Gold Mine	3,731	2,725	14·61	3,565	3,454	19·38	4,609	5,487	23·81	3,827	4,636	24·23	3,198	3,655	22·86
Hill 50 Gold Mines, N.L.	106,479	83,720	15·72	104,010	81,801	15·72	92,411	71,813	15·50	83,865	41,799	9·97	53,803	15,839	5·89
Horseshoe (Anglo Westralian Mining Pty., Ltd.)	....	....	....	....	....	....	45,347	8,524	3·76	54,923	8,896	3·24	35,602	5,428	3·05
Kalgoorlie Enterprise Mines Ltd.	66,744	12,839	3·85	74,429	19,627	5·27	69,789	21,599	6·19	65,220	18,119	5·56	62,869	18,826	5·99
Lake View & Star, Ltd.	657,105	158,487	4·82	656,099	157,527	4·80	657,197	157,667	4·80	657,621	156,589	4·76	610,111	146,256	4·79
New Coolgardie Gold Mines, N.L.	32,560	16,109	9·90	33,296	19,180	11·52	33,534	15,761	9·40	39,570	17,176	8·68	37,436	19,387	10·36
North Kalgurli (1912), Ltd.	351,374	66,948	3·81	348,829	76,237	4·37	251,988	56,945	4·52	253,967	61,057	4·81	256,040	65,255	5·10
South Kalgurli Consolidated, Ltd.	70,631	15,375	4·35	84,928	20,328	4·79	97,711	22,197	4·54	102,449	23,673	4·62	93,992	23,616	5·03
State Batteries	35,740	13,218	7·40	42,207	15,203	7·20	34,600	11,848	6·84	40,218	15,003	7·47	42,270	17,386	8·23
The Sons of Gwalia, Ltd.	113,598	27,376	4·82	102,742	23,226	4·52	103,237	26,168	5·07	100,525	26,026	5·18	85,263	23,768	5·58
Timoni (Moonlight Wiluna G.M., Ltd.)	30,754	17,174	11·17	30,056	17,114	11·39	24,290	13,518	11·13	23,105	13,039	11·29	23,410	11,680	9·98
Total	2,855,591	786,671	5·51	2,854,260	804,854	5·64	3,222,711	825,819	5·12	3,145,741	781,670	4·97	2,605,243	680,247	5·22
Other Sources (excluding large Retreatment Plants)	14,682	10,606	14·45	10,788	11,655	21·61	17,667	15,282	17·30	24,134	19,020	15·76	21,369	22,894	21·43
Total (excluding large Retreatment Plants)	2,870,273	797,277	5·56	2,865,048	816,509	5·70	3,240,378	841,101	5·19	3,169,875	800,690	5·05	2,626,612	703,141	5·35
Golden Horseshoe Sands Retreatment	....	5,003	....	....	6,607	....	....	8,787	....	....	9,246	....	....	9,767	....
Lake View & Star Retreatment	....	8,515	....	....	8,791	....	....	8,802	....	....	9,102	....	....	7,848	....
State Batteries Tailing Treatment	....	2,822	....	....	2,419	....	....	3,302	....	....	4,293	....	....	6,712	....
GRAND TOTAL	2,870,273	813,617	5·67	2,865,048	834,326	5·82	3,240,378	861,992	5·32	3,169,875	823,331	5·20	2,626,612	727,468	5·54

TABLE H.

Development Footages Reported by the Principal Mines.

Gold or Mineral Field.	Mine.	Shaft Sinking.	Driving.	Cross Cutting.	Rising and Winzing.	Diamond Drilling.	Total.
Gold—		Feet.	Feet.	Feet.	Feet.	Feet.	Feet.
Murchison	Hill 50 Gold Mines, N.L.	281	1,692	1,099	852	8,726	12,650
	Hill 50 Eclipse	104	459	494	60	460	1,577
	Mount Magnet Development, N.L.	408	264	130	....	2,281	3,083
Mount Margaret	Sons of Gwalia	....	776	478	981	4,809	7,044
North Coolgardie	Timoni—Moonlight Wiluna G.M., Ltd.	....	700	45	355	....	1,100
	Altona	10	250	....	67	....	327
	Yilgangie Queen	155	110	....	56	....	321
East Coolgardie	Lake View and Star, Ltd.	....	16,902	2,249	7,795	10,439	37,385
	Great Boulder Pty., Gold Mines, Ltd.	528	9,813	2,884	3,883	5,690	22,798
	North Kalgurli (1912), Ltd.	30	9,762	2,329	2,301	11,091	25,513
	Gold Mines of Kalgoorlie	40	12,938	5,500	6,509	69,325	94,312
	Kalgoorlie Southern G.M., N.L.	....	....	....	....	5,633	5,633
	Haoma Gold Mine	....	575	311	108	....	994
	Daisy Gold Mine	....	138	40	85	....	263
Coolgardie	Gold Mines of Kalgoorlie	....	3,308	343	1,255	7,234	12,140
	Jackpot	45	300	....	50	....	395
Yilgarn	Great Western Consolidated	358	8,632	2,345	4,276	56,017	71,628
	Marjorie Glen G.M.	....	200	75	30	....	305
	Radio Gold Mine	....	152	....	132	....	284
	Sunshine Reward G.M.	....	348	179	155	1,135	1,817
Dundas	Central Norseman Gold Corporation, N.L.	1,101	8,700	3,117	2,106	36,591	51,615
	Total in Gold Mines	3,060	76,019	21,618	31,056	219,431	351,184
Pyrite—							
Dundas	Norseman Gold Mines, N.L.	....	2,003	44	960	2,045	5,052
Asbestos—							
West Pilbara	Australian Blue Asbestos	....	864	739	399	....	2,002
Copper—							
Phillips River	Ravensthorpe Copper Mines, N.L.	....	....	....	....	10,287	10,287
Pilbara	Copper Hills	295	105	65	145	....	610
West Pilbara	Yannery Hills C.M.	....	92	57	115	....	264
	Total in Copper Mines	295	197	122	260	10,287	11,161
Lead—							
Northampton	Protheroe Lead Mine	138	1,911	121	575	6,528	9,273
	Mendip Leases	207	256	152	....	....	615
	Gurkha Lead Mine	96	254	45	142	....	537
	Surprise Mine	....	486	43	178	....	707
	Maybell	126	100	6	7	....	239
	Total in Lead Mines	567	3,007	367	902	6,528	11,371
	TOTAL IN ALL MINES	3,922	82,090	22,890	33,577	238,291	380,770

OPERATIONS OF THE PRINCIPAL MINES.

EAST COOLGARDIE GOLDFIELD.

The total ore treated in this goldfield amounted to 1,935,143 tons and the gold yield of 474,683 fine ounces was an average of 4·91 dwts. per ton. This is equal to 58·3 per cent. of the gold production for the State. In the previous year 1,921,668 tons of ore averaging 5·09 dwts. were treated for a recovery of 489,040 fine ounces of gold.

There was very little activity in the *Bulong District,* only 42 ounces won from the treatment of 343 tons. In the *East Coolgardie District* 474,641 fine ounces were recovered from the treatment of 1,934,800 tons of ore. Following are notes on the activities of the principal producers for 1956:—

Lake View and Star Ltd., with a production of 657,105 tons of ore for a return of 158,487 fine ounces of gold at an average of 4·82 dwts. per ton, was the State's leading producer. Retreatment of tailings yielded an additional 8,515 fine ounces.

The previous year's production was 157,527 fine ounces from the treatment of 656,099 tons, plus 8,791 fine ounces from tailings retreatment.

Working costs were reduced by one penny per ton to 51s. 10d. during the year.

Development footages amounted to 26,946 feet, which figure excludes 10,439 feet from exploratory diamond drilling. Ore reserves are stated as 3,668,000 tons at 4·77 dwts. per ton.

Additions at the mine include a new 4 ft. Symons shorthead crusher and the erection of the steel head frame, ex Big Bell, at the Ivanhoe Shaft.

This headframe replaces the timber frame that had given many years of useful service. Trials are in progress with the replacement of cages and skips with special light alloy cages and skips.

Great Boulder Pty. Gold Mines Ltd. treated 428,571 tons averaging 5·71 dwts. for a return of 122,313 fine ounces of gold. During the previous year 423,879 tons yielded 114,560 fine ounces at an average grade of 5·41 dwts. per ton. The increase in the value of the ore was due mainly to the favourable developments on Phantom Lode. Ore reserves stand at 2,071,500 tons of 5·5 dwts. value.

Work in progress includes the deepening of Hamilton Shaft to 3,250 feet, sinking of an internal shaft in the Edwards Shaft section, and the establishment of a main haulage system between Edwards and Hamilton Shafts. Diamond drilling from the lower levels has indicated seams of higher than average value and encouraging results are expected from the development work now in progress.

New plant installed includes a 8 ft. x 12 ft. Marcy rod mill, an 18ft. diameter thickener for underground fill preparation, and a 24ft. diameter agitator for fill storage.

North Kalgurli (1912) Ltd. treated 351,374 tons of ore for a recovery of 66,948 fine ounces at an average of 3·81 dwts. per ton. The small increase in tonnage treated over the previous year's total of 348,829 tons was more than offset by the lower grade of ore mined as compared with 4·37 dwts. per ton for 1955. The lowering of grade can be attributed to the partial absence of telluride enrichments common in the East lode system of the mine. Ore reserves are set at 2,217,473 tons of 5·4 dwts. value.

Work is in progress to sink the Main Shaft and the Kalgurli Shaft, and immediately develop the mine at deeper horizons. Some exploratory work has been carried out at the Croesus Mine.

The full output from the mine is now treated at the Croesus plant which was enlarged to absorb portion of the ore that was previously treated at the Kalgoorlie Ore Treatment plant.

Gold Mines of Kalgoorlie (Aust.) Ltd.—The Kalgoorlie group of mines under the control of this company produced 107,785 fine ounces of gold from 482,228 tons of ore averaging 4·47 dwts. per ton. Production from the *Boulder Perseverance* was 122,397 tons for a recovery of 18,354 fine ounces at 3·00 dwts per ton. *South Kalgurli* production was 70,631 tons for a recovery of 15,375 fine ounces at 4·35 dwts per ton. Production from the *Enterprise* mine was 12,839 fine ounces recovered from 66,744 tons of ore at an average recovery of 3·85 dwts. per ton. The parent company produced 61,217 fine ounces from 222,456 tons at an average value of 5·50 dwts. per ton.

During the previous year this group of mines produced 117,553 fine ounces from the treatment of 481,340 tons, average recovery being 4·88 dwts. per ton.

Ore reserves are stated as 1,574,000 tons averaging 5·9 dwts. per ton.

Ninety-four thousand three hundred and twelve feet of development work, which included 69,325 feet of diamond drilling, was undertaken during the year.

The rich Blatchford ore pipe which bottoms on slates at the No. 10 Paringa level has been tested for upward extension.

The South Paringa Shaft has been equipped with a steel headframe and electric winder. New plats have been cut to connect with Iron Duke levels and working from the Iron Duke Shaft has been suspended. The electrification of the South Kalgurli winding engine was completed.

Golden Horseshoe (New) Ltd. ceased operations after recovering 5,003 fine ounces during the year from retreatment of tailings. This company had been operating for twenty years.

At Mount Monger the *Haoma* mine experienced a successful year's operation. A cross cut west intercepted a new shoot and this is being developed on the 269, 400, and 451 foot levels. Production for 1956 was 2,725 fine ounces from 3,731 tons.

The *Daisy Mine* at the same centre treated an increased tonnage at lower values, 918 ounces being recovered from 1,874 tons. Rich returns were again won from the adjoining *Rosemary Mine*, which treated 313 tons at the Kalgoorlie State Battery for a return of 802 fine ounces.

DUNDAS GOLDFIELD.

The production of 89,089 fine ounces of gold from the treatment of 161,131 tons of ore was equivalent to 11 per cent. of the State's total production. In the previous year 160,418 tons were mined for a recovery of 95,718 ounces.

Practically all of the production was from the *Central Norseman Gold Corporation*, which treated 160,916 tons for a recovery of 89,039 fine ounces. Gold recovery was at a rate of 11·06 dwts. per ton of ore treated. Values were lower than in the previous year, when 160,224 tons yielded 95,700 fine ounces at the rate of 11·95 dwts. per ton.

Development work for the year amounted to 51,615 feet, which includes 36,591 feet of exploratory drilling. Shaft sinking continued at the Crown and North Royal Shafts. At the Regent Shaft, sinking was discontinued at the No. 42 level. Work is in hand to develop the Nos. 14 and 16 levels of the Crown reef from the Regent Shaft.

Ore reserves stated are 446,333 tons averaging 8·5 dwts per ton.

MURCHISON GOLDFIELD.

110,531 tons of ore were treated in this goldfield for a return of 85,914 fine ounces of gold. This production was equal to 10.50 per cent. of the State's total.

In the previous year 89,146 fine ounces were obatined from the treatment of 125,208 tons of ore averaging 14.24 dwts. per ton.

Cue District produced 1,124 fine ounces of gold from the treatment of 1,253 tons of ore, average recovery, excluding 481 ounces obtained from around Big Bell treatment plant, was 10.26 dwts. per ton.

Three prospectors obtained good returns from a new find south-east of the Big Bell lode. This may become a regular producer, but insufficient work has been done to assess the future prospects.

Meekatharra District produced 704 fine ounces from the treatment of 987 tons of ore, averaging 14.27 dwts. per ton. In the previous year 563 ounces were recovered from the treatment of 3,606 tons.

The principal producers were the *Blue Bird* with a recovery of 106 ounces from 439 tons and *Ingliston* with 70 fine ounces recovered from the treatment of 82 tons of ore. Generally prospecting has been at a low ebb throughout the Murchison.

Day Dawn District.—This district was very quiet only 56 fine ounces recovered from 242 tons treated.

Departmental diamond drilling continued throughout the year at the Great Fingall. The first hole, drilled to 4,137 feet, cut the ore body between 3,786 and 3,807 feet. The 21 feet of core averaged 4.69 dwts. per long ton with a seven foot section assaying 8.16 dwts. per ton. This intersection was made approximately 1,000 feet below the deepest workings of the mine. At the end of the year drilling was in progress in a diverted hole which was drilled out of the original at 2,465 feet. A second successful intersection of the ore body is contemplated.

Mount Magnet District with 84,030 ounces from the treatment of 108,049 tons of ore, averaging 15.55 dwts. per long ton, was again above the previous year's production of 82,142 fine ounces of gold from 105,127 tons of ore averaging 15.63 dwts. This advance was mainly due to increased tonnage from *Hill 50 Gold Mines N.L.*, which produced 83,720 fine ounces of gold for the year from the treatment of 106,479 tons of ore averaging 15.72 dwts. per ton. In the previous year 104,010 tons yielded 81,801 fine ounces of gold.

Ore reserves are quoted as 833,000 short tons.

During 1956 the main shaft was deepened to 1,480 feet and a plat was cut 1,304 feet below the shaft collar. A start was made on the ore pass system and a loading pocket for skip haulage. Work on the new winder was suspended pending the arrival of motors and switch gear.

The mine provided employment for an average of 189 employees.

One hundred and fifty fine ounces of gold were obtained from the treatment of 754 tons of ore mined at the *Morning Star* by Mount Magnet Development N.L. This company continued to develop the mine for the purpose of exposing an ore body indicated by surface drilling but the project was abandoned at the end of the year through lack of finance and the mine is now being worked by the owners, Messrs. Denner and Parkinson.

Work continued throughout the year on the *Hill 50 Eclipse G.M.*, the main object being to develop the ore body before negotiating the sale of the mine to a producing company.

Prospecting in the district did not yield anything of note.

YILGARN GOLDFIELD.

Production for the year was 84,187 fine ounces of gold from 450,126 tons averaging 3.74 dwts. per ton. as compared with 66,710 fine ounces from 428,253 tons of ore in the previous year. This goldfield was responsible for 10.3 per cent. of the State's production.

Great Western Consolidated N.L. milled 444,185 tons for a recovery of 73,707 fine ounces of gold, the average recovery being 3.32 dwts. per ton. An additional 2,572 fine ounces were recovered from sands retreatment. Production for the previous year was 62,136 fine ounces recovered from 423,012 tons at an average rate of 2.94 dwts. per ton.

At the *Copperhead Mine*, Bullfinch, development work consisting of driving, crosscutting, winzing and rising totalled 5,117 feet for the year. Preparations were made to sink the shaft to the No. 20 level but no actual sinking was commenced. By the end of the year most of the ore above the No. 8 level had been mined out. Between this level and the No. 14 level development and stoping were in progress. The Nos. 16 and 18 levels were further developed during the year. Quarrying operations continued in both the Southern and Northern Series quarries.

An aluminium alloy man cage was installed in the shaft replacing the small cage which has been used since the re-opening of the mine.

The company has been actively engaged during the year in re-opening the Corinthian, Three Boys and Nevoria Mines. Work was continued on Fraser's mine, the No. 3 shaft sunk to 650 feet and plats cut at the Nos. 5 and 6 levels. Results from this mine have been particularly encouraging as the 24,060 tons milled gave a return of 9,356 fine ounces.

The power line to Southern Cross was extended to the Nevoria at Marvel Loch and power now is transmitted over 50 miles after generation at Bullfinch.

At the *Radio Gold Mine* 1,450 tons were treated for a return of 1,651 fine ounces of gold. This tonnage came from development work on the Nos. 7, 8 and 9 levels and from stoping above the No. 7 level. Retreatment of 15,000 tons of sands yielded 2,255 ounces.

An average of 12 men are employed on the mine.

Edwards Reward treated 1,926 tons for a return of 392.38 fine ounces of gold. All the ore mined came from development headings on the No. 3 level. In addition to surface drilling undertaken by this Department, five holes totalling 1,135 feet were drilled from the 179ft. level. The manager advises that exploratory work has been completed and prospects assessed. The successful outcome or otherwise of endeavours to form a company to work the mine will determine its future.

The *Francis Furness* was worked consistently throughout the year and a total of 469 tons was treated for a return of 296 ounces. The crushings came from mining operations consisting of benching and winzing below the 230ft. level.

Five hundred and fifty nine ounces of gold were recovered from the treatment of 408 tons of ore mined at the *Marjorie Glen Mine* at Mount Rankin. Work in the mine was confined to development and stoping above the 250ft. level.

Mackie Bros. obtained 320 tons of ore from the *Centipede Mine* at Parkers Range. The return from this tonnage, which was ore left on the hanging and footwalls by previous operators, was 150 fine ounces of gold.

Prospectors have been particularly active throughout the Yilgarn, no doubt being encouraged by the optimism shown by Great Western in re-opening several mines in the field.

NORTH COOLGARDIE GOLDFIELD.

Forty-seven thousand six hundred and twenty-two tons of ore were treated in this goldfield for a return of 27,646 fine ounces of gold, the average recovery being 11.40 dwt. per ton. In the previous year 64,848 tons of ore were treated for a return of 35,918 fine ounces. The decline in output can be attributed to the closing down of the *Callion Mine*, and the cessation of development at the *Timoni Mine* at Mt. Ida. These two mines have been the best producers in this goldfield over the last few years and the expected closure of the Timoni mine in about three years' time will be a further blow to the goldfield.

Production for 1956 was 3.4 per cent. of the State's total.

In the *Menzies District* 17,633 ounces were recovered from the treatment of 32,483 tons of ore, production mostly from the Timoni lease of *Moonlight Wiluna Gold Mines* at Mt. Ida which treated 30,754 tons for a recovery of 17,174 fine ounces of gold. In the previous year 33,055 tons yielded 17,114 fine ounces.

Development results were discouraging and the future work of the company will be to mine and treat their present known ore reserves. Eighty-two men were employed on the mine during the year.

At Menzies the biggest producers were Bechelli and party on the *Spion Kopp*, who treated 797 tons of ore for 136 ounces of gold and H. F. Sache at Woolgar, who obtained 55 ounces from 115 tons treated.

Production in the *Ularring District* declined to 10,889 tons of ore returning 6,814 ounces as compared with the previous year's output of 15,402 fine ounces recovered from 29,407 tons. This large decrease is due to the closure of the *Callion* Mine at Davyhurst, which treated 8,305 tons for a recovery of 4,045 ounces as compared with the previous year's output of 13,037 ounces from 26,922 tons.

Among the smaller mines the best returns were from the *Emerald* at Morley's Find, with 222 fine ounces from 723 tons, *First Hit* at the same centre

with 1,257 ounces from 743 tons, *Paramount* with 547 ounces from 659 tons, and *Oakley* at Mulwarrie with 381 ounces recovered from 296 tons of ore.

Mining in the *Niagara District* was responsible for 459 ounces from 1,218 tons treated. The only producer of note was the *Altona* at Kookynie with 370 ounces from 988 tons.

In the *Yerilla District* 2,740 fine ounces of gold were obtained from 3,033 tons of ore. The increased production can be attributed to the *Yilgangie Queen* where 2,652 ounces were recovered from 2,684 tons of ore. During the previous year this mine's output was 1,568 ounces from 1,468 tons.

MOUNT MARGARET GOLDFIELD.

The total ore treated in this goldfield amounted to 120,368 tons and the gold yield of 29,776 fine ounces was an average of 4.96 dwts. per ton. This is equal to 3.7 per cent. of the gold production for the State. In the previous year 114,744 tons averaging 5 dwts. were treated for a recovery of 28,671 fine ounces of gold.

The only producer of note in the *Mount Morgans District* was the *Queen of the May* which produced 154 fine ounces of gold from 402 tons. Work on the mine ceased early in the new year and the plant was sold by auction in March.

At Morgans C. Rymer and party worked the *Westralia* lease under a tribute agreement with Morgans Gold Mines Ltd. At the end of the year about 70 tons of low grade ore were ready for crushing at the Laverton State Battery.

The *Sons of Gwalia Ltd.* at Gwalia was the main producer in the *Mt. Malcolm District*. Employing an average of 255 men the company treated 113,598 tons of ore for a return of 27,376 fine ounces of gold. As a result of the shaft collapse in December, 1955, there was no production for the following month. Repairs to the shaft were completed at the end of January, and normal underground work was resumed in February. Notwithstanding this lost production period, production was better than the previous year's output of 23,226 fine ounces from 102,742 tons.

Most of the labour was concentrated below the No. 25 level and work was continued on the West lode series on the upper levels.

At the *Jessie Alma*, Mazza and party recovered 124 fine ounces from 75 lbs. of specimen stone. The party is working only a few feet below the surface.

One hundred and sixty-six fine ounces of gold were recovered from 163 tons mined from the *Beau Don* at Mt. Clifford. The *Reefer Battery* at Leonora was purchased by the local Prospectors' Association and a start was made to put the battery in running order.

In the *Mt. Margaret District* the *Lancefield Mine* produced 380 fine ounces from 6,006 tons. Five men were employed at the mine but the labour force was reduced to two after the holiday period at the end of the year.

The *Boomerang* did not operate during the year, as two pumps sent away for repairs had not been returned.

The industry around Laverton has slumped during the year and once again the possible closure of the Malcolm-Laverton railway line is causing concern in the area.

COOLGARDIE GOLDFIELD.

This Goldfield produced 17,705 fine ounces of gold from the treatment of 35,500 tons of ore averaging 9.97 dwts. per ton recovery, which was below last year's average grade of 11.30 dwts. obtained from the treatment of 38,224 tons which yielded 21,591 fine ounces. The production for 1956 was equal to 2.2 per cent. of the State's total.

New Coolgardie Gold Mines, owned and operated by Gold Mines of Kalgoorlie (Aust.) Ltd., produced 16,109 fine ounces from 32,560 tons of ore from this Goldfield. Production of this section was from the *Bayleys* and *Barbara Mines*. Production for 1955 was 19,180 fine ounces from the treatment of 33,296 tons.

Development on the *Barbara Mine* has ceased and operations are mainly salvage. Stoping was carried out between the Nos. 5 and 7 levels in the North lode area. At *Bayleys* the programme of reconditioning old workings has been completed and new development instituted. The North Spur reef, reported last year as partly exposed, has now been proved from No. 10 level to above No. 6 level. At No. 11 level a new ore shoot on Prices reef is being developed. There has been a slight recession at Coolgardie following the company's decision to transport all ore to Kalgoorlie for treatment.

Baker Brothers continued working the *Jackpot*, 1,027 tons being broken and treated for a return of 409 fine ounces. Most of this tonnage was from development.

Production reported from the *Kunanalling District* was 140 fine ounces of gold recovered from 450 tons.

PILBARA GOLDFIELD.

In this goldfield 2,074 fine ounces were recovered from the treatment of 1,762 tons of ore averaging 23.54 dwts. per ton as compared with 3,873 fine ounces from 5,163 tons for the previous year. The high average value of the ore treated can be attributed to a clean up at Blue Spec where 972 fine ounces were recovered from virtually no tonnage.

At the end of the year the Departmental drilling programme at Blue Spec was nearly complete. Drilling continued at Bamboo Creek where several good intersections were obtained.

Six hundred and twenty-two ounces were recovered from 1,208 tons in the *Marble Bar District*, the principal producer being the *Prince Charlie* where 399 tons of ore yielded 313 fine ounces of gold.

In the *Nullagine District* 554 tons yielded 1,452 fine ounces, the principal producers being *Blue Spec Mining Coy. N.L.* with 972 fine ounces, *Barton* 200 ounces from 398 tons and the *Alice* with 163 fine ounces from 20 tons.

BROAD ARROW GOLDFIELD.

A number of small mines in this goldfield produced a total of 1,957 fine ounces of gold from 6,970 tons of ore averaging 5.61 dwts. per ton. In the previous year 5,528 tons of ore yielded 2,735 ounces at an average rate of 9.9 dwts. per ton.

The best return in this goldfield was from the *Prince of Wales* at Grants Patch where 281 ounces were recovered from 82 tons. The *Bellevue* at Black Flag produced 240 ounces from 678 tons. 214 ounces were recovered from 113 tons mined at the *New Mexico South* at Christmas Reef. Other mines producing over 100 ounces were *Ora Banda Amalgamated* with 208 ounces from 125 tons, *Gimlet Leases* with 171 ounces from 1,075 tons and the *King of Kings* with 123 ounces from 1,368 tons.

Production from the other Goldfields in the State amounted to 298 ounces of fine gold from 598 tons of ore.

MINERALS OTHER THAN GOLD AND COAL.

The production of minerals, other than Gold and Coal, for 1955 and 1956 is shown in the table below—

PRINCIPAL MINERALS OTHER THAN GOLD AND COAL.

Mineral.	1955.		1956.	
	Tons.	Value £A.	Tons.	Value £A
Antimony Concentrates	203·88	230	78·44	742
Asbestos—				
Chrysotile	274·58	15,997	761·10	25,366
Crocidolite	4,342·42	486,032	7,285·97	800,710
Barytes	10·00	70	927·10	5,187
Bentonite	646·94	2,591	1,403·54	5,658
Beryl	198·63	34,430	310·19	57,113
Chromite	....	....	6,096·20	97,526
Clays—				
Cement Clay	34,924·32	25,445	18,314·00	15,208
Fire Clay	6,912·00	6,868	9,437·00	9,939
White Clay	76·00	380	2,090·00	8,360
Corundum	9·15	275	....	....
Copper Ore	12·12	1,001	212·23	12,742
Cupreous Ore (Fertiliser)	7,730·78	101,731	7,713·31	113,443
Dolomite	81·00	324	171·00	690
Emery	8·15	245	....	....
Felspar	3,565·00	16,660	3,781·00	17,719
Fergusonite	0·13	226	....	....
Fullers Earth	10·76	54	40·13	201
Glass Sand	6,758·98	4,801	7,343·17	5,154
Glauconite	196·50	7,407	85·00	3,360
Graphite	110·00	990	5·10	37
Gypsum	39,946·00	30,336	27,121·00	20,928
Iron Ore (for Pig)	17,302·88	220,558	19,853·60	278,846
Iron Ore (for Export)	496,882·00	492,741	327,815·00	323,923
Lead	1,415·96	95,191	7,612·89	643,253
Magnesite	....	....	803·55	1,978
Manganese	37,490·66	423,830	57,323·14	648,956
Ochre—Red	345·19	3,913	368·93	3,595
Yellow	....	....	75·45	755
Pyrites	49,485·00	397,269	60,968·98	420,052
Silver (fine ounces)	235,794·73	92,781	217,247·01	90,973
Spodumene	3·89	57	....	....
Talc	2,586·81	37,767	4,455·57	54,438
Tantalo/Columbite Ore	12·98	25,762	71·27	127,664
Tin	179·72	94,912	358·35	208,273
Titanium (Ilmenite)	....	....	3 293·40	15,150
Tungsten (Scheelite) lb.	17,365·00	7,417	....	....
Vermiculite	....	....	1·04	9
Totals	....	2,628,291	....	4,017,948

Brief notes on mineral production are given below.

Antimony.

78.44 tons of auriferous antimonial concentrate, from the Blue Spec Mine at Nullagine, yielded 23.26 tons of antimony valued at £742. Surface diamond drilling undertaken by this Department has been partially successful in establishing additional reserves, but the future of the mine is still doubtful.

Asbestos.

The operations of the blue asbestos industry at Wittenoom continued to flourish throughout 1956 and this industry has become one of the major mining projects in Western Australia. Some consideration has been given to the use of wet treatment for fibre recovery, and the changeover from the dry treatment now used may be made when sufficient orders have been received for the wet treated fibre.

Output of crocidolite from the mine increased 68 per cent. from 4,342 tons in 1955 to 7,286 tons for the year under review.

Production of chrysotile from Hancock's leases at Lionel and Nunyerry more than doubled the previous year's output.

Another deposit near Soansville was re-opened late in the year.

Barytes.

Production for the year was 927 tons as compared with 10 tons in 1955 and 1,044 tons during 1954. The producing centres were once again Chesterfield in the Murchison with 426 tons and Cranbrook in the South West with 501 tons.

Bentonite.

Bentonite production from Marchagee rose to 1,404 tons after a recession in the previous year. Both bentonite and baryte production depend on orders received mainly from the oil well drilling industry.

Beryl.

Production for the year amounted to 310.19 tons containing 3,678 units of beryllium oxide valued at £57,113. Over one third was obtained from Pippingarra in the Pilbara Goldfield.

During the latter half of 1956 the minimum grade acceptable was raised to 10 per cent. BeO. An increase in the price paid per unit was also made and there is a good demand for this mineral.

Chromite.

The Broken Hill Pty. obtained 6,096 tons from the Coobina deposit. Ore is only broken as required.

Clays.

Just under 21,000 tons were obtained from deposits within the metropolitan area, 7,000 tons from Clackline and 2,000 tons from Goomalling.

Copper.

Although copper ore production was much the same as last year, the industry received a set back following an over-supply of fertilizer grades for local use. 7,713 tons of local ore averaging 8.6 per cent. copper were absorbed by fertilizer works during the year. An additional 212 tons were shipped to smelters.

Interest in the Phillips River Goldfield has been revived by the efforts of Ravensthorpe Copper Mines in securing former well known mines in the district. The company proposes to initially mill 5,000 tons per month. Production should start in 1957.

Dolomite.

Westralian Ores Pty. Ltd. obtained 171 tons from their mineral claims at Mount Magnet.

Felspar.

Australian Glass Manufacturers Pty. Ltd. continue to operate their Londonderry quarry and production for the year was 3,773 tons valued at £17,686.

An eight ton parcel was obtained from Balingup by V. C. Oma.

Fullers Earth.

Forty tons, valued at £201, were obtained from Marchagee.

Glass Sand.

Production from the Lake Gnangara deposit amounted to 7,343 tons valued at £5,154.

Glauconite.

Eighty-five tons of glauconite were recovered from the treatment of 515 tons of greensand obtained from the Gingin deposit.

Graphite.

A trial parcel of 5.10 tons assaying 24.7 per cent. C. was obtained from Munglinup and beneficiated at the School of Mines, Kalgoorlie. The 1.2 tons of concentrate obtained assayed 86 per cent. carbon.

Gypsum.

Plaster manufacturers obtained their supplies of raw material from Yellowdine, Lake Brown, Baandee, and Hines Hill. The value at works of the 27,121 tons mined was £20,928.

Iron Ore.

At Cockatoo Island, Australian Iron and Steel Ltd. had a comparatively quiet year. Production was reduced to 327,815 tons and the equipment was at no time working to capacity. Now that the sintering plant in New South Wales is in operation it is anticipated that production will increase to 1,000,000 tons per annum.

The Charcoal Iron and Steel industry at Wundowie obtained 19,854 tons of ore from the Koolyanobbing deposit. A crushing and screening plant was put into operation at Koolyanobbing during November.

Lead.

Production leapt during 1956 to 7,613 tons of concentrate as compared wih 1,416 tons in the previous year. This increased tonnage was brought about by the relatively stable and good prices offering. No new mines came into production.

Some further development work was commenced at the Ragged Hills lead mine in the Pilbara, so this mine should continue to operate whilst the market is favourable.

At Protheroe, which is the deepest operating lead mine in the State, results have not been encouraging despite extensive exploration by the company.

Magnesite.

Eight hundred and four tons were obtained from deposits at Bulong, Mount Hunt and Coolgardie.

Manganese.

Westralian Ores Pty. Ltd. mined 49,798 tons from the Horseshoe deposit. Most of this ore was railed to Geraldton from Meekatharra. A parcel of high grade ore amounting to 202 tons was railed to Guildford for sale to chemical manufacturers.

Production from the Mount Sydney deposits in the Pilbara amounted to 7,525 tons averaging 50.34 per cent. Mn.

During 1956 an intensive search for new manganese deposits was directed at an area along the Oakover and Davis Rivers.

Ochre.

From the Weld Range 369 tons of red and 75 tons of yellow ochre were obtained. The product was valued at £9 16s. per ton f.o.r. Cue.

Oil.

The two operating companies, W.A. Petroleum Pty. Ltd. and Associated Freney Oil Fields N.L., were unsuccessful in their quest for oil during the year. Some shows of gas and oil were obtained, but formation testing failed to disclose any concentration of commercial possibilities.

Pyrites.

Norseman Gold Mines railed 48,426 tons, with a sulphur content of 21,736 tons, to superphosphate works in the metropolitan area. Output was slightly below that recorded last year. The mine is still operating well below rated capacity.

Gold Mines of Kalgoorlie forwarded to works at Fremantle 12,543 tons of auriferous pyritic concentrate for use in acid manufacture and for recovery of the gold. The sulphur content of the concentrate was 4,568 tons.

Silver.

Silver as a by-product of Gold, Lead and Copper mining amounted to 217,247 fine ounces.

Talc.

Virtually all of the 4,456 tons produced came from Three Springs. Mining operations at Mt. Monger accounted for 77 tons of the State's output.

Tantalo-Columbite.

Production of these minerals was re-established following the sudden decline in the previous year. A little over 71 tons of concentrate valued at £127,664 were produced. Nearly two thirds of the output was from the Pilbara and the rest was obtained as a by-product of tin mining at Greenbushes.

Titanium (Ilmenite).

Perron Bros. obtained 3,293 tons of Ilmenite concentrate, valued at £15,150, from the Bunbury deposit. Late in the year the mine was sold to Cable (1956) Ltd., which company intends to increase production to about 2,000 tons per month.

Western Titanium at Capel will be producing early in the coming year.

Westralian Oil Ltd. have been testing deposits in the South-West with encouraging results.

Vermiculite.

One ton valued at £9 was produced at Bulong in the East Coolgardie Goldfield.

(Sgd.) J. K. N. LLOYD,
Assistant State Mining Engineer.

Appendix No. 1.

REPORT ON ACTIVITIES OF BOARD OF EXAMINERS FOR UNDERGROUND SUPERVISORS' AND MINE MANAGERS' CERTIFICATES FOR 1956.

School of Mines,
Kalgoorlie,
23rd January, 1957.

The Chairman, Board of Examiners for Mine Managers' and Underground Supervisors' Certificates, Mines Department, Perth.

I submit herewith the Annual Report on the work of the Board of Examiners for Mine Managers' and Underground Supervisors' Certificates for the year 1956.

Examination in Mining Law.—An examination in Mining Law was held on April 6th, 1956. The results being as follows:—

Number entered	9
Number passed	6
Number failed	2
Did not sit	1

The successful candidates were as follows:—

P. C. Dunn—Bullfinch.
R. G. Graham—Gwalia.
J. C. Lissiman—Coolgardie.
R. H. Poole—Coolgardie.
L. E. Quan—Norseman.
S. W. Silvester—Norseman.

A copy of the examination paper is attached.

Underground Supervisors' Examination:—An examination for Underground Supervisors' Certificates of Competency was held on September 3rd, 1956.

Forty-three candidates sat for the examination, which includes two taking sections only.

Entries were received from the following centres:—

Kalgoorlie District	27
Norseman	4
Coolgardie	1
Bullfinch	3
Marvel Loch	1
Gwalia	6
Wittenoom Gorge	1
Three Springs	1
Geraldton	1
Wilkitana (S.A.)	1
Marble Bar	1
Copperfield	1
	48

Five of the applications were refused, leaving 43 to sit for the examination. The results were as follows:—

Number passed	31
Number failed	12

The names of the successful candidates are as follows:—

G. J. Allen
K. C. Bailey.
R. J. Beavis.
W. A. Bextrum.
E. M. Biltoft.
A. D. Cragan.
T. B. Corboy.
H. G. Doust.
M. J. Fiora.
C. L. Gallop.
G. N. Gordon.
E. F. Graham.
R. G. Graham.
S. J. Harvey.
G. F. Hodgins.
G. A. Hinchliffe.
J. D. Hug.
P. C. Kenny.
R. C. Matson.
H. J. Messenger.
J. H. McLeod.
T. A. Parnham.
R. J. Russell.
H. A. Rymer.
S. Salinovich.
G. J. Schulz.
L. S. Seinor.
T. F. Simcock.
F. C. Simms.
A. S. Sofoulis.
R. J. Prince.

A copy of the examination paper is attached.

Two duplicate Underground Supervisors' Certificates of Competency were issued during the year.

D. A. Durant, whose application had been deferred pending completion of additional practical experience, was granted an Underground Supervisor's Certificate.

Mine Manager's Certificate of Competency.—Ten applications for Mine Managers' Certificates of Competency were received during the year. Six were approved, three deferred, and one refused.

The names of the successful applicants are as follows:—

G. K. McLellan.
L. E. Quan.
R. H. Poole.
R. G. Graham.
J. C. McDermott.
R. J. Agnew.

(Sgd.) G. M. LUMB,
Secretary, Board of Examiners.

MINES REGULATION ACT, 1946.

Examination for Mine Manager's Certificate of Competency.

MINING LAW.

April, 1956.

Time allowed—Three hours.

Attempt all questions from Section A. Attempt four questions from Section B.

Candidates should note:—

(a) The Mining Act and Regulations may be used at the examination, but *not* the Mines Regulation Act.

(b) In answering questions on the Mining Act candidates should summarise the requirements of the Act or the Regulations and should refer to the appropriate sections of the Act or of the Regulations by numbers—thus Act, Section 160, Regulation 150.

(c) Candidates are required to pass in both sections of the paper.

SECTION A.

(Mines Regulation Act).

Attempt all questions from this section.

1. What does the Mines Regulation Act require in respect of any ten of the following:—
   (a) Internal Combustion engines underground.
   (b) Underground Dams.
   (c) Underground Locomotive Drivers.
   (d) Ventilation—Standards of Purity.
   (e) Ventilation—Stoppings and Doors.
   (f) Return Airways.
   (g) Recirculation of Air.
   (h) Ladders in Shafts.
   (i) Rises in Mines.
   (j) Penthouses.
   (k) Men working alone.
   (l) Use of Explosives.
   (m) Winzes.
   (n) Inspection of Mine by Manager.
   40 marks.
2. (a) What action is necessary if the registered manager is absent from the mine for more than five days?
   (b) What action is necessary if the certificated manager is incapacitated?
   10 marks.
3. Who may make annual plans for submission to the Mines Department? What plans are required?
   10 Marks.

SECTION B.

(Mining Act).

Attempt four questions from this section. Do not attempt more than four questions from this section. Marks allowed are ten per question.

1. (a) What are the obligations of a Lessee regarding exploratory bore holes drilled on his property.
   (b) How would you peg and mark off a Gold Mining Lease of 18 acres—
      (i) in a newly found field,
      (ii) which is identical with a previously surveyed lease which has been forfeited?
2. (a) What is Private Land?
   (b) A miner desires to search for gold on private land. What must he first do?

3. (a) What are the differences, if any, between the following:—
   (i) Tailings Area.
   (ii) License to Treat Tailings?
   (b) Is a Miner's Right necessary for holding either one or both of the above (a) (i) or (a) (ii)?
   (c) If a Lease is to be surrendered what action must the Lessee take if he wishes to protect any tailings on the Lease?
4. (a) Under what conditions may a drain be constructed through a mining tenement?
   (b) Can a Lessee prevent water from an adjacent Lease being discharged through a natural channel on his own Lease?
   (c) A Lease may be declared void, cancelled, or forfeited. If this is done when is the land open for selection?
5. (a) When must labour conditions be complied with on:—
   (i) A Gold Mining Lease.
   (ii) A Mineral Lease.
   (iii) A Mineral Claim?
   (b) The approval of an application for a lease confers certain rights on the Lessee. What are these rights, and what, if any, are the differences between a Gold Mining Lease and a Mineral Lease?

Western Australia.

MINES REGULATION ACT, 1946.

Examination for Certificate of Competency as Underground Supervisor.

MINING.

September, 1956.

Time allowed: Three Hours. Answer six questions.

Note.—Read the Examination Paper Carefully. Answers must be written in ink.

Candidates should illustrate with sketches where possible.

1. An old prospecting shaft 200 feet deep is to be examined. Describe the gear you would use, precautions you would take, and how you would do the work.
2. (a) What are the essential features of a safe penthouse.
   (b) Where are the weakest points in a penthouse and how are they safeguarded.
3. You are a Shaft Foreman and have to instruct a new Platman as to his duties. What instructions would you give him?
4. Several patterns of a "burn cut" are at present used. Describe and sketch the full round you would bore in an 8 ft. x 8 ft. drive, using the "burn cut". Give reasons for using the method.
5. What safety precautions are essential in:—
   (a) operating a mechanical loader in a leading stope;
   (b) sinking a winze using an air hoist.
6. (a) Name three methods of stoping.
   (b) How many methods of timbering a level do you know and what are they?
   (c) Describe one method of timbering a level from which to commence a stope and give sketches showing at least one ore draw point. Explain under what conditions you would use this method.
7. An old prospecting shaft measures 6 feet by 4 feet cross section. At the 150 feet level a 7 feet by 4 feet drive extends 60 feet south from the shaft and 90 feet North from the shaft. A sump extends below the floor of the drive for pumping purposes. The workings are filled with water to within 30 feet of the shaft collar.
   (a) How many gallons of water will have to be removed so that the drive floor will be exposed?
   (b) What will be the total cost of unwatering to the required depth if it costs 14s. 6d. per thousand gallons to remove the water. Cost to nearest shilling.

   One cubic foot of water equals 6.25 gallons.

Western Australia.

MINES REGULATION ACT, 1946.

Examination for Certificate of Competency as Underground Supervisor.

MINING LAW.

September, 1956.

Time Allowed: Two Hours. Answer All Questions.

Note.—Read the Examination Paper Carefully. Answers must be written in ink.

What does the Mines Regulation Act and/or the Regulations made under that Act require regarding the following:—

1. Handling and distribution of detonators.
2. (a) In shaft sinking, winzing, and rising how many fuses may be lit at any one time?
   (b) How many may be lit when driving or cross cutting?
   (c) What is the minimum length for a master fuse?
3. Misfires.
4. A development end which is approaching a place likely to contain an accumulation of water.
5. Use of safety belts.
6. Signalling in winzes.
7. Aid to injured persons and first aid outfit.
8. Precautions to be taken when repairing shafts.
9. Stoppings and doors (ventilation).
10. Ventilation of development ends.
11. Who may take charge of a locomotive underground.
12. Boring in butts.
13. Men working alone.
14. Permanent ladders in shafts.
15. Men and material in same cage.

Index to State Mining Engineer's Annual Report for 1956

LIST OF TABLES.

DIVISION III

Report of the Superintendent of State Batteries

UNDER SECRETARY FOR MINES:

For the information of the Hon. Minister for Mines, I have the honour to submit my report on the operations of the State Batteries for the year ending 31st December, 1956.

CRUSHING GOLD ORES.

One 15 head, six 10 head, and ten 5 head mills crushed 35,740.50 tons of ore made up of 524 separate parcels, an average of 68.2 tons per parcel. The bullion produced amounted to 15,597 oz., which is estimated to contain 13,218 oz. of fine gold, equal to 7 dwts. 10 grs. of gold per ton of ore.

The cost of crushing, including administration was 62s. 9d. per ton, a rise of 8s. 11d. per ton compared with the previous year when 42,207.50 tons were crushed at a cost of 53s. 10d. per ton.

The average value of the ore after amalgamation, but before cyanidation was 3 dwts. 14 grs. Thus the average head value of the ore was 11 dwts., which is 7 grs. more than the previous year's average.

Values in this ore before cyanidation can be segregated as follows:—

	Tons.	Per cent.
Over 2 dwts. 8 grs. per ton	18,556	52·0
1 dwt. 18 grs. to 2 dwts. 8 grs. per ton	2,842·25	8·0
Under 1 dwt. 18 grs. per ton	13,598·25	38·0
Refractory	744	2·0
	35,740·50	100·0

CYANIDING.

Five plants treated 17,011 tons of tailings from amalgamation for a production of 2,822 fine ozs. of gold worth £44,148. The average content was 4 dwts. 12 grs. before cyanidation, while the residue after treatment averaged 1 dwt. 4 grs. The theoretical extraction was therefore 74 per cent. The actual extraction was 73 per cent.

The cost of cyaniding was 44s. 4d. per ton, an increase of 2s. 2d. per ton on the previous year, when 12,858 tons were treated at a cost of 42s. 2d. per ton.

ESTIMATED OVERALL RECOVERY.

Figures for estimated recovery are:—

	Content.	Per ton crushed.	Per cent.
	Fine oz.	dwts. grs.	
Head value	19,628	11 0	100·0
Amalgamation Recovery	13,218	7 10	67·3
Cyanidation Recovery	2,822	1 14	14·4
Total Recovery	16,040	9 0	81·7

Treatment of Ores other than Gold.
Lead Ores.

During the year the Northampton State Battery crushed 3,731.75 tons of lead ore with an estimated average content of 14.61 per cent. lead. There were 21 separate parcels, giving an average of 177.7 tons of ore per parcel.

A total of 621.53 tons of concentrates were produced. The concentrates averaged 78.3 per cent. lead giving an estimated content of 486.71 tons of lead in concentrates.

3,110.26 tons of tailings were discarded. These had an average content of 1.89 per cent. lead, giving a total of 58.63 tons of lead discarded in tailings.

The recovery of lead in the concentrates was 89.2 per cent. of the lead in the ore delivered to the plant.

The cost of operating the Northampton State Battery, including administration, was £9,520 17s. 4d., being 51s. 3d. per ton of ore crushed. Revenue received was £5,893 4s., 31s. 8d. per ton. The corresponding figures for 1955, when 3,648.50 tons of ore was crushed, were operating cost £12,164 4s., 75s. 8d. per ton, and revenue £4,981 18s., 31s. per ton.

Sales of lead concentrates from the Northampton State Battery for the year were valued at £54,228.

Columbite Ore.

Ninety-five tons of columbite ore was crushed at the Coolgardie State Battery, giving 600 lb. of columbite concentrates.

Scheelite Ore.

Three tons of scheelite ore was crushed at the Nullagine Battery, giving 1.50 tons of concentrate. This concentrate was retreated at the Coolgardie Battery, giving 7 cwts. of concentrates.

VALUE OF PRODUCTION.

The estimated value of production from the State Batteries since their inception, excluding the value of gold tax paid to the Commonwealth, is:—

GOLD.

	1956.	Grand Total.
	£	£
Par production—		
Crushing	56,150	8,389,484
Cyanidation	11,988	2,078,956
Gold Premium—		
Crushing	150,394	4,373,195
Cyanidation	32,107	1,294,395
Open Market Premium—		
Crushing	405	29,237
Cyanidation	86	10,025
Total Gold Production	£251,130	£16,175,292

OTHER ORES REALISED.

Tin—		
Ores		94,005
Residues		572
Tungsten Concentrates		18,712
Agricultural Copper Ore		2,648
Lead Concentrates	54,228	117,148
Total Other Ores	54,228	233,085
Grand Total	£305,358	£16,408,377

FINANCIAL.

	Tons.	Expenditure.	Receipts.	Loss.
		£	£	£
Crushing—				
Gold Mills	35,740·50	112,124	17,744	94,380
Northampton	3,731·75	9,521	5,893	3,628
Cyaniding	17,011	37,696	18,697	18,999
		£159,341	£42,334	£117,007

The loss of £117,007 is an increase of £3,851 on the previous year. It does not include depreciation and interest charges.

Capital expenditure, all from General Loan Fund, was incurred as below:—

	£ s. d.
Kalgoorlie Cyanide Plant	2,037 12 11
Conversion of Ora Banda Engine	1,383 14 2
Manager's Residence, Laverton	3,073 0 0
Alterations to Kalgoorlie Bins	945 1 10
Portable Welding Equipment	439 15 2
Curvilinear Table, Marvel Loch	498 8 4
	£8,377 12 5

Cartage Subsidies.

	Tons.	Cost.
Ore carted to State Plants	12,679	4,847
Ore carted to Private Plants	70	44
	12,749	£4,891

Comparative figures for the last three years are:—

—	State Plants.				Private Plants.		
	Tons Crushed	Tons Subsidised.	Per-cent. Subsidised.	Cost.	Tons Subsidised.	Cost.	Total Cost.
			%	£		£	£
1954	34,600	7,682	22·2	2,759	49	31	2,790
1955	42,207	8,739	20·7	4,150	238	136	4,286
1956	35,740	12,679	35·5	4,847	70	44	4,891

ADMINISTRATION.

Expenditure amount to £16,668 12s. 3d., equivalent to 5s. 11d. per ton of ore crushed and cyanided, compared with an expenditure of £14,843 11s. 5d., 5s. 5d. per ton, for 1955.

	1955.	1956.
	£ s. d.	£ s. d.
Salaries	8,920 19 5	10,079 17 0
Pay Roll Tax	2,296 19 10	2,417 14 9
Workers' Compensation	2,244 17 9	1,907 5 10
Travelling and Inspection	1,261 1 5	1,841 7 8
Sundries	119 13 0	422 7 0
	£14,843 11 5	£16,668 12 3

STAFF.

During the year, Manager Mack was seconded to the Northern Territory, where he has taken charge of the Government Batteries. Mr. Mack has been with the State Batteries for over twenty years, and his going will be a loss to the State, but his ability and experience will be of great assistance to the Northern Territory batteries.

Manager Sturman was transferred from Cue-Meekatharra to Northampton and Manager Young from Ora Banda to Cue.

Leading Hand Clayden is acting manager at Ora Banda.

Manager Clemesha was transferred from Marble Bar to Marvel Loch, and Manager Steel from Lake Darlot to Marble Bar.

I wish to thank the staff at Head Office and in the field for their efficient and willing service during the year.

GENERAL REMARKS.

The 35,740.50 tons of gold ore crushed in 1956 was a decrease of 6,467 tons from the 42,207.50 tons crushed in 1955. The reduction in the tons crushed was due to low prospecting activity early in the year. From May to the end of the year there was much more ore for crushing, and present indications are that a considerably higher tonnage will be crushed in 1957. The Menzies Battery which started operating at the beginning of 1955 was again kept in almost continuous operation during 1956, crushing 3,694 tons, this amount being exceeded by only two other State batteries, Kalgoorlie and Laverton.

Although the gross expenditure on gold milling was slightly lower, £112,124 compared with £112,987 in 1955, the lower tonnage crushed resulted in an increase from 53s. 10d. to 62s. 9d. per ton crushed. Maintenance of plants was again high, and rises in wages and particularly salaries contributed considerably to the increased cost per ton.

Seventeen thousand and eleven tons of sands were cyanided compared with 12,858 tons in 1955. Although there was a big increase in tonnage treated, increased operating costs caused an increase from 42s. 2d. per ton in 1955 to 44s. 4d. per ton in 1956. It has become more difficult to obtain men willing to hand shovel tailings, and most of the tailings treated were handled by contractors using their own front end loaders and trucks. The new cyanide plant at Kalgoorlie was completed at the end of the year. This plant consists of large steel rectangular vats, filled and emptied by an electrically driven scraper. This obviates almost all hand shovelling and should give appreciably lower costs. A similar plant will be constructed at Menzies during 1957.

The Northampton lead battery operated efficiently during the year. 3,731.75 tons of ore were treated, almost the same as the 3,648.50 tons treated in the previous year. Mainly due to improvements made to the plant during 1955, operating costs decreased from 75s. 8d. per ton in 1955 to 51s. 3d. per ton in 1956.

(Sgd.) K. M. PATERSON,
Superintendent of State Batteries.

SCHEDULE 1.

Return showing tons crushed, Gold yield by Amalgamation, average per ton in Shillings, and Total value without Premium for the Year ended 31st December, 1956.

Battery.	Tons Crushed.	Gold Yield Bullion oz.	Value per ton in shillings.	Total Value without premium.
				£ s. d.
Bamboo Creek	646·50	479·10	53·36	1,724 15 2
Boogardie	1,581·50	357·95	16·30	1,288 12 5
Coolgardie	2,727·25	1,169·75	30·88	4,210 2 0
Cue	1,294	980·50	54·56	3,529 16 0
Kalgoorlie	8,755·75	2,223·35	18·28	8,004 1 3
Lake Darlot	54	51·10	68·14	183 19 2
Laverton	6,309·50	608·60	6·94	2,190 19 3
Marble Bar	559·25	150·95	19·42	543 5 0
Marvel Loch	1,894	1,340·35	50·96	4,825 5 2
Meekatharra	1,038·50	583·52	40·46	2,100 13 4
Menzies	3,694·25	2,163·55	42·16	7,788 15 7
Norseman	170	39·10	16·56	140 15 2
Nullagine	427	244·25	41·18	879 6 0
Ora Banda	3,192·25	1,776·15	39·50	6,394 2 10
Peak Hill	44	17·70	28·96	63 14 5
Sandstone	312·25	145·10	33·46	522 7 3
Yarri	3,040·50	3,265·80	77·34	11,756 17 8
	35,740·50	15,596·82	31·38	56,147 7 8

SCHEDULE No. 2.

Number of Parcels Treated, Tons Crushed and Head Value for the Year ended 31st December, 1956.

No. of Parcels Treated	Battery.	Tons Crushed.	Yield by Amalgamation (Bullion).	Yield by Amalgamation (Fine Gold).	Tailings Gross @ 100%	Total Contents of Ore (Fine Gold).	Average per Ton (Fine Gold).	Gross Value per Ton fine gold at £4 4s. 11½d. per Ounce.
			Ozs. Dwts.	Ozs. Dwts.	Ozs. Dwts.	Ozs. Dwts.	Dwts. Grs.	£ s. d.
12	Bamboo Creek	646·50	479 2	406 1	240 17	646 18	20 0	4 4 11
29	Boogardie	1,581·50	357 19	303 7	329 13	633 0	8 0	1 14 0
63	Coolgardie	2,727·25	1,169 15	991 7	347 12	1,338 19	9 22	2 2 1
44	Cue	1,294	980 10	830 19	389 4	1,220 3	18 20	4 0 0
109	Kalgoorlie	8,755·75	2,223 7	1,884 6	954 6	2,838 12	6 12	1 7 8
3	Lake Darlot	54	51 2	43 6	6 5	49 11	18 8	3 17 11
31	Laverton	6,309·50	608 12	515 16	1,548 8	2,064 4	6 13	1 7 9
17	Marble Bar	559·25	150 19	127 19	165 10	293 9	10 12	2 4 7
26	Marvel Loch	1,894	1,340 7	1,135 19	377 10	1,513 9	15 23	3 7 10
13	Meekatharra	1,038·50	583 10	494 11	164 9	659 0	12 17	2 14 0
55	Menzies	3,694·25	2,163 11	1,833 12	754 19	2,588 11	14 0	2 19 6
8	Norseman	170	39 2	33 3	20 15	53 18	6 8	1 6 11
9	Nullagine	427	244 5	207 0	60 15	267 15	12 13	2 13 3
68	Ora Banda	3,192·25	1,776 3	1,505 6	760 8	2,265 14	14 3	3 0 0
1	Peak Hill	44	17 14	15 0	6 12	21 12	9 19	2 1 7
7	Sandstone	312·25	145 2	122 19	38 8	161 7	10 8	2 3 11
29	Yarri	3,040·50	3,265 17	2,767 15	244 2	3,011 17	19 19	4 4 1
524		35,740·50	15,596 17	13,218 6	6,409 13	19,627 19	11 0	2 6 9

Average Tons per Parcel	68·21.
Average Yield by Amalgamation per ton (fine gold)	7 dwts. 9·53 grs.
Average Value by Amalgamation per ton (fine gold)	£1 11s. 5d. Australian £5 1s.
Average Head Value of Tailings per ton (fine gold)	3 dwt. 14 grs.
Average Value of Tailings per ton (fine gold)	15s. 3d. Australian £2 16s.

SCHEDULE No. 3.

Segregation of Tailings Produced according to Value for the Year ended 31st December, 1956.

Battery.	Payable.		2 dwts. 8 grains to 1 dwt. 18 grains.		1 dwt. 18 grains and under.		Refractory.		Total.	
	Tons.	Ozs. Dwts.	Tons.	Ozs. Dwts.	Tons.	Ozs. Dwts.	Tons.	Ozs. Dwts.	Tons.	Ozs. Dwts.
Bamboo Creek	646·50	240 17	....	....	....	....	....	....	646·50	240 17
Boogardie	1,024·50	273 3	65	6 15	334	13 18	158	35 17	1,581·50	329 13
Coolgardie	658·75	203 6	119·75	12 14	1,948·75	131 12	....	....	2,727·25	347 12
Cue	601·75	282 12	398	39 18	245·50	18 3	48·75	48 11	1,294	389 4
Kalgoorlie	1,801·25	599 1	346·50	34 14	6,608	320 11	....	....	8,755·75	954 6
Lake Darlot	18	3 12	18	2	18	 13	....	....	54	6 5
Laverton	6,254·50	1,545 2	....	....	55	3 6	....	....	6,309·50	1,548 8
Marble Bar	365·75	149 17	58	5 6	23	1 3	112·50	9 4	559·25	165 10
Marvel Loch	1,489	346 15	32	2 17	287	18 6	86	9 12	1,894	377 10
Meekatharra	631	103 3	14·50	1 13	57·25	3 14	335·75	55 19	1,038·50	164 9
Menzies	2,418·75	635 3	969·75	96 12	305·75	23 4	....	....	3,694·25	754 19
Norseman	70	14 17	20	2 3	80	3 15	....	....	170	20 15
Nullagine	388	58 3	12	1 4	24	1 8	3	....	427	60 15
Ora Banda	1,541·50	675 2	132·75	12 14	1,518	72 12	....	....	3,192·25	760 8
Peak Hill	44	6 12	....	....	....	....	....	....	44	6 12
Sandstone	137·25	27 12	....	....	175	10 16	....	....	312·25	38 8
Yarri	465·50	50 7	656	63 15	1,919	130	....	....	3,040·50	244 2
	18,556	5,215 4	2,842·25	282 5	13,598·25	753 1	744	159 3	35,740·50	6,409 13

SCHEDULE No. 4

Details of Extraction—Tailings Treatment, 1956.

Battery.	Tons Treated.	Head Value.	Contents.	Tail Value.	Contents.	Recovery.	Call.	Recovery.	Shortage.	Surplus.
		Dwts. Grs.	Dwts.	Dwts. Grs.	Dwts.	%	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Coolgardie	3,722	2 22	10,900	17	2,632	76	1,759 4 7	1,836 19 1	....	77 14 6
Cue	1,344	5 16	7,620	1 12	2,005	74	1,192 11 6	1,164 7 9	28 3 9	....
Laverton	8,168	5 0	40,900	1 11	11,774	71	6,216 2 7	6,118 8 0	97 14 7	....
Marvel Loch	2,385	4 17	11,200	22	2,044	80	1,899 13 0	1,803 4 8	96 8 4	....
Meekatharra	1,392	4 9	6,140	1 2	1,534	75	977 6 3	984 12 3	....	7 6 0
	17,011	4 12	76,760	1 4	19,989	74	12,044 17 11	11,907 11 9	222 6 8	85 0 6

Net Shortage : £137 6s. 2d.

Head Value .... 4 dwts. 12 grains.
Tail Value .... 1 dwt. 4 grains.
Theoretical Recovery .... 74%.
Actual Recovery .... 73%.

SCHEDULE No. 5.

Direct Purchase of Tailings, Year ended 31*st December,* 1956.

Battery.	Tons of Tailings Purchased.	Amount Paid at £4 4s. 11½d. per oz.	Amount Paid Account of Premium.
		£ s. d.	£ s. d.
Bamboo Creek	307·50	325 13 11	747 13 11
Boogardie	921·75	408 8 6	937 12 2
Coolgardie	568·50	265 5 5	808 9 1
Cue	526·75	364 17 4	1,115 10 3
Kalgoorlie	1,434·75	1,007 13 0	2,312 14 5
Lake Darlot	129·50	17 8 8	40 0 6
Laverton	5,163·50	2,172 14 11	6,257 18 4
Marble Bar	307·75	318 0 3	730 0 7
Marvel Loch	791·25	401 18 2	1,047 6 8
Meekatharra	149·50	21 0 6	224 8 11
Menzies	1,876·25	1,197 11 3	2,749 3 11
Norseman	63·25	19 6 6	44 7 3
Nullagine	352·50	37 14 7	86 12 0
Ora Banda	1,561	1,425 19 9	3,307 17 1
Paynes Find	....	....	....
Peak Hill	39·50	4 3 11	9 12 8
Sandstone	122	20 1 9	46 2 2
Yarri	352·25	85 1 5	195 5 11
	14,667·50	8,092 19 10	20,660 15 10

SCHEDULE No. 6.

Cyanide Yield, 1956.

Battery.	Tons.	Fine ozs.	Value.	Premium.	Total.
			£	£	£
Coolgardie	3,722	432·45	1,836·951	4,920·160	6,757·111
Cue	1,344	279·79	1,188·498	3,183·284	4,371·782
Kalgoorlie	....	11·68	49·608	132·870	182·478
Laverton	8,168	1,433·76	6,137·965	16,312·554	22,450·519
Marvel Loch	2,385	424·52	1,803·233	4,829·853	6,633·086
Meekatharra	1,392	231·81	984·611	2,637·223	3,621·834
Ora Banda	....	8·39	35·628	95·429	131·057
	17,011	2,822·40	12,036·494	32,111·373	44,147·867

SCHEDULE No. 7.

Statement of Receipts and Expenditure for Year ended 31st December, 1956.

MILLING.

Batteries.	Tons Crushed	Expenditure.									Receipts.		Profit.	Loss.
		Management and Supervision.	Wages.	Stores.	Total Working Expenditure.	Cost per Ton.	Repairs and Renewals.	Sundries.	Gross Expenditure.	Cost per Ton.	Receipts.	per Ton.		
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	s. d.	£ s. d.	£ s. d.	£ s. d.	s. d.	£ s. d.	s. d.	£ s. d.	£ s. d.
Bamboo Creek	646·50	519 5 6	1,302 3 5	248 16 6	2,070 5 5	64 7	278 2 11	441 8 0	2,789 16 4	86 4	303 10 8	9 5	....	2,486 5 8
Boogardie	1,581·50	1,502 11 4	1,862 11 4	1,018 16 2	4,383 18 10	55 5	1,118 7 6	1,245 6 9	6,747 13 1	85 10	827 4 7	10 6	....	5,920 8 6
Coolgardie	2,727·25	1,261 18 9	2,048 7 8	1,907 14 2	5,218 0 7	38 3	3,359 17 4	837 13 7	9,415 11 6	69 1	1,566 15 6	11 6	....	7,848 16 0
Cue	1,294	1,209 5 6	1,742 15 2	762 19 4	3,715 0 0	58 0	1,572 8 8	884 15 1	6,172 3 9	95 4	977 14 8	15 1	....	5,194 9 1
Kalgoorlie	8,755·75	2,220 8 1	8,148 11 7	5,308 14 4	15,677 14 0	35 10	2,116 7 8	2,853 2 9	20,647 4 5	47 3	3,432 0 11	7 10	....	17,215 3 6
Lake Darlot....	54	406 7 8	187 9 10	85 1 2	678 18 8	251 5	251 8 11	115 0 3	1,045 7 10	387 0	48 7 0	17 9	....	997 0 10
Laverton	6,309·50	1,838 16 10	4,628 18 9	2,644 11 6	9,112 7 1	27 11	3,152 19 8	2,162 8 4	14,427 15 1	45 8	3,472 6 11	11 0	....	10,955 8 2
Linden	....	....	....	....	....	....	....	....	....	....	1 11 0	....	1 11 0	....
Marble Bar	559·25	1,327 6 3	939 16 3	991 5 0	3,258 7 6	116 6	802 17 9	907 12 2	4,968 17 5	177 8	452 19 0	16 4	....	4,515 18 5
Marvel Loch	1,894	1,447 2 7	2,459 17 1	849 17 11	4,756 17 7	50 3	2,315 2 10	1,030 9 1	8,102 9 6	85 6	1,013 4 0	10 8	....	7,089 5 6
Meekatharra....	1,038·50	708 17 5	1,195 4 11	893 7 7	2,797 9 11	54 3	1,091 5 9	554 19 11	4,443 15 7	83 8	543 1 6	10 5	....	3,900 14 1
Menzies	3,694·25	1,588 16 8	2,547 2 5	1,054 16 5	5,190 15 6	28 1	270 17 5	1,652 12 9	7,114 5 8	38 6	1,482 3 3	8 1	....	5,632 2 5
Mt. Ida	....	....	....	....	....	....	64 11 1	44 1 6	108 12 7	....	....	....	....	108 12 7
Norseman	170	84 0 2	323 7 3	181 14 6	589 1 11	69 3	....	158 1 7	747 3 6	87 10	91 2 5	10 8	....	656 1 1
Nullagine	427	290 13 10	1,096 2 7	355 4 1	1,742 0 6	81 6	224 11 11	563 19 2	2,530 11 7	118 6	237 6 5	11 1	....	2,293 5 2
Ora Banda	3,192·25	1,159 11 11	3,793 17 6	2,029 19 8	6,983 9 1	43 9	1,866 17 9	1,593 8 4	10,443 15 2	65 5	1,474 10 7	9 3	....	8,969 4 7
Paynes Find	....	....	141 0 0	....	141 0 0	....	....	....	141 0 0	....	....	....	....	141 0 0
Peak Hill	44	21 11 3	136 14 5	16 8 5	174 14 1	79 5	42 0 2	46 18 3	263 12 6	79 6	13 12 0	5 11	....	250 0 6
Sandstone	312·25	192 7 1	472 19 4	333 7 11	998 14 4	63 11	447 13 10	228 12 0	1,675 0 2	107 8	88 11 9	5 8	....	1,586 8 5
Yarri	3,040·50	1,996 18 8	4,715 4 11	1,260 2 11	7,972 6 6	52 5	966 7 3	1,400 5 6	10,338 19 3	68 0	1,714 1 6	11 3	....	8,624 17 9
Head Office	....	....	....	....	....	....	....	....	....	....	3 10 8	....	3 10 8	....
	35,740·50	17,775 19 6	37,742 4 5	19,942 17 7	75,461 1 6	42 3	19,941 18 5	16,720 15 0	112,123 14 11	62 9	17,743 14 4	10 0	5 1 8	94,385 2 3
Northampton	3,731·75	2,595 12 5	2,855 8 9	1,353 0 6	6,804 1 8	36 6	1,377 12 11	1,339 2 9	9,520 17 4	51 3	5,893 4 0	31 8	....	3,627 13 4
	39,472·25	20,371 11 11	40,597 13 2	21,295 18 1	82,265 3 2	41 8	21,319 11 4	18,059 17 9	121,644 12 3	61 8	23,636 18 4	11 11	5 1 8	98,012 15 7
Net Loss	....	....	....	....	....	....	....	....	....	....	....	....	....	98,007 13 11

SCHEDULE 8.

Statement of Receipts and Expenditure for Year ended 31st December, 1956

CYANIDING.

Battery.	Tons Treated.	Expenditure.									Receipts.		Profit.	Loss.
		Management and Supervision.	Wages.	Stores.	Total Working Expenditure.	Cost per Ton.	Repairs and Renewals.	Sundries.	Gross Expenditure.	Cost per Ton.	Receipts.	per Ton.		
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	s. d.	£ s. d.	£ s. d.	£ s. d.	s. d.	£ s. d.	s. d.		£ s. d.
Bamboo Creek	....	....	....	....	....	....	....	1 6 8	1 6 8	....	....	....	....	1 6 8
Boogardie	....	42 14 11	8 15 4	306 5 8	357 15 11	....	6 10 9	68 11 0	432 17 8	....	....	....	....	432 17 8
Coolgardie	3,722	735 7 5	3,255 7 7	1,378 7 5	5,369 2 5	26 4	202 14 4	1,656 1 11	7,227 18 8	38 10	4,768 12 8	25 8	....	2,459 6 0
Cue	1,344	383 0 11	642 4 9	440 13 6	1,465 19 2	21 9	556 18 3	1,009 12 5	3,032 9 10	45 1	1,632 7 5	24 4	....	1,400 2 5
Kalgoorlie	....	1,498 12 8	2,358 12 0	1,171 16 0	5,029 0 8	....	564 4 0	611 16 6	6,205 1 2	....	....	....	....	6,205 1 2
Laverton	8,168	761 18 3	6,344 0 5	2,466 2 11	9,572 1 7	23 4	243 0 2	2,742 16 10	12,557 18 7	30 9	8,547 11 9	20 11	....	4,010 6 10
Marble Bar	....	41 2 4	80 19 1	29 6 3	151 7 8	....	....	25 16 7	177 4 3	....	....	....	....	177 4 3
Marvel Loch	2,385	513 14 9	1,417 3 1	689 10 9	2,620 8 7	21 11	711 2 4	975 16 4	4,307 7 3	36 6	3,843 17 8	31 5	....	463 9 7
Meekatharra....	1,392	294 17 11	1,088 13 6	531 3 3	1,914 14 8	27 6	....	998 19 8	2,913 14 4	41 10	1,901 5 1	27 3	....	1,012 9 3
Ora Banda	....	25 5 3	8 0 6	109 0 10	142 6 7	....	....	521 16 6	664 3 1	....	43 9 5	....	....	620 13 8
Peak Hill	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Sandstone	....	....	....	20 8 8	20 8 8	....	....	120 4 3	140 12 11	....	....	....	....	140 12 11
Yarri	....	....	....	....	....	....	....	35 12 8	35 12 8	....	....	....	....	35 12 8
	17,011	4,296 14 5	15,203 16 3	7,142 15 3	26,643 5 11	31 4	2,284 9 10	8,768 11 4	37,696 7 1	44 4	20,737 4 0	24 4½	....	16,959 3 1
Interest Paid to Treasury....	....	....	....	....	....	....	....	....	....	....	2,040 0 0	....	....	2,040 0 0
											18,697 4 3	....	....	18,999 3 1
Net Loss	....	....	....	....	....	....	....	....	....	....	....	....	....	18,999 3 1

STATE BATTERIES.

Trading and Profit and Loss Account for the Year ended 31st December, 1956.

1955		1956	
£		£	£
69,208	Trading Costs— Wages	80,470	
34,694	Stores	28,439	
26,670	Repairs, Renewals and Battery Spares	23,604	
21,695	General Expenses and Administration	26,828	
152,267			159,341
39,111	Earnings— Milling and Cyaniding Charges		42,334
113,156	Operating Loss for the Year		117,007
	Other Charges—		
19,298	Interest on Capital	20,855	
12,550	Depreciation	12,803	
1,967	Superannuation—Employers Share	1,980	
33,815			35,638
£146,971	Total Loss for the Year		£152,645

STATE BATTERIES.

Balance Sheet as at 31st December, 1956.

31st December, 1955	Funds Employed.	31st December, 1956	
£	Capital—	£	£
530,449	Provided from General Loan Fund	538,705	
137,613	Provided from Consolidated Revenue Fund	137,495	
668,062			676,200
	Reserves—		
28,622	Commonwealth Grant—Assistance to Goldmining Industry	28,622	
13,786	Commonwealth Grant—Assistance to Metaliferous Mining	13,786	
42,408			42,408
	Liability to Treasurer—		
858,498	Interest on Capital		879,353
	Other Funds—		
675,562	Provided from Consolidated Revenue Fund (Excess of payments over collections)		794,605
2,244,530			2,392,566
	Deduct—		
	Profit and Loss :		
1,914,614	Loss at commencement of year	2,061,585	
146,971	Loss for year	152,645	
2,061,585	Total Loss from Inception		2,214,230
£182,945			£178,336
	Employment of Funds.		
	Fixed Assets—		
662,470	Plant, Buildings and Equipment	670,609	
551,782	*Less* Depreciation	564,586	
110,688			106,023
	Current Assets—		
3,305	Debtors	4,578	
40,674	Stores	44,721	
3,623	Battery Spares	1,332	
	Purchase of Tailings—		
10,422	Treasury Trust Account	3,669	
41,572	Tailings not Treated	47,786	
6,400	Estimated Gold Premium	7,310	
105,996			109,396
216,684	Total Assets		215,419
	Deduct—		
	Current Liabilities :		
7,514	Creditors	8,506	
15,831	Liability to Treasurer (Superannuation—Employer's Share)	17,812	
	Purchase of Tailings—		
3,994	Creditors	3,455	
6,400	Estimated Premiums Due	7,310	
33,739			37,083
£182,945			£178,336

DIVISION IV

Annual Progress Report of the Geological Survey Branch of the Mines Department for the Year 1956

CONTENTS

CONTENTS—*continued*

NOTE.—*Owing to a change in the Mines Department's publication policy, the reports listed above do not appear with this Annual Report. The arrangement is that they will appear as a Geological Survey bulletin under the title of "Miscellaneous Bulletin."*

DIVISION IV

Annual Progress Report of the Geological Survey Branch of the Mines Department for the year 1956

The Under Secretary for Mines,

I have the honour to submit, for the information of the Honourable the Minister for Mines, my report on the operations and progress of the Geological Survey for the year ended 31st December, 1956.

STAFF.

Strength as at 31st December, 1956:—

Professional—

Ellis, H. A., B.Sc., A.O.S.M.	Government Geologist		
Berliat, K., D.Sc.	Senior Geologist		
Sofoulis, J., B.Sc.	Geologist, Grade 1		
de la Hunty, L. E., B.Sc.	Do.	}	8
Low, G. H., B.Sc.	Do.		
Noldart, A. J., B.Sc.	Do.		
Duggan, J. W., B.Sc.	Geologist, Grade 2		
Wyatt, J. D., B.A.	Do.		
Connolly, R. R.	Trainee Geologist		1

Clerical—

Martin, T. J.	Clerk		
Samuel, E. J.	Junior Clerk	}	3
White, S. V. G.	Typiste		

Laboratory—

Fimmell, L. H.	Laboratory Technician	1

Promotions, Resignations, Appointments.

Mr. J. D. Wyatt, B.A., was appointed to the Professional Staff as Geologist, Grade 2, and commenced duties on 9th January, 1956.

Mr. J. W. Duggan, B.Sc., was appointed to the Professional Staff as Geologist, Grade 2, and commenced duties on 23rd January, 1956.

Mr. J. N. Clift was transferred to the Mines Department Drafting Office as a Cadet on 20th February, 1956, and was replaced by Mr. E. J. Samuel as Junior Clerk on this day.

Professional Staff.

The approved establishment for professional officers as at 31st December, 1956, is as follows:—

Government Geologist	H. A. Ellis
Senior Geologist	K. Berliat
Geologist, Grade 1	J. Sofoulis
Do.	L. E. de la Hunty
Do.	G. H. Low
Do.	A. J. Noldart
Geologist, Grade 2	J. W. Duggan
Do.	J. D. Wyatt
Do.	*Vacant*
Do.	*Vacant*

This year again saw no resignations of professional officers, and efforts to fill existing vacancies gave two new appointments.

The following tabulated statement shows the relation between the area of the State and the availability of geologists during the year:—

Period.	No. of Geologists available including Government Geologist.	Area of State (sq. miles).	Square Miles per Geologist.	Population of State.
Jan.-Dec., 1956	8	975,920	121,990	680,686

Activities of Professional Officers.

H. A. Ellis, Government Geologist—

In addition to Head-office duties, the following field work was undertaken:—

Places Visited.	Purpose of Visit or Investigation.	Month.
Edward's Find	Diamond Drilling—Gold	Jan.
Day Dawn-Cue	Diamond Drilling—Gold	Feb.
Edwards' Find	Diamond Drilling—Gold	April
Edwards' Find	Diamond Drilling—Gold	May
Edwards' Find	Diamond Drilling—Gold	June
Marble Bar	Pilbara Regional Survey	July
Exmouth Gulf	Oil Permit Area	
Kalgoorlie	Diamond Drilling—Gold	Sept.
Coolgardie	Diamond Drilling—Gold	
Torbay Area	Beach Sands	
Bonnievale	Diamond Drilling—Gold	Oct.
Coolgardie	Locating Drill Sites	
Day Dawn-Cue	Diamond Drilling—Gold	Nov.
Bonnievale	Diamond Drilling—Gold	

K. Berliat, Senior Geologist—

Jan.-Dec.—Iron Survey of the State.

J. Sofoulis, Geologist Grade 1—

Jan.-March—Copper Survey and Drilling Supervision—Pilbara Goldfield.

April-June—Copper Survey and Drilling Supervision—Murchison Goldfield.

July-Sept.—Copper Survey and Drilling Supervision—Pilbara Goldfield.

Oct.-Dec.—Long Service Leave.

L. E. de la Hunty, Geologist, Grade 1

Jan.-March—Manganese Survey and Drilling Supervision—Murchison Goldfield.

April-June—Manganese Survey and Drilling Supervision—Pilbara Goldfield.

July—Manganese Investigations.

Aug.—Water Supply Investigations—Wiluna Area.

Sept.-December—Manganese and Drilling Supervision—Pilbara Goldfield.

G. H. Low, Geologist, Grade 1—

Jan.—Sedimentary Area Investigation—State Geological Map.

Feb.-March—Collie Mineral Field Bulletin compilation.

April-June—Supervision of Drilling at Collie.

July-Nov.—Supervision of Drilling at Busselton—Abba River.

December.—Report writing.

A. J. Noldart, Geologist, Grade 1—

Jan.-March—Drilling Supervision—Murchison Goldfield.

April-Nov.—Regional Survey—Pilbara Goldfield.

Dec.—Progress Report writing.

J. W. Duggan, Geologist, Grade 2—

Jan.-Feb.—Drilling Supervision—Yilgarn Goldfield.

March-Dec.—Drilling Supervision—Murchison Goldfield.

J. D. Wyatt, Geologist, Grade 2—

Jan.-March—Office and Preparation for Regional Survey—Pilbara Goldfield.

April-Nov.—Regional Survey—Pilbara Goldfield.

Dec.—Progress Report writing.

R. R. Connolly, Trainee Geologist—

Jan.-Dec.—Second and Final Year—Training.

FIELD WORK.

Major Field Work Completed during the Year and in Progress as at 31st December, 1956.

(1) Completion of Collie Coal Field Exploratory Drilling.

(2) Completion of Exploratory Diamond Drilling of "Sunshine Reward Amalgamated" G.M., Edwards' Find, Yilgarn G.F.

(3) Completion of Exploratory Diamond Drilling on Company held Gold Mining Leases at Mt. Magnet, Murchison G.F.

(4) Completion of Drilling Programme to test Abandoned Gold Shows, Cue District, Murchison G.F.

(5) Continuation of the Deep Drilling of the "Great Fingall" G.M., after a successful and promising intersection of this reef had been made.

(6) Continuation of Exploratory Drilling of the Bamboo Creek Centre, Pilbara G.F., following very promising results.

(7) A Regional Survey of an area around Marble Bar and Nullagine, Pilbara G.F., was commenced.

(8) Continuation of the Iron Ore Survey of the State.

(9) Continuation of the Copper Reserves Survey of the State.

(10) Continuation of the Manganese-Chromite Survey of the State.

(11) Exploratory Diamond Drilling of Abandoned Gold Shows was commenced in the Coolgardie G.F.

(12) An Underground Exploratory Drilling Programme was commenced in conjunction with the owner of the "Comet" G.M., Marble Bar, Pilbara G.F.

Field Work for 1957.

(1) Continuation and completion of the Regional Survey of an area around Marble Bar and Nullagine, Pilbara G.F.

(2) Continuation of the Iron Ore Survey of the State.

(3) Continuation of the Copper Resources Survey of the State.

(4) Continuation of the Manganese-Chromite Survey of the State.

(5) Continuation of the Deep Drilling of the "Great Fingall" G.M.

(6) Continuation of Exploratory Diamond Drilling, Pilbara G.F.

(7) Continuation of Exploratory Diamond Drilling, Coolgardie G.F.

(8) An Exploratory Drilling Programme, Sandstone, East Murchison G.F.

(9) An Exploratory Drilling Programme, Peak Hill, Peak Hill G.F.

TRANSPORT.

Tabulated details of transport at present in use by the Geological Survey are as follows:—

Vehicle W.A.G.	Make and Type	Load cwt.	Mileage as at 31/12/56	Mileage for 1956	Date Vehicle Purchased	Remarks
909	Willys Jeep	5	36,640	9,974	1953 (new)	
1194	Ford Utility	15	103,568	12,553	1946 (new)	
2044	Dodge Utility	18	61,021	9,808	1950 (new)	
2393	International Utility	14	76,520	18,315	1950 (new)	
2412	International Utility	14	82,834	10,341	1950 (new)	
2608	International Utility	14	62,213	13,785	1951 (new)	
3135	Fargo Utility	15	36,738	8,828	1954 (new)	
3535	Land Rover Utility	10	23,083	17,125	1955 (new)	
3678	Dodge Utility	15	17,474	11,891	1955 (new)	
3876	Land Rover Utility	10	9,400	9,400	1956 (new)	Purchased 29-3-56

Total miles : 122,020.

SERVICE TO THE GENERAL PUBLIC, MINING INTERESTS AND GOVERNMENT DEPARTMENTS.

Much information, both written and oral, was given to a variety of applicants during the year, and our publications were in constant demand. This year, as the technical reports show, assistance to private interests and other Government Departments in the search for water and minerals in the State, was restricted, due to drilling supervision commitments. Wherever possible however, the more urgent requests for assistance were dealt with.

ACTIVITIES OF THE COMMONWEALTH BUREAU OF MINERAL RESOURCES.

During 1956 the Bureau of Mineral Resources continued geological surveys in the Carnarvon and Canning Basins. On the latter the area now covered by reconnaissance survey amounts to approximately 200,000 square miles.

Early in the year a seismic party conducted a survey in the Busselton area, and later transferred to the West Kimberleys, where a gravity meter team was already operating, for the remainder of the field season.

An airborne magnetic and scintillometer survey was conducted in the Yilgarn Goldfield, and also in four east-west strips (between latitudes 22°15′ and 26°45′) in the coastal region Geraldton to Onslow.

PUBLICATIONS.

Issued during 1956.

Annual Progress Report of the Geological Survey of Western Australia for 1953.

Compiled and Awaiting Authority to Print.

Mineral Resources of W.A. Bulletin No. 6—Gypsum, by L. E. de la Hunty, B.Sc., and G. H. Low, B.Sc.

Miscellaneous Bulletin Series Bulletin No. 109—Annual Progress Reports 1954.

Bulletin Series Bulletin No. 110—The Geology of the Phillips River Goldfield, W.A., by J. Sofoulis, B.Sc.

Bulletin No. 111—The Exploratory Diamond Drilling of the Koolyanobbing Iron Ore Deposits for Pyrite, by H. A. Ellis, B.Sc., A.O.S.M.

K. BERLIAT,
Acting Government Geologist.

DIVISION V

School of Mines, Western Australia

The Under Secretary for Mines.

I have the honour to submit for the information of the Honourable the Minister for Mines my report for the year 1956. The report is divided into four main sections: Kalgoorlie, Norseman, Bullfinch, and Acknowledgments. All three schools—the main school at Kalgoorlie and the branch schools at Norseman and at Bullfinch—were active throughout the year.

KALGOORLIE.

Enrolments.

The total number of enrolments received during 1956 was 365—an increase of 18 by comparison with the previous year. The number of students enrolling each year appears to have become stabilized at from 350 to 400. The School could accommodate more students, and openings could be found in industry for more graduates. Table I gives the individual and class enrolments for 1954, 1955, and 1956, and Table II gives the enrolments in the various subjects in 1956. Table III sets out the number of students enrolled for the various courses.

TABLE I.

Enrolments—1954, 1955, 1956.

Year.	First Term.		Second Term.		Third Term.	
	Individual.	Class.	Individual.	Class.	Individual.	Class.
1954	355	837	307	691	284	593
1955	324	764	322	629	294	543
1956	365	839	331	734	288	613

TABLE II.

Class Enrolments—1956.

Subject.	First Term.	Second Term.	Third Term.
Preparatory Chemistry	30	23	20
Chemistry IA	22	19	18
Chemistry IB	10	9	8
Chemistry II	6	5	4
Analytical Chemistry I	2	2	2
Analytical Chemistry II	4	4	4
Chemical Metallurgy I	3	3	3
Mineral Dressing I	14	12	11
Mineral Dressing II	2	2	2
Physical Metallurgy I	3	3	3
Assaying	9	9	9
Trade Metallurgy	12	8	8
Preparatory Mathematics....	46	34	28
Mathematics I	27	22	22
Mathematics IIA	23	22	18
Mathematics IIB	10	9	8
Mathematics IIE	2	2	2
Mathematics IIM	7	7	6
Applied Mathematics I	30	27	22
Applied Mathematics II	1	1	1
Preparatory Physics	18	14	11
Physics I	34	32	28
Physics IIA	13	12	11
Physics IIB	—	—	—
Trade Mathematics I	28	24	14
Preparatory Drawing	54	45	30
Engineering Drawing I	44	33	25
Engineering Drawing IIA	12	8	6
Engineering Drawing and Design IIB	5	5	4
Engineering Drawing and Design IIC	4	5	2
Engineering Drawing and Design IID	4	2	0
Surveying Drawing II	8	8	5
Mechanical Engineering I	7	5	5
Mechanical Engineering II	4	4	4
Practical Electricity	6	7	7
Electrical Engineering I	22	17	14
Electrical Engineering II	7	7	6
Internal Combustion Engines	14	12	12
Workshop Practice I	32	26	22
Workshop Practice II	14	12	10
Workshop Practice IIIA	5	4	4
Workshop Practice IIIB	3	2	1
Engineering Workshop Practice	2	2	2
Welding I	35	31	29
Welding II	14	14	13
Steam Engine Driving	5	4	2
Structural Engineering I	14	12	12
Structural Engineering II	3	3	3
Machine Design	8	7	7
Materials of Construction	10	10	6
Preparatory Geology	19	20	17
Geology IA	8	7	7
Geology IB	21	23	19
Geology IIA	7	7	7
Geology IIB	7	7	6
Geology IIC	4	4	4
Geology IIIA	2	1	1
Geology IIIB	—	—	—
Geology IIIC	1	1	1
Mining I	15	14	11
Mining II	8	9	7
Mining III	4	4	5
Mining IIIB	—	—	3
Mine Ventilation	4	3	3
Surveying I	20	19	16
Surveying II	6	6	6
Surveying IIA	—	—	—
Preparatory English	5	5	4
English I	6	4	3
English IA	10	10	9
Totals	839	734	613
Totals, 1955	764	629	543

TABLE III.

Number of Students Enrolled for Various Courses.

Course.	Number Enrolled. 1955.	1956.
Associateship Courses:		
Mining	33	30
Metallurgy	20	23
Engineering	43	40
Mining Geology	11	9
Total	107	102

Course.	Number Enrolled. 1955.	1955.
Certificate Courses:		
Assayer's	3	2
Surveyor's	14	15
Mine Manager's	4	2
Engineering Draughtsman's	9	11
Electrical Engineer's	5	5
Mechanical Engineer's	1	1
Total	36	36
Technicians' Courses:		
Engine Operation and Maintenance	3	2
Workshop Foreman's	5	9
Welding	9	13
Total	17	24
No Set Course:		
Engine Operation and Maintenance	3	2
Workshop Foreman's	5	9
Welding	9	13
Total	17	24
No Set Course:		
Preparatory subjects	Information not available	54
Others		149
Total	187	203
Total for year	347	365

Revenue.

Fees received from students and income from the sale of official publications amounted to £683 6s. 0d. —an increase of £49 2s. 0d. by comparison with 1955. The numbers of students who paid fees other than lecture-note fees, which are paid by all students, are given in Table IV. Fees were received from students in Groups 1, 2 and 3.

Fees received for work done in the Kalgoorlie Metallurgical Laboratory, and paid into a Trust Fund amounted to £234 5s. 8d.—a decrease of £228 17s. 8d. by comparison with 1955.

TABLE IV

Numbers of Students Paying Fees

Group No.	Description	Full Time	Part Time	Ext.	Totals
1	Students who pay class fees—				
	Age 21 and over	1	112	3	
	Under age 21	....	5	....	
		1	117	3	121
2	Students nominated by Repatriation Department. Class fees paid (C.R.T.S. and others)	....	2	....	2
3	Students under 21, who pay registration fees	10	95	....	105
4	Students under 21, who do not pay registration fees	6	52	....	58
5	Students aged 21 and over who do not pay class fees—				
	Returned servicemen	....	69	....	
	Staff	....	7	....	
	Scholarship holders (Y.F.S.)	....	3	....	
		....	79	....	79
	Total	....	....	....	365

Staff.

The following staff changes occurred during the year:—

Name, Position, Date, Notes.

Baldwin, W. J.; Cadet; 2/3/56; Resigned.

Cahill, M. E.; Typist; 8/10/56; Appointed.

Connelly, M. A.; Cadet; 31/12/56; Resigned.

Critchlow, R.; Junior Clerk; 6/2/56; Appointed.

Essex, W. F.; Cadet; 6/3/56; Appointed; 12/3/56; Resigned.

Foote, D. A.; Typist; 4/5/56; Resigned.

George, T. J. F.; Assayer; 26/11//56; Appointed.

Hayter, I. E. M.; Typist (temporary); 23/7/56; Appointed; 7/9/56; Resigned.

Kozak, P.; Cadet; 10/8/56; Resigned.

Meharry, C. H. S.; Senior Research Metallurgist; 17/2/56; Resigned.

Murray, K. J.; Junior Clerk; 7/2/56; Transferred.

Scattini, P. M.; Typist; 7/5/56; Appointed; 18/7/56; Resigned.

Sullivan, A. D.; Cadet (Temporary); 17/9/56; Appointed; 21/12/56; Resigned.

Tasker, E.; Senior Research Metallurgist; 20/2/56; Appointed.

Thomas, R. P.; Research Metallurgist (acting); 5/9/56; Appointed.

Wills, M. F.; Cadet; 13/3/56; Appointed.

Courses of Study.

No changes were made in the Courses in 1956.

Annual and Supplementary Examinations.

The results of the Annual and the Supplementary Examinations are summarized in Table V and VI—Table V is based on class enrolments and Table VI on individual enrolments. The figures given in the table indicate a small increase in the proportion of students sitting for and passing at the examinations by comparison with the previous year. As in previous years the biggest wastage is among students not enrolled for any set course.

TABLE V.

Results of Annual and of Supplementary Examinations based on Class Enrolments, 1952-1956.

KALGOORLIE.

	1952	1953	1954	1955	1956
Class enrolments = A	856	837	901	802	878
Number of entries for Annual Examinations = B	458	546	521	495	557
B/A per cent.	54	65	58	62	63
Number of passes at Annual Examinations, as a per cent. of A	43	54	47	51	53
Number of passes at Annual Examinations, as a per cent. of B	80	83	82	82	83
Number of passes at Annual and Supplementary Examinations, as a per cent. of A	44	56	49	52	55
Number of passes at Annual and Supplementary Examinations, as a per cent. of B	82	85	85	85	86

TABLE VI.

Students Sitting for Annual Examinations, 1956.

KALGOORLIE.

	1955. Number enrolled.	1955. Per cent. sitting.	1956. Number enrolled.	1956. Per cent. sitting.
Associateship Courses	107	81	102	81
Certificate Courses	36	78	36	86
Technicians' Courses	17	76	24	75
No set course	187	42	203	48
	347	60	365	63

The results for individual subjects are given in Appendix I.

Scholarships and Prizes.

No students held Mines Department Scholarships in 1956.

Seven students holding Chamber of Mines Scholarships attended the School—four full-time and three part-time. All students completed a good year's work, and two—C. H. Annear and G. M. Sainsbury—completed all the School of Mines subjects necessary for the Associateship Course in Mining. G. M. Sainsbury, in addition, completed all the requirements of the Associateship in Mining, and Diploma number 207, dated 31st December, 1956, was granted him. He thus became the first Chamber of Mines Scholarship holder to complete an Associateship Course.

The usual Scholarships and Prizes were awarded based on the results of the Annual Examinations, and a list is given in Appendix 2.

Diplomas and Certificates.

The number of Diplomas and Certificates granted is given in Table VII. The figures include any Diplomas or Certificates granted to students attending Branch Schools.

TABLE VII.

Diplomas and Certificates Awarded, 1952-1956.

	1952	1953	1954	1955	1956
Associateship Courses—					
Mining	5	3	7	1	6
Metallurgy	2	1	6	2	4
Engineering	4	4	3	2	8
Mechanical and Electrical Engineering (pre 1947 course)	2	....	1	....	....
Mining Geology	....	1	2	....	1
	13	9	19	5	19
Certificate Courses—					
Assayer's	1	3	4	3	2
Industrial Chemist's (pre 1947 Course)	1	1	1	....	....
Mine Manager's	2	4	2	4	3
Mine Surveyor's	14	7	9	8	4
Engineering Draughtsman's	3	3	....	1	....
Electrical Engineer's	....	1	2	....	....
Mechanical Engineer's	....	1	....	1	....
	21	20	18	17	9
Technicians' Courses—					
Engine Operation and Maintenance	....	5	3	3	....
Workshop Foreman's	....	....	....	....	2
Welding	....	....	....	....	3
	....	5	3	3	5

Students Nominated by Repatriation Department.

Only two students were assisted by the Repatriation Department. Details are as follows:—

Commonwealth Reconstruction Training Scheme.

	1954.	1955.	1956.
Full-time	—	—	—
Part-time	14	2	1

Disabled Members and Widow's Training Scheme.

	1954.	1955.	1956.
Full-time	1	—	—
Part-time	—	1	1

Library.

Re-organisation of the School library was commenced in 1955. Prior to this date a list of books had been kept, but no attempt had been made to classify or catalogue the books. No central library is available and books are housed in Departments. In some Departments special library accommodation is available, but in others books are housed in lecture-rooms, in laboratories, or in staff rooms. Present plans provide for additional Departmental libraries rather than a large central library. Because of the lack of finance it has not been possible to improve library accommodation in years.

Prior to 1947 not very much progress had been made with the binding of periodicals, but in recent years funds have been available for this work. At the present time periodicals are in a reasonably satisfactory conditions, and missing numbers are gradually being replaced. The work to be done each year now is mainly concerned with current periodicals.

The Universal Decimal Classification is used and about 3,100 bound volumes have been classified and catalogued. About 1,000 bound volumes remain to be done, and in addition, there is quite a large amount of unbound serial matter to be classified and catalogued. Author cards and shelf list cards are prepared. A union author catalogue is being prepared, and shelf list indexes are available for each Department.

In the near future it is hoped to extend this work to the Branch Schools at Norseman and at Bullfinch, and later to the libraries of other organisations in Kalgoorlie. The School has a reciprocal inter-loan service with the Library Board of W.A.

Services to the Public.

The School continued as in previous years to provide a number of services to the public other than its teaching activities. These included the following: work done in the Kalgoorlie Metallurgical Laboratory to which reference is made in Appendix 3, free assays and mineral determinations for prospectors, accommodation for Junior and for Leaving examinations and for meetings of various professional bodies and other societies. In addition members of the Staff give assistance and advice as required.

During the year 393 samples were received from prospectors and others for assay and/or mineral examination. The work done on these samples is summarized below.

	1954.	1955.	1956.
Assay—gold	191	90	147
Assay—gold and other constituents	6	21	23
Assay—metals other than gold	27	23	20
Assay plus mineral determination	—	4	11
Mineral examination	218	225	150
Rejected or transferred to Met. Lab. pay	2	8	42
	444	371	393

Buildings.

No new buildings were added during 1956. Minor improvements were made to existing buildings, and generally the buildings are in good condition.

Requirements of the School.

No funds were available for major additions at the School, and these remain as set down in the 1954 report. Some further thought was given to Library buildings, and it is now considered desirable to provide departmental libraries rather than one central library. Some central accommodation is still necessary to house library personnel. This arrangement is likely to be more satisfactory, and is also likely to cost less than one central library.

Advisory Committee.

Mr. Maloney's death in February, 1956, was recorded in last year's Annual Report. Mr. F. J. O'Dea was appointed to replace Mr. Maloney; and Mr. E. B. Mundle, to replace Mr. Manners. Mr. Harwood continued as chairman, and the Committee met ten times. Attendance was as follows: Mr. M. Harwood, 8; Mr. C. H. Warman, 8; Mr. F. J. O'Dea, 8; Mr. E. B. Mundle, 7; Mr. F. Collard, 2; Mr. R. A. Hobson, 10. The Registrar, Mr. G. M. Lumb, continued to act as Secretary to the Committee.

In July a special meeting of the Committee was held to discuss with the Minister building requirements at the School. The Committee outlined the main requirements of the School, i.e., additions and alterations to the Metallurgical Laboratory, provision of a mineral dressing laboratory for student use, and additional library accommodation. The Minister was sympathetic to School's requirements, but could not guarantee that funds would be available.

An additional £2,000 was received for the Apparatus and Equipment Trust Fund—£1,000 from the Chamber of Mines, and £1,000 from the Department. During the year purchase of equipment valued at approximately £2,800 was authorised, and in addition £2,000 was set aside towards

the cost of a Universal Testing Machine. At the end of the year the estimated balance available was £600.

Kalgoorlie Metallurgical Laboratory.

Table VIII summarizes the work done in the Metallurgical Laboratory. Of the 10 reports issued four had reference to gold ores, one to a gold-copper ore, one to a gold-antimony ore, one to a lead-zinc ore, and three to non-metallics. In addition 71 certificates were issued, and 272 free assays were made for prospectors and others. For investigation number 680 approximately 5 tons of graphite ore from Munglinup was treated in the pilot plant, and a concentrate assaying 85.97 per cent graphitic carbon and containing 81.97 per cent of the carbon in the ore was produced. During November and December the Senior Research Metallurgist visited Christmas Island at the request of the British Phosphate Commissioners to gain first hand knowledge of the work being done on the Island, and to discuss with resident officers pilot plant work to be done during 1957. This work follows from that done in investigation number 655. More information about the work of the Laboratory is given in Appendix 3.

TABLE VIII

Kalgoorlie Metallurgical Laboratory

Summary of Work

——	1954	1955	1956
Investigations outstanding (1st January)	12	6	5
Investigations asked for (676-689, inclusive)	20	17	14
	32	23	19
Investigations completed	23	18	10
Investigations outstanding (31st December)	6	5	8
Investigations cancelled	3	....	1
	32	23	19
Certificates issued (assays analyses, etc.)	50	54	71

No funds were available during the year for extensions or alterations to buildings, and much of the work of the Laboratory is being done under unsatisfactory conditions.

The C.S. & I.R.O. continued to assist the Laboratory, and for the 1956/57 financial year provided £2,700 for salaries, equipment, and travelling expenses. The Senior Research Metallurgist attended the Australasian Institute of Mining and Metallurgy Conference at Broken Hill and Port Pirie, and also visited various laboratories in Melbourne and in Adelaide.

Students' Association.

The Students' Association held the usual functions—the Annual Ball on 27th July and the Annual Dinner on 23rd November. Both functions were very successful. The Association also provided four scholarships.

NORSEMAN.

Enrolments.

The total number of students enrolled was 62—an increase of two by comparison with 1955. Table IX sets out the individual and class enrolments for the year and for the two previous years, and Table X the enrolments in individual subjects. Table XI gives the students enrolled for the various courses. A pleasing feature of the enrolments for 1956 is small loss in individual enrolments over the year (1st term, 60; 3rd term, 58).

TABLE IX.

Enrolments—1954, 1955 and 1956.

Year.	First Term.		Second Term.		Third Term.	
	Individual.	Class.	Individual.	Class.	Individual.	Class.
1954	63	150	58	137	56	129
1955	60	160	55	141	53	127
1956	60	159	59	156	58	135

TABLE X.

Class Enrolments, Norseman, 1956.

Subjects	First Term	Second Term	Third Term
Preparatory Chemistry	7	8	4
Preparatory Mathematics	7	7	5
Mathematics I	5	3	5
Applied Mathematics I	3	3	2
Trade Mathematics I	9	8	5
Trade Mathematics II	10	10	10
Preparatory Engineering Drawing	13	12	12
Engineering Drawing I	20	20	21
Engineering Drawing IIA	3	4	3
Surveying Drawing II	1	1	1
Practical Electricity	10	10	7
Workshop Practice I	15	13	12
Workshop Practice II	7	7	6
Welding I	10	10	8
Welding II	6	6	4
Internal Combustion Engines	8	7	7
Structural Engineering I	5	5	5
Preparatory Geology	8	8	7
Geology IIB	5	5	5
Mineral Dressing I	7	7	6
Totals	159	156	135
Totals, 1955	160	141	127

TABLE XI.

Number of Students Enrolled for Various Courses.

Course	Number Enrolled 1955	Number Enrolled 1956
Associateship Courses—		
Mining	1	6
Metallurgy	—	—
Engineering	1	—
Mining Geology	2	—
Total	4	6
Certificate Courses—		
Assayer's	—	1
Surveyor's	7	5
Mine Manager's	—	1
Engineering Draughtsman's	—	—
Electrical Engineer's	—	—
Mechanical Engineer's	—	—
Total	7	7
Technician's Courses—		
Engine Operation and Maintenance	27	27
Workshop Foreman's	—	2
Welding	—	1
Total	27	30
No Set Course—		
Preparatory Subjects	Information not available	5
Others	Information not available	12
Total	22	17
Total for Year	60	60

Revenue.

The revenue received was £62 16s. 6d.

Staff.

There were no Staff changes during 1956. The vacant position of lecturer was advertised throughout Australia, but no suitable applications were received, and the position remained unfilled. Nine part-time instructors were employed.

Subjects Taught.

Twenty subjects were taught at Norseman—the same number as in 1955. As in previous years classes in Workshop Practice, in Welding, and in Practical Electricity were held in the workshop of Central Norseman Gold Corporation.

Examination.

The results of the Annual Examinations are summarized in Tables XII and XIII—Table XII is based on class enrolments and Table XIII on individual enrolments. Table XIV makes a comparison with Kalgoorlie results, and is based on class enrolments. The tables show that the results were generally better than in 1955, and also better than Kalgoorlie.

Scholarships and Prizes.

The two students who held Reg Dowson Scholarships in 1956 both completed a good year's work—R. M. Hennessy passed in five subjects and obtained one credit pass; A. E. Avery passed in three subjects and obtained one credit pass. Reg Dowson Scholarships based on work done during 1956 were awarded to D. A. Stewart and S. J. Bastow.

TABLE XII

Results of Annual and of Supplementary Examinations Based on Class Enrolments, 1952–1956

——	1952	1953	1954	1955	1956
Class Enrolments = A	149	144	157	167	163
Number of entries for Annual Examinations = B	108	84	100	90	111
B/A per cent.	72	58	64	54	68
Number of passes at Annual Examinations, as a per cent of A	54	46	48	43	58
Number of passes at Annual Examinations, as a per cent. of B	75	80	76	79	86
Number of passes at Annual and Supplementary Examinations, as a per cent. of A	58	48	49	43	61
Number of passes at Annual and Supplementary Examinations, as a per cent. of B	80	82	77	80	89

TABLE XIII

Students sitting for Annual Examinations, Norseman

Courses.	1955		1956	
	Number enrolled	Per cent. sitting	Number enrolled	Per cent. sitting
Associateship Courses	4	50	6	100
Certificate Courses	7	86	7	86
Technicians' Courses	27	78	30	83
No set course	22	64	17	81
Totals	60	72	60	83
Kalgoorlie for comparison	347	60	365	63

TABLE XIV.

Examination Results, Norseman and Kalgoorlie.

Note:—The letters A and B have the same meaning as in Table XII.

	Norseman.			Kalgoorlie.		
	1954.	1955.	1956.	1954.	1955.	1956.
B/A per cent.	64	54	68	58	62	63
Total passes as a per cent. of A	49	43	61	49	52	55
Total passes as a per cent. of B	77	80	89	85	85	86

Buildings.

The additions and alterations referred to in the Annual Report for 1955 were completed in time for the opening of School in 1956. The buildings and grounds are now in very good condition, and are generally very satisfactory indeed.

Advisory Committee.

The Advisory Committee continued to meet with Mr. Dutton as chairman, and to take a lively interest in the affairs of the School. Through the Advisory Committee the two local mining companies agreed to assist the School financially, and for approved projects or equipment agreed to provide money on a pound for pound basis. The first item approved was an L.P. gas installation, and it is hoped to have this completed in 1957.

BULLFINCH.

Enrolments.

The total number of enrolments during 1956 was 41—a decrease of 15 by comparison with 1955. Table XV gives the individual and class enrolments for 1956 and for the two previous years, and shows that the loss of students during the year was less than in 1955. Table XVI gives the enrolments in the subjects taught at Bullfinch, and Table XVII the number of students enrolled for the various courses.

TABLE XV.

Enrolments—1954, 1955 and 1956.

Year.	First Term.		Second Term.		Third Term.	
	Individual.	Class.	Individual.	Class.	Individual.	Class.
1954	42	72	36	71	32	62
1955	55	111	36	65	30	46
1956	33	64	33	59	27	54

TABLE XVI.

Class Enrolments, Bullfinch, 1956.

Subjects.	1st Term	2nd Term	3rd Term
Preparatory Chemistry	5	4	4
Preparatory Geology	6	4	4
Preparatory Physics	5	5	5
Preparatory Mathematics	8	6	6
Trade Mathematics I	10	9	8
Applied Mathematics I	1	1	1
Workshop Practice I	5	8	7
Preparatory Engineering Drawing	11	10	9
Engineering Drawing I	5	4	4
Engineering Drawing and Design IIA	1	1	1
Welding I	6	5	3
Welding II	1	2	2
Totals, 1956	64	59	54
Totals, 1955	111	65	46

Revenue.

The revenue received was £34 0s. 6d.

Staff.

Mr. V. J. Tie resigned from the position of officer-in-charge on 7th December in order to return to New Zealand. Four part-time instructors and a part-time registrar were employed.

Subjects Taught.

Twelve subjects were taught in 1956—one less than the previous year.

TABLE XVII.

Number of Students Enrolled for Various Courses.

Course.	Number Enrolled. 1955.	1956.
Associateship Courses:		
Mining	—	—
Metallurgy	—	—
Engineering	—	—
Mining Geology	1	2
Total	1	2
Certificate Courses:		
Assayer's	2	—
Surveyor's	6	3
Mine Manager's	2	—
Engineering Draughtsman's	2	—
Electrical Engineer's	2	1
Mechanical Engineer's	—	—
Total	14	4
Technicians' Courses:		
Engine Operation and Maintenance	3	—
Workshop Foreman's	1	—
Welding	5	—
Total	9	0
No Set Course:		
Preparatory subjects	Information not available	10
Others		17
Total	32	27
Total For Year	56	33

Examinations.

The results of the Annual and the Supplementary Examinations are summarized in Tables XVIII, XIX, and XX. The tables show that a bigger proportion of students sat for their examinations this year, and that this proportion is about the same as at Kalgoorlie and at Norseman. The proportion who passed is about the same as last year, but is still less than the proportions at Kalgoorlie or Norseman. Generally, the results are satisfactory.

The results for individual subjects are given in Appendix I.

TABLE XVIII

Results of Annual and of Supplementary Examinations based on Class Enrolments, Bullfinch, 1954–1956

——	1954	1955	1956
Class enrolments = A	79	113	77
Number of entries for Annual Examinations = B	48	30	45
B/A per cent.	61	27	58
Number of passes at Annual Examinations as a per cent of A	37	17	39
Number of passes at Annual Examinations as a per cent of B	47	63	67
Number of passes at Annual and Supplementary Examinations as a per cent of A	37	19	39
Number of passes at Annual and Supplementary Examinations as a per cent of B	47	70	67

TABLE XIX

Students Sitting for Annual Examinations, Bullfinch.

Courses.	1956		1956	
	Number enrolled	Per cent. sitting	Number enrolled	Per cent. sitting
Associateship Courses	1	100	2	50
Certificate Courses	14	57	4	75
Technicians' Courses	9	44	....	....
No set course	32	26	27	59
Totals	56	39	33	67
Totals—Kalgoorlie	347	60	365	63
Norseman	60	72	60	83

Scholarships and Prizes.

The two students, I. Maclean and B. J. D. Van der Hoek, between whom the Country Club Prize was divided at the end of 1955 completed a fair year's work in 1956. The award for 1956 was made to B. H. Harris. Because of an unforeseen difficulty the Club is not able to continue awarding this prize.

Buildings.

A portion of the verandah at the east end of the building was enclosed and lined during the year to provide an additional class room. The building is now adequate for present requirements, and the building and grounds are in good condition.

TABLE XX

Examination Results—Bullfinch, Norseman, and Kalgoorlie

Note.—The letters A and B have the same meaning as in Table XVII

——	1954	1955	1956
B/A per cent.—			
Bullfinch	61	27	58
Norseman	64	54	68
Kalgoorlie	58	62	63
Total passes as a per cent of A—			
Bullfinch	37	19	39
Norseman	49	43	61
Kalgoorlie	49	52	55
Total passes as a per cent of B—			
Bullfinch	47	70	67
Norseman	77	80	89
Kalgoorlie	85	85	86

ACKNOWLEDGMENTS.

During the year all members of the Staff have carried out their various duties efficiently, and appreciation is due to all for assistance and co-operation. The Schools at Norseman and at Bullfinch could not carry on without the assistance of the part-time instructors. Much of the information in this report has been compiled by the Registrar and Office Staff in Kalgoorlie, by the Officers-in-Charge and the Registrars at Norseman and Bullfinch, and by the Senior Research Metallurgist.

Thanks are due to members of the three Advisory Committees for their assistance and co-operation during the year.

Thanks are also due to the mining companies at Norseman and at Bullfinch for assistance and co-operation. These companies have, as in the past, made available their workshops for practical classes.

Finally, thanks are due to Head Office Staff for assistance and co-operation during the year.

(Sgd.) R. A. HOBSON,
Director, School of Mines.

APPENDIX 1.

School of Mines of Western Australia.

ANNUAL EXAMINATIONS.

1956.

PASS LIST.

Passes are in order of merit.

(E) denotes equal.

(*) denotes year fee scholarship.

Preparatory English.

Pass:
McNee, W. Z.
Frank, P. H.
Fraser, P. G.

English I.

Pass:
Hill, J. C.
Jasson, K. E.

English IA.

Credit:
Smith, C. L. (*)

Pass:
Mitchell, P. N.
Compton, G. S.
Annear, C. H. (E)
Sainsbury, G. M. (E)
Sullivan, A. D. (E)
Way, I. E.
Kozak, P.
Nelson, R. A.

Trade Mathematics I.

Credit:
Leslie, W. E. (*)
Cadlolo, L. D.
Luke, E. D.
Bevans, E. T.
Baroni, E. J.
French, J.
McFarling, G. M.
Foote, N. W.

Pass:
Bell, D. R.
Brooks, R. G.
Attrill, D. M.

Preparatory Mathematics.

Credit:
McIntyre, A. T. (*)
Essex, W. F.
Chisholm, M. R.
Draper, E. J.
Green, I. (E)
Williams, J. G. (E)

Pass:
Hunter, S. T.
Procter, J. D. (E)
Wills, M. F. (E)
Klose, W. F.
Thompson, E. A.

Supp. Exam. Granted:
Gowdie, B. A.
Mierlo, W. L. Van

Mathematics I.

Credit:
McGushin, P. J. (*)
Kew, J. A.

Pass:
Slocomb, J. H.
Polinelli, L. A.
Dykstra, F. D.
McNally, R. T.
Beetson, E. R.
Jongen, P. J. F. G. (E)
Radge, K. A. (E)
Dodge, G. J.
Gray, R. A.
Boyd, J. C.

Supp. Exam. Granted:
Crew, W. J.
Davey, C. R.

Mathematics IIA.

Credit:
Buckett, L. N. (*)

Pass:
Bracanin, B. F.
Dunstan, H. R.
Suthisorn, V.
Thomas, R. P.
Sullivan, A. D.
Crocker, R. F. (E)
Ganthavee, S. (E)
Mullins, H. D.

Supp. Exam. Granted:
Canning, D. G.
Cruickshank, R. A.
Symons, W. S.

Mathematics IIB.

Credit:
Mitchell, P. N. (*)
Marsh, F. E.

Pass:
Jacobs, N. M. (E)
Sullivan, A. D. (E)
Jasson, K. E.
Gard, R. C.
Scott, S. J.

Mathematics IIE.

Credit:
Jasson, K. E. (*)

Pass:
Thompson, B. M.

Mathematics IIM.

Credit:
Hooker, L. F. (*)

Applied Mathematics I.

Credit:
Oliver, J. B. (*)
Mitchell, P. N.
Zani, D. A.
Thomas, R. P.
Parry, K. F.

Pass:
Buckett, L. N.
Simmons, M. R.
McDermott, J. C.
Compton, G. S.
Bracanin, B. F.
Boddington, E. H.

Supp. Exam. Granted:
Botica, G. G.
Miller, J. J.
Terrell, R. J. H.

Preparatory Physics.

Credit:
Essex, W. F. (*)
Proctor, J. D.
Hunter, S. T.
Clifton, M. R.

Pass:
Cliff, I. F.
Wills, M. F.
Bell, D. R.
Martin, H. F.

Pass Practical only:
Sullivan, B. S.

Physics I.

Credit:
George, T. J.* (E)
Zani, D. A.* (E)
Kops, J. N.

Pass:
Simmons, M. R.
Bracanin, B. E.
Cruickshank, K.
Gray, D. G.
Jordan, A. F.
McDermott, J. C. (E)
Mair, N. J. (E)
Slocomb, J. H. (E)

Pass Practical only:
Goddard, R. L.

Supp. Exam. Granted:
Sutherland, G. W.
Mackay, I. D.
Radge, J. A.

Physics IIA.

Credit:
Marsh, F. E. (*)
Oliver, J. B.
Jasson, K. E.

Pass:
Scott, S. J.
Ganthavee, S.
Neve, H. D.
Sullivan, A. D.
Mullins, H. D.

Supp. Exam. Granted:
Bennett, V. G.
Botica, G. G.

Preparatory Chemistry.

Credit:
Essex, W. F. (*)
McIntyre, A. T.
Klose, W. F.

Pass:
Veale, I. L.
Drakeford, A.
Forrest, R. N. (E)
Williams, J. G. (E)
Dykstra, F. D.
Mair, N. J.
McNally, R. T.
Hunter, S. T.
Wills, M. F.

Chemistry IA.

Credit:
Laffer, B. G. (*)
Shenton, E. F.
Hill, J. C.
Sullivan, A. D.

Pass:
Wallis, F. A.
Warburton, J. C.
Reed, E. W.
Bagworth, B. A.
Simmons, M. R.

Pass Practical only:
Mullins, H. D.
Timoney, E. G.

Supp. Exam. Granted:
Mullins, H. D.
Timoney, E. G.

Chemistry IB.

Credit:
Buckett, L. N. (*)

Pass:
Neve, H. D.
Mahalingham, S. S.
Bracanin, B. F.
Gray, D. J.
Hooker, L. F.

Supp. Exam. Granted:
Brien, J. W.
Connelly, M. A.

Chemistry II.

Pass:
Garrigan, J. S.
Bialecki, G.
Bower, J. K.

Analytical Chemistry I.

Pass:
Higgs, K. E.
Garrigan, J. S.

Analytical Chemistry II.

Credit:
George, T. J. F.* (E)
Bialecki, G.* (E)

Pass:
Bartlett, M. S.
Symons, W. S.

Trade Metallurgy.

Credit:
Cadlolo, L. D.* (E)
Carthew, A. E. H.* (E)
Goldner, H.

Pass:
Baker, A. H.
Mills, W. J.
Martin, N. A.
Martin, H. F.

Chemical Metallurgy I.

Pass:
Garrigan, J. S.
Dowson, J. W.
Zani, D. A.

Physical Metallurgy I.

Pass:
Bower, J. K.
Lennon, B. P.
Thompson, A. P.

Assaying.

Credit:
Smith, C. L. (*)

Pass:
Buckett, L. N.
Sainsbury, S.
Gray, D. J.
Mistry, S. D.
Henderson, G. A.
Botica, G. G.
Mahalingham, S.

Mineral Dressing I.

Credit:
Buckett, L. N. (*)
Garrigan, J. S.
Dowson, J. W.

Pass:
Kops, J. N.
Bracanin, B. F.
Oliver, J. B.

Supp. Exam. Granted:
Connelly, M. A.
Higgs, K. E.
Simmons, M. R.

Mineral Dressing II.

Credit:
Dunstan, H. R. (*)

Pass:
Garrigan, J. S.

Practical Electricity.

Credit:
Manners, R. B. (*)
Ward, A. T.

Electrical Engineering I.

Credit:
Buckett, L. N. (*)
Carter, K. J.
Willis, J. S.

Electrical Engineering I–*continued.*
Pass:
Oliver, B. C.
Neve, H. D. (E)
Garrigan, J. S. (E)
Bower, J. K.
Rasmussen, G. C. R.
Thompson, B. M.
Boddington, E. A.
Rich, H. J.
Cameron, J. W.

Electrical Engineering II.
Credit:
Hill, J. C. (*)
Pass:
Kozak, P.
Jacobs, N. M.
Jones, J. L.
Currie, E. G.

Mechanical Engineering I.
Credit:
Coles, E. T. (*)
Pass:
Annear, C. H.
McDermott, J. C.
Mair, N. J.

Mech. Engineering II.
Credit:
Wallis, F. A. (*)
Pass:
Kozak, P.
Scott, S. J.
Currie, E. G.

Structural Engineering I.
Credit:
Coles, E. T. (*)
Shenton, E. F.
Rasmussen, G. C.
Simmons, M. R.
Willis, J. S.
Carter, K. J.
Pass:
McDermott, J. C.
Mair, N. J.
Cameron, J. W.
Mistry, S.
Timoney, E. G.

Structural Engineering II.
Credit:
Wallis, F. A. (*)
Kozak, P.

Machine Design.
Credit:
Mitchell, P. N. (*)
Sullivan, A. D.
Rasmussen, G. C.
Jasson, K. E.
Pass:
Boddington, E. H.
Kozak, P.
Kew, J. A.

Materials of Construction.
Credit:
Bevans, E. J. (*)
Genge, A. B. (E)
Rasmussen, G. C. R. (E)
Shiel, S. T. J.
Pass:
Mair, N. J.
Brownrigg, N. J.

Workshop Practice I.
Credit:
Turner, F. L. (*)
Duncan, A. M.
Essex, W. F.
Pass:
Leeson, R. T.
Woods, C. T.
Hunter, S. T.
Thompson, E. A.
Lamont, E. G.
McKeig, R. L.
Martin, N. A.
Golding, J. T.
Joyce, M. J.
Farrell, R. T.
Robertson, R. G.
Brayshaw, K. V.
Pass Practical only:
Hoddy, D. K.
Roberts, R. V.
Sullivan, B. S.

Workshop Practice II.
Credit:
Matheson, W. S. (*)
Bevans, E. T.
Lonsdale, M. R.
Douglas, D. C.
Pass:
Cadlolo, L. D.
Maguire, D. W.
Beilken, C. D.
Hall, M. G.
Pass Practical only:
Jenkins, K.

Workshop Practice IIIA.
Credit:
Shiel, S. T. J. (*)
Pass:
Mills, W. J.
Passed Theory only:
Martin, H. F.

Engineering Workshop Practice.
Credit:
Rasmussen, G. C. R. (*)
Sullivan, A. D.

Internal Combustion Engines.
Credit:
Carthew, A. E. H. (*)
Beccaria, A.
Mills, W. J. (E)
Thompson, F. (E)
Pass:
Lund, R.
Turrell, B. L.

Welding I.
Credit:
Goldner, H. (*)
Turner, F. L.
Smith, R. W.
Pass:
Clifton, M. R.
Moyle, H. R.
Lonsdale, M. R.
Martin, N. A.
Gowdie, B. A.
Lawrence, W. F.
Jennings, R. R.
Golding, J. T.
Hall, R. H. H.
Simcock, T. F.
Wright, C. T.
Jenkins, K.
Beveridge, A. W. S.
Simms, B. F.
Rees, W. E.
Brooks, R. G.
Hoddy, D. K.

Welding II.
Credit:
Baroni, E. J. (*)
Pass:
Keogh, C. E.
Carthew, A. E. H.
Duncan, A. M. S. (E)
French, J. (E)
Beilken, C. D.
Genge, J. W. (E)
Loan, G. J. (E)
Hicks, D. C.
Edwards, K. R.

Steam Engine Driving.
Pass:
Butler, J.
Castle, D. W.

Preparatory Drawing.
Credit:
Leslie, W. E. (*)
Hunter, S. T.
Luke, E. D.
Klose, W. E.
Goldner, H.
Dykstra, F. D.
Simms, B. F.
Bracanin, B. F.
French, J.
Keogh, J. T.
Polinelli, L.
Oliver, B. C.
Pass:
Baker, B. G.
Farrell, R. T.
Jessop, E. J.
Bain, W. B.
Muncaster, I. N.
Smith, R. W.
Attrill, D. M.
Joyce, M. J.
Flanagan, K. J.
Marwick, W. D.
Golding, J. T.
Lamont, E. G.
Hart, B. D.
Templeman, M.
Laing, E. R.

Engineering Drawing I.
Credit:
Cruickshank, R. A. (*)
Sullivan, A. D.
Rasmussen, G. C.
Essex, W. F.
Veale, I. L.
Maguire, D.
Veale, M. V. (Miss)
McIntyre, A. T.
Pass:
Morel, F. R.
Baker, A. H.
Cameron, J. W.
Slocomb, J. H.
Beetson, E. R.
Duncan, A. M.
Beveridge, A. W.
Cooper, M. N. (Miss)
Turner, B. C.
Veale, N.
McCahon, B. J.
Forrest, R. N.
Loxton, I. W.
McGushin, P. J. (E)
Mahalingham, S. S.
Boyd, J. C.
Thompson, E. A.
Argus, J. C.
Martin, W. A.
Martin, H. F.
Connelly, M. A.
Henderson, G. A.

Engineering Drawing and Design IIA.
Credit:
Rasmussen, G. C. (*)
Sullivan, A. D.
Radzikowski, S. A.
Weir, D.
Pass:
Keogh, C. E.
Radge, J. A.
Hug, R. L.
Sainsbury, G.
Fraser, P. G.
Ganthavee, S.

Engineering Drawing and Design IIB.
Credit:
Marsh, F. E. (*)
Willis, J. S.
Pass:
Tennant, E. M.

Engineering Drawing and Design IIC.
Credit:
Hill, J. C. (*)
Matheson, W. S.
Pass:
Kozak, P.
Wallis, F. A.
Nelson, R. A.

Engineering Drawing and Design IID.
Credit:
Hill, J. C. (*)
Jacobs, N. M.
Gard, R. C.
Pass:
Nelson, R. A.
Tennant, E.
Jones, J. L.

Survey Drawing II.
Credit:
Radzikowski, S. A. (*)
Way, I.
Pass:
Nelson, R. A.
Elliott, R. J.
Fraser, P. G.
Sainsbury, G.
Jordan, A.

Mining I.
Pass:
Morel, F. R.
Biltoft, E. M.
Bailey, K. C.
Ganthavee, S.
Graham, E. F.
Foote, N. W.
Mahalingham, S. S.
Simcock, T. F.

External Student.
Pass:
Hinchcliffe, G. A.
Supp. Exam. Granted:
Fiegert, J.
Suthisorn, V.

Mining II.
Credit:
Dodge, G. J. (*)
Pass:
Nelson, R. A.
Brien, J. W.
Wolff, D. L.
Dykstra, F. D.
Hooker, N. R.

Mining IIA.
Pass:
Wilkinson, R.
Supp. Exam. Granted:
Bird, C. R.

Mining IIB.
Pass:
Parry, K.
Timoney, E. G.

Mining IIC.
Credit:
Parry, K. (*)

Mining III.
Credit:
Sainsbury, G. M. (*)
Annear, C. H.
Pass:
Way, I. E.
Steel, W. D.

Mining IIIB.
Credit:
Carter, K. J. (*)

Mine Ventilation.
Credit:
Shenton, E. F. (*)
Pass:
Wolff, D. L.
Elliott, R. J.

Surveying I.
Credit:
Hill, J. C. (*)
Mitchell, P. N.
Marsh, F. E.
Gard, R. C. (E)
Boddington, E. H. (E)
Pass:
Warburton, J. C.
Sullivan, A. D.
Kozak, P.
Ganthavee, S.
Mahalingham, S. S.
Argus, J. C.
Brownrigg, N. J.
Terrell, R. J.
Fiegert, J.
Supp. Exam. Granted:
Cameron, J. W.
Suthisorn, V.

Surveying II.
Pass:
Brien, J. W.
Wolff, D. L.
Hooker, N. R.
Mistry, S. D.
Henderson, G. A.
Sloan, R. B.

Preparatory Geology.
Credit:
Buckett, L. N. (*)
McNally, R. T.
Pass:
Bracanin, B. F.
McGushin, P. J.
Flanagan, K. J. (E)
Veale, M. V. (Miss) (E)
Argus, J. C.
Mahalingham, S. S.
Frank, P. H.
Davey, C. R.
Campbell, A. D.
Wills, M. F.
Lennon, B. P.
Supp. Exam. Granted:
Cooper, M. N. (Miss)
Van Mierlo, W. L.

Geology IA.
Pass:
Ganthavee, S.
Morel, F. R.
Passed Practical only:
Fraser, P. G.
Mistry, S.
Sloan, R. B.
Supp. Exam. Granted:
Mistry, S.

Geology IB.
Credit:
Dowson, J. W. (*)
Ganthavee, S.
Hooker, L. F.
Pass:
George, T. J.
Garrigan, J.
Mahalingham, S. S.
Kops, J. N.
Hug, R. L.
Bartlett, M. S.
Lennon, B. P.
Sloan, R. B.
Hooker, N. R.
Fiegert, J.
Sutherland, G. W.
Pass Theory only:
Fraser, P. G.
Jordan, A. F.

Geology IIA.
Pass:
Oliver, J. B.
Brien, J.
Shenton, E. F.
Way, I. E.

Geology IIB.
Credit:
Brien, J. (*)
Pass:
Henderson, G. A.
Annear, C.
Wolff, D. L.
Edlington, W. B.

Geology IIC.
Credit:
Dunstan, H. R. (*)
Pass:
Miles, A. T.
Symons, W. S.
Brownrigg, N. J.

Geology IIIA.
Credit:
Compton, G. S. (*)

Geology IIIC.
Pass:
Compton, G. S.

NORSEMAN.

Trade Mathematics I.
Pass:
Oliver, D.
Supp. Exam. Granted:
Moir, L. W.

Trade Mathematics II.
Credit:
Bastow, S. J. (*)
Bassett, C. H.
Pass:
Jones, W. B.
Young, P. A.
Stewart, G. G.
Kirwan, F. M.
Shinnick, M. J.
Long, A. B.
Avery, A. E.

Preparatory Mathematics.
Pass:
Stewart, D. A.
Denison, J. L.
Supp. Exam. Granted:
Salmon, W. J.

Mathematics I.
Credit:
Hennessy, R. M. (*)
Basell, C. A.
Pass:
Roberts, J. L.
Supp. Exam. Granted:
Moffatt, B.

Applied Mathematics I.
Pass:
Baker, S. R.
Hennessy, R. M.

Preparatory Chemistry.
Pass:
Basell, C. A.
Hennessy, R. M.

Mineral Dressing I.
Credit:
Moore, G. H. (*)
Baker, S. R.
Pass:
Worth, I. R.
Reid, A. J.
Supp. Exam. Granted:
Silvester, S. W.

Structural Engineering I.
Credit:
Reid, A. J. (*)
Baker, S. R.
Lea, E. J.
Pass:
Worth, I. R.
Williamson, H. C.

Workshop Practice I.
Credit:
Young, P. A. (*)
Hide, B.
Pass:
Jones, W. B. (E)
Maitland, R. E. (E)
Moir, L. W.
Wilson, N. E.
Avery, A. E.
Perkin, R. E.

Workshop Practice II.
Pass:
Young, C. J.
Bassett, C. H.
Hedley, W. K.
Mahoney, A. J.
Horne, L. C.
Steddy, E. W.

Practical Electricity.
Credit:
Wilson, K. L. (*)
Pass:
Shinnick, M. J.
Hedley, W. K.
Mahoney, W. K.
Bingham, B. J.
Pass Theory only:
Schulz, J. G.
Silvester, S. W.

Welding I.
Pass:
Baker, R. C. C. ((E)
Hide, B. (E)
Foote, A. S.
Horne, L. C.
Stewart, D. A.
Baker, P. J.
Hunter, T. J. (E)
Semmens, N. (E)

Welding II.
Pass:
Medling, S. W.
Oliver, D.
Stewart, C. G.

Internal Combustion Engines.
Credit:
Salmon, W. J. (*) (E)
Wilson, K. L. (*) (E)
Pass:
Hedley, W. K.
Horne, L. C.
Mahoney, A. J.
Baker, P. J.
Calderaro, J.

Preparatory Geology.
Pass:
Hennessy, R. M.
Basell, C. A.
Roberts, J. L.
Moffat, B.
Daly, P. R.

Geology IIB.
Pass:
Baker, S. R.
Lea, E. J. (E)
Reid, A. J. (E)
Worth, I. R. (E)
Quan, L. E.

Preparatory Drawing.
Pass:
Morton, D. C.
Denison, J. L.
Moir, L. W.
Perkin, R. E.
Bastow, S. J.
Oliver, D.
Stewart, G. G.
Baker, P. J.
Shinnick, M. J.

Engineering Drawing I.
Credit:
Avery, A. E. (*)
Pass:
King, P.
Reid, A. J.
Salmon, W. J.
Horne, L. C.
Roberts, J. L.
Stewart, D. A.
Hunter, T. J.
Hedley, W. K.

Engineering Drawing IIA.
Credit:
Schulz, J. G. (*)
Pass:
Hennessy, R. M.

BULLFINCH.

Trade Mathematics I.
Pass:
Basten, L. J.
Powell, W. C.
Cossens, K. C.

Preparatory Mathematics.
Credit:
Stokes, M. C. (*)
Harris, B. H.

Preparatory Physics.
Credit:
Gray, K. C. (*)
Powell, P.
Tromans, F. W.
Pass:
Van Der Hoek, B. J. D.
Walker, J. G.

Preparatory Chemistry.
Pass:
Gray, K. C.
Powell, P.

Workshop Practice I.
Pass:
Martain, R. A.

Welding I.
Pass:
McLeod, J. H.
Pass Practical Only:
Knowler, B. W.
Supp. Exam. Granted:
Knowler, B. W.

Welding II.
Pass:
Jaffrey, S. C.
Turner, C. C.

Preparatory Geology.
Pass:
Harris, B. H.
Stocker, P.
Supp. Exam. Granted:
Van Der Hoek, B. J. D.

Preparatory Drawing.
Pass:
Powell, P.
Kuiper, M.
Basten, L. J.
Knowler, B. W.
Walker, L. G.
Stokes, M. C.
Ryan, T. E.

Engineering Drawing I.
Pass:
Tromans, F. W.
MacLean, I.
Van Der Hoek, B.
Kuiper, M.

Engineering Drawing and Design IIA.
Pass:
Gray, K. C.

SUPPLEMENTARY EXAMINATIONS.

February, 1956.

The following students passed in the subjects indicated below:—

KALGOORLIE.

Preparatory Mathematics.
M. R. Clifton.

Applied Mathematics I.
V. G. Bennett.

English IA.
S. D. Mistry.

Preparatory Geology.
K. E. Higgs.

Mining I.
R. Sloan.

Surveying I—Paper "A."
M. A. Connelly.
D. L. Wolff.
G. J. Dodge.

Surveying II—Paper "A."
I. Way.

Mine Ventilation.
I. Way.

Geology IIA.
G. McLellan.
C. Annear.
G. J. Dodge.

NORSEMAN.

Preparatory Mathematics.
Roberts, J. L.

BULLFINCH.

Preparatory Geology.
MacLean, I.

Surveying I—Paper "A."
Van Der Hoek, B. J. D.

APPENDIX 2.

SCHOLARSHIP PRIZES.

MINES DEPARTMENT.

Entrance Scholarship: No award made.
Senior Scholarship: No award made.

CHAMBER OF MINES PRIZES.

Mining: Ganthavee, S.
Metallurgy: Dowson, J. W.
Engineering: Rasmussen, G. C.
Geology: Mahalingham, S.

SCHOOL OF MINES STUDENTS' ASSOCIATION SCHOLARSHIP.

Mining: Shenton, E. F.
Metallurgy: George, T. J.
Engineering: Marsh, F. E.

INSTITUTE OF MINING SURVEYORS' PRIZE.

£10: No award.
£5: Brien, J. W.

SOCIETY OF W.A. SCHOOL OF MINES ASSOCIATES' PRIZE.

Morel, F. R.

REG. DOWSON SCHOLARSHIPS.

Stewart, D. A.
Bastow, S. J.

ROBERT FALCONER PRIZES.

Essex, W. F.
Hunter, S. J.

C. A. HENDRY PRIZE.

Buckett, L. N.

"INDUSTRIAL AND MINING STANDARD" PRIZE.

Morel, F. R.
Buckett, L. N.

WESLEY LADIES GUILD PRIZES.

Cruickshank, R. A.

SOCIETY OF ENGINEERS PRIZES.

Marsh, F. E.
Rasmussen, G. C.

BULLFINCH COUNTRY CLUB PRIZE.

Harris, B. H.

APPENDIX 3.

KALGOORLIE METALLURGICAL LABORATORY.

By E. Tasker, A.W.A.S.M. (Met.), A.M. Aust. I.M.M., Senior Research Metallurgist.

INTRODUCTION.

Ten reports and seventy-one certificates were issued during the year. A brief description of the more comprehensive investigations is included in this report. The complete list of reports issued, senders, localities of samples, ore types, and scope of the investigations is contained in the table with this report.

For further information regarding these reports apply to—

Research Secretary,
Industrial and Physical Sciences,
Commonwealth Scientific and Industrial Research Organization,
314 Albert Street,
East Melbourne, C.2, Victoria.

from whom copies of reports can be obtained, usually six months after date of issue.

As in 1955 a considerable proportion of the certificates issued covered gold assays of diamond drill core samples for the Government Geologist.

In addition to the reports issued five other investigations (Nos. 678, 681, 684, 686, 688) were substantially complete at the end of the year.

At the request of the British Phosphate Commissioners, the Senior Research Metallurgist paid a visit to Christmas Island, Indian Ocean, to gain first hand knowledge of the phosphate rock treatment operations on the Island, in preparation for pilot testing of a treatment method for high grade phosphate material containing excessive amounts of iron and alumina.

GOLD ORES AND PRODUCTS.

Report No. 667.

Recovery of gold from Wiluna calcine residues.

A detailed series of tests were carried out applying chlorination at various temperatures, salt roasting, volatilisation and various cyanidation conditions to develop a method of recovering the refractory gold in the residues. An economical method of treatment was not developed.

Report No. 674.

Tests were carried out with a new type of rabbling mechanism for an Edwards Roaster. A model roaster (36in. x 6in.), incorporating some novel ideas was built at the Croesus Proprietary Treatment Plant and equipped with auxiliary apparatus at this Laboratory. Several test runs were made of up to ten hours' duration, and the results encouraged the building of a 12ft. x 4ft. wide pilot scale roaster by the management of the above plant. The main advantages of the new rabbling mechanism were: firstly, the higher sulphur dioxide tenor of the flue gas, and secondly, the increased roasting capacity per square foot of furnace hearth.

Report No. 677.

This investigation was carried out on a sample of sulphide ore from Bullfinch, W.A.

The ore sample contained a considerable proportion of gold bearing arsenopyrite and very little gold was recoverable by amalgamation and cyandition. A high-grade arsenopyrite-pyrite concentrate was produced by flotation, which was roasted and cyanided to recover 80 per cent. of the gold.

Report No. 683.

This investigation was carried out on a sulphide ore from the Morning Star Gold Mine, Mt. Magnet, W.A.

The ore was relatively simple in nature and could be treated for satisfactory gold recovery by grinding to all minus 52 mesh, straking, amalgamation of the strake concentrate, and agitation cyanidation of the straking and amalgamation tailings for 24 hours. Cyanide and lime consumptions were moderate and overall gold recovery was 90 per cent.

LEAD ZINC ORE.

Report No. 673.

This work was carried out to determine what modifications should be made to a plant treating a lead-zinc ore from the Napier Range, W.A. Due to the fine grain size of the galena and its intimate association with sphalerite it was recommended that a grinding mill and classifier be installed in the existing gravity plant; also that a second Wilfley table be used to clean the lead concentrate. A flotation process was not recommended as results of the selective flotation tests were not promising.

GRAPHITE.

Reports Nos. 671 and 680.

Two reports were issued on tests carried out on Munglinup graphite ores.

Report 671—check tests on recovery of graphite from Munglinup ore by flotation.

Some check tests were made on a fresh sample of Munglinup graphite ore to check earlier testwork, in particular, Kalgoorlie Metallurgical Laboratory Report 617.

The tests confirmed the earlier work and a flotation concentrate assaying 81 per cent. graphitic carbon was produced.

Report 680—A pilot plant test was carried out on a sample of graphite ore from Munglingup, W.A.

The work was carried out to vertify results of the batch test work, in particular, Reports Nos. 617 and 671, and to produce a large quantity of graphitic concentrates for supply to graphite processing firms to determine suitable uses.

The graphite concentrate produced by flotation in the pilot plant assayed 85.97 per cent. graphitic carbon.

INCOMPLETE REPORTS.

Report No. 678.—This investigation was carried out on a gold-copper battery tailing from the Paris Group, Widgiemooltha, W.A. Flotation tests were made to determine whether the gold and copper could be recovered in a marketable grade concentrate.

Report No. 681.—Concentration tests were made on an oxidised copper-gold-cobalt ore from Roebourne, W.A.

Tests were carried out to determine the most suitable concentrating process for this ore.

Report No. 684.—Treatment tests were carried out on a high grade gold ore from the Hill 50 Eclipse Gold Mine, Mt. Magnet, W.A. Straking, amalgamation and cyanidation tests were made on this ore for plant design purposes.

Report No. 685.—Further cyanidation tests were carried out on a sample of ore from the Northern Hercules Mine, Pine Creek, N.T.

Report No. 686.—Amalgamation and cyanidation tests were carried out on a strake concentrate from the Radio Gold Mine, Bullfinch, W.A.

Report No. 687.—Treatment tests were made on samples of "sweep" from the Royal Mint, Perth.

Report No. 688.—Flotation tests were made on a sulphide copper ore from Marble Bar, W.A.

Report No. 689.—Copper leaching and gold cyanidation tests were carried out on samples of battery tailings from Gabanintha, W.A.

CERTIFICATES.

The seventy-one certificates issued covered the usual wide range of measurements. Thirty-eight of these certificates covered gold assays of diamond drill cores for the Government Geologist.

GENERAL.

The provision of adequate laboratory space for chemical analyses, and the partitioning of the unlined portion of the Laboratory to separate the sampling section from the remainder is urgently required.

KALGOORLIE METALLURGICAL LABORATORY.

Summary of Year's Work—1956.

Report No.	Owner.	State.	Locality.	Ore Type.	Type of Investigation.	Confidential Until.	Number of Metallurgical Tests.	Number of Assays.	
								Gold.	Others.
667	H. H. Carroll, Perth	W.A.	Wiluna	Gold	Recovery of gold from calcine residues	18–1–57	46	79	26
671	G. Halbert, Esperance	W.A.	Munglinup	Graphite	Flotation tests on graphite ore	1–8–56	13	....	30
673	J. A. Mazza, Perth	W.A.	Napier Range, Derby	Lead-Zinc	Method of treatment of Lead-zinc ore	1–11–56	8	1	130
674	North Kalgurli (1912), Ltd., Kalgoorlie	W.A.	Kalgoorlie	Gold	Determination of characteristics of small scale modified Edwards roaster	26–10–56	3	23	17
675	B. E. Hewitt, Perth	W.A.	....	Gypsum	Washing tests to remove impurities	6–8–56	3	....	16
676	Western Uranium Mines, Ltd., Norseman	W.A.	Ravensthorpe....	Copper-gold	Flotation tests on sulphide copper ore	14–2–57	10	18	82
677	R. W. Gray, Bullfinch	W.A.	Bullfinch	Gold	Treatment tests	29–4–57	10	52	54
679	G. Ramsay, Kalgoorlie	Vic.	Hoddles Creek	Antimony-gold	Method of treatment of antimony-gold ore	24–3–57	4	10	6
680	G. Halbert, Esperance	W.A.	Munglinup	Graphite	Pilot scale beneficiation of graphite ore	14–2–57	1	....	41
682	CANCELLED	....	....	....	....	....	....	....	....
683	Mt. Magnet Development, N.L., Mt. Magnet	W.A.	Mt. Magnet	Gold	Treatment tests	24–3–57	6	7	3
	Totals	....	....	....	....	....	104	190	405
	Certificates, Nos. 105–175....	....	....	....	....	....	....	582	96
	Free Assays	....	....	....	....	....	....	176	63
	School of Mines	....	....	....	....	....	....	19	14
	Totals	....	....	....	....	....	104	967	578

THE FOLLOWING INVESTIGATIONS WERE INCOMPLETE OR PENDING AT 31ST DECEMBER, 1956.

678	G. Lister, Widgiemooltha	W.A.	Paris Group, via Widgiemooltha	Gold-copper	Method of treatment	....	5	44	45
681	D. M. Hedley, Roebourne	W.A.	Roebourne	Copper-cobalt-gold	Concentration tests	....	15	1	63
684	Hill 50 Eclipse G.M., Mt. Magnet	W.A.	Mt. Magnet	Gold	Treatment tests	....	19	26	2
685	Northern Hercules G.M. Pine Creek	N.T.	Pine Creek	Gold-copper	Cyanidation tests	....	6	13	8
686	Barr Bros., Bullfinch	W.A.	Bullfinch	Gold	Cyanidation tests	....	4	7	....
687	Royal Mint, Perth	W.A.	Perth	Gold	Treatment method	....	5	68	68
688	S. H. Stubbs, Marble Bar	W.A.	Marble Bar	Copper	Concentration Tests	....	11	1	43
689	J. Steiner and R. Hooker, Perth	W.A.	Gabanintha	Copper-gold	Leach tests	....	....	7	4
	Totals for 1956	....	....	....	....	....	169	1,134	811

DIVISION VI

Annual Report of the Inspection of Machinery Branch of the Mines Department for the Year 1956

Operations under the Inspection of Machinery Act, 1921-1954

Annual Report of the Chief Inspector of Machinery and Chairman of the Board of Examiners for Engine-Drivers for the Year ended 31st December, 1956, with statistics

The Under Secretary for Mines:

For the information of the Hon. Minister for Mines I submit the report of the Deputy Chief Inspector of Machinery in the administration of the Inspection of Machinery Act, 1921-1954 for the year ended 31st December, 1956.

(Sgd.) E. E. BRISBANE,
Chief Inspector of Machinery.

Section 1.

INSPECTION OF BOILERS, MAINTENANCE, ETC.

(See Returns Nos. 1, 2 and 3.)

Under the Act "Boiler" means and includes—

(a) any boiler or vessel in which steam is generated above atmospheric pressure for working any kind of machinery, or for any manufacturing or other like purposes;

(b) any vessel used as a receiver for compressed air or gas, the pressure of which exceeds 30 lb. to the square inch, and having a capacity exceeding five cubic feet; but does not include containers used for transport;

(c) any vessel used under steam pressure as a digester, and

(d) any steam jacketed vessel used under steam pressure for boiling, heating, or disinfection purposes.

It also includes the setting, smoke stack, and all fittings and mountings, steam and other pipes, feed pumps and injectors, and other equipments necessary to maintain the safety of the boiler.

Return No. 1.

Registrations of new boilers totalled 312; this represents a decrease of 153 compared to the number of new registrations in 1955.

Return No. 2.

This is a tabulation of the numbers of useful boilers of the various types in the register at the close of the year: also recorded in this return is the total of those boilers, though considered still useful, that were not in commission.

That there were only 249 more pressure vessels in the register at the end of 1956 than at the close of the previous year against 312 new registrations shown in Return No. 1, is explained by a large number of vessels being removed from the list of useful boilers due both to permanent condemnation and a small number transferred from jurisdiction under the Inspection of Machinery Act.

Return No. 3.

Therein is a precis of the operations of the Branch relative to boilers during the year.

RETURN No. 1.—SHOWING THE NUMBER OF BOILERS OF EACH TYPE, AND COUNTRY OF ORIGIN OF NEW REGISTRATIONS FOR THE YEAR ENDED 31ST DECEMBER, 1956.

Type.	Country of Origin.						
	Germany	United Kingdom	U.S.A.	Eastern States	Western Australia	Unknown Sources	Total
Lancashire	....	....	....	....	....	....	....
Cornish	....	....	....	....	....	....	....
Vert. Stationary	....	....	....	1	6	....	7
Vert. Portable	....	....	....	....	....	....	....
Return Multi Stat. Underfired	....	....	....	1	12	....	13
Ret. Multi Stat. Int. Fired	....	....	....	1	8	....	9
Water Tube	....	2	....	8	4	....	14
Saddle Back	....	....	....	1	....	....	1
Cylindrical	....	....	....	....	1	....	1
Digester	....	....	....	1	1	....	2
Vulcanizer	....	....	....	22	2	....	24
Steam Jacketed Vessel	4	....	....	6	18	....	28
Sterilizer	....	....	....	23	15	....	38
Air Receiver	1	5	1	52	54	13	126
Gas Receiver	....	....	21	2	17	....	40
Blood Receiver	....	....	....	....	1	....	1
Heat Exchanger	....	....	....	....	2	....	2
Surge Drum	....	....	....	6	....	....	6
Totals	5	7	22	124	141	13	312

RETURN No. 2.—SHOWING CLASSIFICATION OF VARIOUS TYPES OF USEFUL BOILERS IN PROCLAIMED DISTRICTS ON 31ST DECEMBER, 1956

Types of Boilers.	Districts Worked from PERTH.	Districts Worked from KALGOORLIE.	Totals.	
			1956.	1955.
Lancashire	46	49	95	97
Cornish	157	440	597	602
Semi Cornish	11	36	47	47
Vert. Stationary	415	340	755	759
Vert. Portable	62	17	79	81
Vert. Multi Stat.	45	25	70	70
Vert. Multi Port.	15	3	18	18
Vert. Pat. Tubular	47	....	47	47
Loco. Rect. F/box Stat.	74	61	135	137
Loco. Rect. F/box Port.	227	64	291	291
Loco. Circ. F/box Port.	104	8	112	112
Locomotive	72	33	105	109
Water Tube	482	107	589	578
Ret. Multi U/Fired Stat.	264	57	321	307
Ret. Multi U/Fired Port.	1	8	9	9
Ret. Multi Int. Fired Stat.	51	12	63	55
Ret. Multi Int. Fired Port.	2	....	2	2
Egg ended and other types not elsewhere specified	569	37	606	558
Digesters	297	8	305	307
Air Receivers	1,484	569	2,053	1,911
Gas Receivers	201	....	201	184
Vulcanizers	420	17	437	416
Steam Jacketed Vessels	526	13	539	530
Total Registration Useful Boilers	5,572	1,904	7,476	7,227
Total Boilers out of use 31st December, 1956	1,674	1,466	3,140	3,341

RETURN No. 3.—SHOWING OPERATIONS IN PROCLAIMED DISTRICTS DURING YEAR ENDED 31ST DECEMBER, 1956.

Types of Boilers.	Districts Worked from PERTH.	Districts Worked from KALGOORLIE.	Totals. 1956.	Totals. 1955.
Total number of useful boilers registered	5,572	1,904	7,476	7,227
New boilers registered during year	305	7	312	465
Boilers Converted	1	4	5	....
Boilers inspected—thorough	3,157	440	3,597	3,243
Vessels exempt under Act constructed for export—thorough	21	....	21	74
Boilers inspected—working	721	2	723	654
Boilers condemned during year temporarily	9	1	10	6
Boilers condemned during year permanently	60	....	60	302
Boilers sent to other States during the year	2	1	3	17
Boilers sent from other States during the year	....	....	....	....
Transferred to other Departments	2	....	2	....
Transferred from other Departments	2	....	2	....
Number of notices of repairs issued during year	418	65	483	416
Number of Certificates issued, including those issued under Section 30 during year	3,161	440	3,601	3,497

MAINTENANCE, ETC.

In general, care and maintenance of boilers of average and larger sizes has improved in those instances where, in the past, such attention was somewhat indifferent.

I find it necessary however to recapitulate to some extent the comments of my previous report on this subject.

In the course of progress in design water tube boilers of the near to package type having a reasonably high evaporative capacity for size together with fast steam raising qualities, and fitted with automatic oil fuel and feed equipment have been absorbed in the service of industry.

During the year under review, on a number of occasions again as in the preceding year, boilers in this category have suffered damage—particularly to tubes, due to regular and exhaustive testing of control equipment which is most essential being ignored by operators.

Undoubtedly it must be recognised that automatic firing and feed equipment is a great asset. Not only are such appliances a necessary provision to preserve reasonably steady pressures and water levels in boilers having small water and large evaporative capacities, but also they facilitate boiler attendants being relieved of considerable manual activities in keeping steam and replenishing with feed water, thus making attendants available for some other work in conjunction with their care of these vessels.

It is therefore regrettable that there are still some owners who have not yet appreciated the value of the services obtained from automatically controlled boilers by ensuring that a daily check is carried out on the performances of associated appliances in order to ascertain that gear has not been damaged or rendered partially ineffective by some extraneous agency.

Another cause of damage to these boilers where tubes have been burnt is the failure of some owners to recognise the need for efficient water treatment appropriate to their problems regarding the particular quality of feed water available.

It should be understood that boilers of higher exaporative capacity require relatively more make-up water, especially where condensate is not recoverable. As most water supplies contain matter of more or less injurious nature which deposits in a boiler, the rate of build-up of damaging deposits on heating surfaces is faster than in the case of similar size boilers of lower exaporative capacities.

Section 2.

EXPLOSIONS AND INTERESTING DEFECTS.

Two accidents of note, each involving boiler isolating valves to main steam lines, occurred at one factory within thirty hours. In both instances an isolating valve attached to the same boiler, which was one of a range of three ruptured when coupling this vessel with the steam header.

The three boilers are of Lancashire type 150 p.s.i. working pressure and are set side by side in the order Nos. 1, 2 and 3.

From each the main steam supply was conveyed through 5 in. branch pipe leading horizontally from the main stop valve located near boiler front to position toward back end where in a bend it changed direction vertically upward for a distance of 7 ft. and entered the bottom of a 6 in. diameter header common to the three boilers.

This header lies transversely over the back of these, steam to services in the factory being conducted through main lines extending from both ends of the header.

An isolating valve was introduced into the branch pipe of each boiler immediately at the end of a 90° short bend leading horizontally from the main stop valve. Drain valves were fitted in each branch pipe adjacent to the isolating valve and at the back end of the horizontal section immediately before the commencement of the pipes turn to the vertical direction.

In the first accident, to which I now refer as "Case A," the boiler attendant was engaged on coupling No. 3 boiler to the header when the crown of the chest of the isolating valve of this unit disintegrated. He was seriously scalded and slightly cut on the face by a fragment of the ruptured casting.

At the time, No. 1 boiler for a considerable time had been on line and Nos. 2 and 3 had been shut down for some days; No. 3 was being brought on line with No. 1.

Quoting from statement of the injured boiler attendant who was on duty at the time, the events leading up to and the circumstances surrounding the accident were as follows:—

Knowing that No. 3 boiler was to be brought into service, at approximately 7.30 a.m. (Sunday) he cracked open the drain valve near the isolating valve and water commenced to drain, and at intervals of half an hour he ascertained whether drain was still blowing. At 9.30 a.m. steam alone was issuing from this valve and the pressures of Nos. 1 and 3 boilers were then within 3 p.s.i. of each other, No. 3 carrying the lower pressure.

No. 3 isolating and then the main stop valves were cracked open. All that was heard was a slight rush of steam which he took to be both boilers equalising. He then opened up both valves a little at a time until they were about half open; at this stage the isolating valve burst.

I should here state that notwithstanding the injury to his face and serious scalding of arms and chest he immediately closed the main stop valve, then went across to No. 1 boiler and closed its main stop and isolating valves.

It is but fitting to also state that an internal combustion engine driver in charge of the factory's compressor room some little distance away on hearing the explosion rushed across to the boiler house and observing violent steam emission at the top of No. 3 boiler and not seeing anyone in attendance on the firing floor shut down the oil burner of this

unit; he then proceeded to No. 1 boiler but ascertained its mechanical stoker to be stationary. He then proceeded to assist the injured attendant.

At the subsequent inspection of the damage it was found that the drain valve near the isolating valve was shut; this was evidently closed by the attendant immediately prior to cracking open the valves or immediately afterwards.

The fractured sections of the valve were examined visually for some inherent weakness, or any crack which had developed during its service but no fault was revealed.

A new spare isolating valve being in stock it was decided that this should be immediately subjected to hydraulic test and then fitted in position to enable the boiler being placed in service without further delay.

The boiler attendant—the only person on duty in the boiler house when the accident occurred—had been a tried and trusted employee of the Company for some years and, as he appeared to have carried out the customary procedure for ensuring that no condensate remained in the branch lines before opening the main valves, the theory of waterhammer seemed to have little to sustain it in this case.

It was therefore decided to have laboratory tests of the ruptured valve body carried out. However, as an extra precaution it was considered advisable before again using the boiler to fit a drain valve in the horizontal short bend between the main stop and isolating valves in case condensate of quantity which could be harmful collected in this short length of pipeline.

Case B:

This was the second of the accidents referred to in the introduction of Section 2. During the afternoon following the day of the first accident and on completion of the installation of the spare isolating valve, preparations for coupling No. 3 boiler to the main steam line header were again in progress, but in this instance No. 2 boiler also had previously been coupled to the header with No. 1.

On this occasion the boiler attendant on duty was assisting the engineer and had opened the drains at both ends of the horizontal section of the branch line running along the boiler from the isolating valve.

This line was draining when two very severe waterhammer actions were heard and the new isolating valve immediately burst.

Unlike the sequence of events leading up to the first accident when the drain valves had been closed after draining and the main stop and isolating valves had been opened an appreciable amount before rupture occurred, on this occasion the line was still draining and the isolating valve had not been cracked open.

As a result of this second explosion, also a boiler attendant on this occasion was severely scalded, and again it is to be noted that similarly to the action of his fellow employee in the first accident he proceeded at once to shut the stop valves on Nos. 1 and 2 boilers.

Consequent to this second incident it was most evident that failure of the isolating valve in the former case was not due to faulty material in the valve but to waterhammer.

This range of boilers has been in service for a very long period and it can only be viewed as amazing that an accident of character similar to the two under review did not occur at some time in the past. These boilers in varying rotation have been shut down for a period and then again coupled to the line without previous incident, and the procedure on the occasions of these mishaps was identical to instructions always enforced.

It could only be assumed that under certain conditions such as those applying at times of small demand of steam, pockets of condensate could collect in the low lying sections of branch pipes.

In such circumstances it is probable that static conditions of those pockets were violently disturbed in these particular instances when a additional boiler was being coupled to the line header.

In this regard it is possible that a trough of water in certain circumstances could have lodged in the low lying level section of one or other of the branch pipes trapped at one end by the upturn of a pipe and at the isolating valve end by the slightly elevated valve seat.

To preclude any similar incident by mischance occurring in the future, entry of the branch lines from the three boilers into the header has now been removed from its lower part to the crown and the isolating valves have been introduced into the branch lines at the highest parts immediately above the header instead of close to the main stop valves at the low level of the lines.

Additionally, the branch lines have been redesigned to have the lengthy horizontal sections as a continuation from the isolating valves in the same plane above the headers to a point where they descend vertically to the boiler main stop valves. As an extra precaution against the possibility of pockets of condensate collecting in the branch line of any boiler in a shut down state, in addition to the manually operated drain valves permanent drainage facilities through steam traps have now been provided.

Case C:

This refers to the explosion of the oil trap of an ammonia refrigeration plant due to the failure of the welded longitudinal seam over the complete length. The dimensions of this vessel were 4ft. 8in. x 10in. diameter, shell ¼in. plate. The period it had been in service is unknown as it had not been registered with the department. With the plant to which it was attached it had only recently been purchased secondhand by the owner in whose possession it was at the time of failure. Whether it was a component of the refrigeration unit when the plant was originally constructed is open to doubt.

When the accident occurred the plant had been under trials at reduced speed and it had not been operating for more than two hours with head pressure not more than normal when the vessel burst, causing much damage to the compressor room and other plant 30 feet or more away. Fortunately no person was in the vicinity of the engine room at the time.

On investigation into the cause of the accident it was found that the butt seam lacked any preparation for welding; the weld itself was devoid of any penetration whatever and appeared to be the first attempt of some person at arc welding.

Unfortunately, all endeavours by the department to ascertain the source of construction of this pressure vessel were unsuccessful.

Case D:

In this instance bulges 3" and 6" depths in the crowns of the second and third sections respectively in the lefthand furnace of a Lancashire boiler in the goldfields resulted from overheating under conditions attended by an unusual circumstance.

There seems no doubt that excessive scale was no small agent to overheating but contributory to this was the unusually large fall of at least 4" in the boiler setting towards the front (blow down) end: also, the fusible plug was heavily scaled.

Investigating the occurrence it was ascertained that when the water level in the lefthand gauge glass was showing above the bottom mounting the sections of the furnace tube towards the rear protruded above water. To correct the false gauge glass reading a ferrule 4" length was fitted to the bottom gland nut on each of the glasses.

SECTION 3.

INSPECTION OF MACHINERY.

See Returns Nos. 4, 5 and 6.

There were 37,592 groups of machinery on the register at the close of the year, an increase of 915 above the number for 1955; of this increase, 30 groups were new lifts and escalators.

RETURN No. 4.—SHOWING CLASSIFICATION ACCORDING TO MOTIVE POWER OF GROUPS OF MACHINERY IN USE OR LIKELY TO BE USED BY PROCLAIMED DISTRICTS AND WHICH WERE ON THE REGISTER DURING THE YEAR ENDED 31ST DECEMBER, 1956.

Classification.	Districts Worked from PERTH.	Districts Worked from KALGOORLIE.	Totals.	
			1956.	1955.
No. of Groups driven by steam engines	228	387	615	642
No. of Groups driven by oil engines	2,234	1,118	3,352	3,196
No. of Groups driven by gas engines	31	158	189	189
No. of Groups driven by Compressed air	2	61	63	63
No. of Groups driven by Electric motors	29,949	3,415	33,364	32,587
No. of Groups driven by hydraulic pressure	1	....	1	....
No. of Groupes driven by Hand	7	1	8	....
Totals	32,452	5,140	37,592	36,677

RETURN No. 5.—SHOWING OPERATIONS IN PROCLAIMED DISTRICTS DURING YEAR ENDED 31ST DECEMBER, 1956.

(*Machinery Only.*)

Classification.	Districts Worked from PERTH.	Districts Worked from KALGOORLIE.	Totals.	
			1956.	1955.
Total registrations useful machinery	32,452	5,140	37,592	36,677
Total inspections made	26,225	4,308	30,533	27,859
Certificates (bearing fees)	6,276	743	7,019	6,277
Certificates (steam without fees)	25	....	25	41
No. of extension certificates issued under Sec. 42 of Act	....	....	....	....
Notices issued (Mach. dangerous)	682	34	716	360

RETURN No. 6.—SHOWING CLASSIFICATION OF LIFTS ON 31ST DECEMBER, 1956.

Types	How Driven.	Totals.	
		1956.	1955.
Passenger	Electrically driven	231	212
Goods	Electrically driven	115	114
	Hydraulically driven	1	2
	Belt driven	4	4
Service	Electrically driven	69	62
	Hydraulically driven	1	1
Escalators	Electrically driven	15	11
		436	406

ACCIDENTS TO MACHINERY.

One incident to record was connected with a small gold mine where the mine shaft after being in disuse for some years was reopened for exploratory work.

The original timber headframe had been patched up and a 50 h.p. Holman electrically driven single drum winch installed, which at the time of the mishap was operating a monkey and kibble in the shaft. A bundle of steel was being hauled to the surface when an unsecured piece of steel caught in the shaft timbering. The kibble held in the shaft and the sudden pull caused the main top member of the headframe to break, allowing the gin wheel assembly to sag downwards some 3ft. or 4ft.

Fortunately no damage was done other than to the headframe and no injury occurred to any person. Temporary repairs were effected and the headframe structure suitably strengthened to enable operations to continue until the property is proved.

Another accident which fortunately resulted in small damage to machinery and no injury arose from most unusual conditions of wind for the part of the State in which this accident occurred.

The engine room of a large winding engine on the goldfields was struck by a miniature "willy willy" and collapsed it onto the winding engine. The damage to the engine was not extensive and was confined to steam and exhaust pipes.

Section 4.

PROSECUTIONS FOR BREACHES OF THE ACT.

During the year there were no prosecutions for breaches of the Act.

Section 5.

ACCIDENTS TO PERSONS.

At the close of the year 110 accidents were reported to the Department and investigated; most unfortunately there were three fatalities. Of the other 107 accidents reported, in 20 instances they were classed as being of minor nature.

Returns Nos. 7 and 7A (see page 74) show the industries and descriptions of machinery to which the accidents were related and the number of persons injured under each group.

Reports of the circumstances connected with the fatalities are as follows—

Case A.

Emery Wheel.

The deceased had been grinding some small object on an unguarded emery wheel and whilst carrying out this operation the wheel broke. Despite exhaustive investigation the nature of the object he was grinding could not be ascertained. His ultimate death due to the injuries he received was quite unexpected as within a few weeks of hospitalisation he was discharged for convalescence.

A guard had not been fitted to the emery wheel as, it is understood, the machine had previously been required for grinding material of such large proportions that a guard would have interfered with the work in hand. Subsequent to this accident however, a guard has been fitted.

Case B.

Driving Belt.

The machinery involved in this accident was a well pump driven from the surface by an electric motor through counter shafting and pulleys to reduce speed from 1,200 r.p.m. at the motor to final drive of 60 r.p.m. The pump supplies water to a Battery 1½ miles distant which is used for goldmining purposes.

A reduction in the flow of water being observed an employee descended the well and locating a defect in the pump rod gave a pre-arranged signal to the surface for the pump to be stopped in order to correct the defect.

The two men on the surface, including the deceased, then entered the motor shed and deceased obtained a length of timber and placing it through the flat belt between the motor and the countershaft levered the belt off the motor pulley.

The momentum of the pump and countershaft caused the latter to continue rotating a number of revolutions. The belt then wrapped itself around the countershaft and in doing so jerked in the direction of the countershaft the lever deceased was still holding. He lost his footing and falling heavily struck his head on a concrete pedestal supporting a countershaft bearing.

The motor was operated by remote control from the Battery which, as previously mentioned, is 1½ miles away. An isolating switch was provided in the motor shed by which the motor could be stopped, but if this were used it would have been necessary to return to the Battery to re-start the machine. In those circumstances it had been the custom to keep the motor running when any adjustments to the pump were needed and to lever the belt off the motor in order to stop the pump. A starter switch has since been fitted in the motor shed.

The former procedure was obviously a dangerous one and this practice is all too prevalent in the case of flat belts in industry generally.

Case C,
Goods Lift.

In this case fatal injuries resulted when a storeman on the third floor of a building intent on attracting the attention of the driver of the lift at the basement level unthinking of the danger mounted a cask projected his head and shoulders over the lift well enclosure between the counterweight guides. The lift served basement, loading dock, ground, first, second and third floors.

From the statements of witnesses of the accident it would appear that when the lift was required at any floor for transport of goods it is the practice to call up or down the lift well to attract the driver's attention, the lift car being clearly visible in any position through the grille of a hall door.

It may have been that on this occasion the deceased had difficulty in gaining the attention of the driver, for he climbed onto a barrel adjacent to the enclosure and perhaps also onto the horizontal timber slats protecting the enclosure grille. By this action he was able to project his head and shoulders into the well over the top of a metal stay between the counterweight guides.

At this moment the car was ascending from the basement to the despatch dock level and the descending counterweight struck the storeman forcing the upper part of his body against the metal stay bar.

GENERAL.

Respective of accidents reported to the department over the year it is of some interests to note a 31 per cent. reduction in the number of persons injured in the operation of woodworking machines compared with the figures for the previous year. Opposed to this reduction, however, a 30 per cent. increase in the number of persons injured in the engineering and metalworking industries combined is to be recorded.

An appreciable number of injuries to fingers and hands investigated in the metalworking industry and other activities are caused by gloves worn by operators on certain classes of continuous motion machines. It is unquestionable that the protruding loose tips of gloves have been no small contributory factor in such instances by becoming caught by some part of the machine or the material being processed.

It is of course most desirable, if not necessary, to wear protective gloves in very many cases. It undoubtedly would be an advantage, however, if leather gloves could be manufactured without closure of the finger tips; somewhat bulky ends on gloves extending beyond the tips of wearers' fingers and thumbs could then be avoided.

Section 6.

EXAMINATION OF ENGINE DRIVERS, CRANE DRIVERS AND BOILER ATTENDANTS.

The Board of Examiners granted 121 engine drivers', 98 crane drivers' and 103 boiler attendants' certificates.

Compared with the previous year these figures show decrease 14, increase 9 and increase 24 respectively in the number of certificates granted.

Section 7.

AMENDMENTS TO ACT.

An amendment has made it obligatory that drivers of Diesel locomotive engines be holders of an appropriate certificate of competency granted under the Inspection of Machinery Act.

The Regulations also were amended to prescribe qualifications required of Overhead Travelling Crane drivers for entitlement to the necessary certificate of competency.

Section 8.

STAFF.

The number of staff personnel in the Branch was unchanged from the preceding year when it became essential to appoint an additional Inspector.

To be recorded with great regret was the death in June of Mr. G. A. Bradshaw, the third member of the Board of Examiners for Engine Drivers. He had been a member from early 1940 and was held in the highest esteem and respected by all those in the Department with whom he at any time was associated: the passing on of Mr. Bradshaw which was of sudden nature was deeply felt. He has worthily been succeeded on the Board by Mr. D. E. Maguire.

Due to the steady increase of registrations of boilers and machinery in the year, as the returns show, the efforts of all members of the staff have been much taxed at times overcoming the consequent increase of work but all demands have been met with an always ready response for which I desire to express my appreciation.

On behalf of other members of the staff and myself I wish to extend to all other officers in the Department of Mines with whom we have been associated our thanks for their co-operative assistance whenever required in carrying out the duties of the Branch.

In conclusion, to the Police Department also I express our appreciation of the co-operation of its officers who have throughout the year informed us of any occurrences regarding machinery accidents causing injuries. In very many instances were it not for their action we would not have advice of such mishaps as owners of plants often neglect to notify this Branch as is necessary.

J. F. WINZAR,
Deputy Chief Inspector of Machinery.

RETURN No. 7.—SHOWING NUMBER OF SERIOUS ACCIDENTS BOTH FATAL AND NON-FATAL WHICH OCCURRED IN PROCLAIMED DISTRICTS DURING THE YEAR ENDED 31st DECEMBER, 1956.

"F" denotes "Fatal."

Industry.	Circular Saw	Bandsaw	Boring Machine (Wood)	Buzzer	Spindle Moulder (Shaper)	Buffing and Wirebrush Machines	Fibre Teaser	Guillotine	Bottle Making Machine	Abrasive Wheels	Press (Metal)	Press (Other)	Wiredrawing and Working	Punch and Shears	Spinning Lathe	Overhead E.T. Crane	Gearing and Chain Drives	Belts and Shafting	Conveyor (Belt, Screw)	Electric Motor Cooling Fan	Printing Machinery	Mixing Machine	Loom	Sewing Machine	Elevator (Bag, Bucket)	Mincer	Rolls	Lift	Explosion (Water Hammer)	Vegetable Cutter	Dough Break	Match Making Machine	Totals per Industry
Woodworking and Furniture	6	....	1	7	1	1	1	....	....	3 (1F)	2	3	4	1	1	2	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	17
Metalworking and Engineering	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	19 (1F)
Leather Processing	....	....	....	....	....	1	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2
Printing and Allied Industries	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	....	....	....	....	....	....	....	....	....	....	....	2
Fertiliser Manufacturing	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	1	....	2	1	....	....	....	....	....	....	....	....	....	....	....	....	....	5
Mining....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	F1	....	L	....	....	....	....	....	....	....	....	....	....	....	....	3 (1F)
Food and Drink Processing	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	4	2	....	....	1	....	....	2	3	3	1	2	1	1	....	22
Building Materials and Building	....	....	....	....	....	....	....	1	....	....	....	1	....	....	....	1	....	2	1	....	....	....	....	....	1	....	....	....	....	....	....	....	7
Glassmaking	....	....	....	....	....	....	....	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2
Other	....	....	....	1	....	1	....	....	....	....	....	....	....	....	....	....	....	3	1	....	....	....	1	1	....	....	1	F1	....	....	....	1	11 (1F)
Totals per type of machine	8	1	1	9	1	3	1	1	2	3 (1F)	2	5	4	1	1	4	1	13 (1F)	6	1	2	1	1	1	3	3	4	2 (1F)	2	1	1	1	90 (3F)

RETURN No. 7A.—SHOWING NUMBER OF ACCIDENTS NOT CLASSED AS SERIOUS UNDER THE ACT AND NOT INCLUDED IN RETURN No. 7 BUT WERE REPORTED AND INVESTIGATED DURING THE YEAR ENDED 31st DECEMBER, 1956.

Industry.	Circular Saw	Buzzer	Bottle Making Machine	Breasting Machine	Abrasive Wheels	Hacksaw	Boring Mill	Shaper (Metal)	Wire Drawing.	Gears	Brick Cracker	Mincer	Mogul Machine	Rope Sling	Doughbreaker	Totals per Industry.
Woodworking and Furniture	2	1	....	....	....	....	....	....	....	....	....	....	....	....	....	3
Metalworking and Engineering	1	....	....	....	1	1	1	....	....	....	....	....	....	1	....	7
Leather Processing	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	1
Fertiliser Manufacturing	....	....	....	....	1	....	....	....	....	1	....	....	....	....	....	2
Mining	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1
Food and Drink Processing	....	....	....	....	....	....	....	1	....	....	....	1	1	....	1	4
Building Materials and Building	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	1
Glassmaking	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	1
Totals per type of machine	4	1	1	1	2	1	1	1	2	1	1	1	1	1	1	20

DIVISION VII

Annual Report of the Government Chemical Laboratories

Under Secretary for Mines:

I have the honour to present to the Honourable the Minister for Mines a summarised Annual Report on the operation of the Government Chemical Laboratories for the year ending 31st December, 1956.

The numerical strength of the Laboratories as at 31st December, 1956, was 54, being 41 professional officers, 7 general and 6 clerical officers. The past year was a difficult one for professional staff, a reflection of the Commonwealth wide shortage of chemists. Staff changes during the year were:—

Appointments—Five.
Resignations—Ten.
Retirement—One.

ADMINISTRATION.

The Laboratories consist of five Divisions, a Physics Section, a central office and a library, all under the control of the Director (Government Mineralogist, Analyst and Chemist), as follows:—

Director—J. C. Hood, O.B.E., F.R.A.C.I.

Agriculture, Water Supply and Forestry— L. W. Samuel, B.Sc., Ph.D. (Lond.), F.R.A.C.I., A.R.I.C., Deputy Government Agricultural Chemist.

Food, Drugs, Toxicology and Industrial Hygiene—N. R. Houghton, B.Sc., A.R.A.C.I., Deputy Government Analyst.

Fuel Technology—R. P. Donnelly, M.A., B.Sc. (Oxon), Fuel Technologist.

Industrial Chemistry—A. Reid, M.A., B.Sc. (Aberd.), A.R.I.C., Chief Industrial Chemist.

Mineralogy, Mineral Technology and Geochemistry—J. N. A. Grace, A.W.A.S.M., A.R.A.C.I., Deputy Government Mineralogist.

Library—Miss M. W. Johnson, Librarian.

Office—Miss D. E. Henderson, Senior Clerk.

The close association of these Laboratories with other Government Departments and with kindred Associations was maintained during 1956, and members of the Staff are members of the following Committees:—

Atomic Energy Commission—Commonwealth—States Committee.
Committee to investigate conditions and duties, etc., of Laboratory Assistants and Technicians in State services.
C.S.I.R.O.—State Committee.
Food and Drug Advisory Committee.
Insecticides Committee.
National Association of Testing Authorities—State Committee.
Oils Committee—Government Tender Board.
Paints Advisory Committee.
Swan River Pollution Reference Committee—Sub-committee.
Technological Standing Committee on hydrogen sulphide in sewerage installations.
Veterinary Medicines Committee.
Water Purity Committee.

NEW EQUIPMENT.

The technical equipment of the Laboratories has been maintained and extended during the year and among the more expensive items purchased in 1956 were: (i), a set of standarised thermometers; (ii), further equipment for differential thermal analysis; (iii), Cooke Universal Polarising Microscope.

The Bradford van attached to these Laboratories was replaced by a Ford Mainline utility.

GENERAL.

The total number of samples received and registered during 1956 was 20,001, slightly more than was received in 1955 (19,534). These were allocated to the various Divisions according to the specialised nature of the work undertaken by each Division.

Agriculture, Forestry and Water Supply	6,502
Food, Drugs, Toxicology and Industrial Hygiene	11,747
Fuel Technology	686
Industrial Chemistry	47
Mineralogy, Mineral Technology and Geochemistry	1,019
	20,001

Table 1 shows the source of the samples and their allocation to the various Divisions. The majority of the samples received from the Metropolitan Water Supply, Sewerage and Drainage Department were again from a systematic survey of factors and conditions resulting in corrosion of concrete sewers and from weekly routine samples for the control of various treatment works.

Table 1, see page 76.

Fees were collected for work undertaken for revenue producing Departments, Boards and Hospitals and various Commonwealth Departments, Local Governing Bodies and the general public. A considerable number of free examinations were made including mineral identifications and assays and aids to industry.

Summarised reports of the individual Divisions follow.

(Sgd.) L. W. SAMUEL,
Acting Director.

TABLE 1.

SOURCE OF SAMPLES RECEIVED DURING 1956.

——	Agri-culture.	Food and Drug.	Fuel Tech-nology.	In-dustrial Chemistry.	Mineral.	Total.
Mines Department—						
Chief Coal Mining Engineer	....	20	....	....	....	20
Chief Inspector of Mines, Kalgoorlie	....	13	....	....	....	13
Corrosion Committee (Interdepartmental)	6	....	....	....	3	9
Departmental	49	13	478	24	2	566
Explosives Branch	....	16	....	....	....	16
Government Geologist	3	....	29	....	112	144
State Batteries	....	....	....	....	217	217
State Mining Engineer	....	7	....	....	3	10
Agriculture Department	4,768	276	....	....	1	5,045
Education Department	1	....	....	....	....	1
Factories, Chief Inspector of	....	8	....	....	....	8
Fisheries Department	....	2	....	....	....	2
Government Stores and Tender Board	....	93	....	....	....	93
Industrial Development Department	2	....	2	6	4	14
Metropolitan Water Supply Department	53	10,048	2	....	....	10,103
Native Welfare Department	....	....	....	....	5	5
Police Department, C.I.B.	2	343	....	....	1	346
Police Department, L.I.B.	....	5	....	....	....	5
Public Health Department	1	102	....	....	1	104
Public Works Department	304	342	2	13	8	669
War Service Land Settlement Scheme	106	....	....	....	....	106
Public, Free	9	11	....	1	456	477
Pay—						
Public	1,188	76	167	2	162	1,595
Department of Army	3	....	....	....	....	3
Department of Navy	....	1	....	....	....	1
Aeronautical Inspection Directorate	....	4	....	....	....	4
Commonwealth Works Department	1	....	....	....	....	1
Commonwealth Mineral Resources Bureau	....	....	....	....	44	44
Commonwealth Repatriation Department	....	3	....	....	....	3
Fremantle Hospital	....	3	....	....	....	3
King Edward Memorial Hospital	....	1	....	....	....	1
Princess Margaret Hospital	....	11	....	....	....	11
Royal Perth Hospital	....	59	....	....	....	59
Crown Law Department	....	....	....	1	....	1
Forests Department	1	2	....	....	....	3
Fremantle Harbour Trust	....	1	....	....	....	1
Honey Pool of W.A.	....	3	....	....	....	3
Local Governing Bodies	1	5	....	....	....	6
Midland Junction Abattoir Board	4	17	....	....	....	21
Milk Board of W.A.	....	226	....	....	....	226
State Brickworks	....	....	6	....	....	6
West Australian Government Railways	....	36	....	....	....	36
	6,502	11,747	686	47	1,019	20,001

AGRICULTURE, FORESTRY AND WATER SUPPLY DIVISION.

The major activities of this Division continued to be the chemical work required by the Department of Agriculture and the examination of water samples from the Metropolitan, Town and Country water supplies and from primary producers.

The total number of samples received during the year was 6,502, an increase of some 40 per cent. on the number (4,549) received in 1955. This is the highest ever received in this Division, being more than three times the number received in 1947. The increase over the previous year was due mainly to an increase in the number of samples of tobacco leaf, an increase of 1,613 samples. The description and origin of the samples received in 1956 is shown in Table 2, see page 77.

Soils.

Of the soils analysed there were three large batches. One of 112 samples was analysed to ascertain the effect on the soil of the various cultural treatments in the Pasture Maintenance Experiment at the Merredin and the Wongan Hills Agricultural Research Stations. Analysis was for organic carbon, total nitrogen and labile nitrogen. A second group of 144 samples were analysed for phosphorus and potassium to investigate the effect of fertiliser treatment on the soil status of these plant nutrients. The added phosphatic fertiliser had increased soil phosphorus only in the top six inches of soil and the added potassium fertiliser had increased soil potassium only in the top 12 inches of soil. In the third group of soils (48 samples) top dressing with potassium had increased soil potassium only in the top four inches of soil.

Waters.

As in past years the major proportion (nearly 70 per cent.) of the water samples examined were from primary producers for determination of suitability for domestic, irrigation and stock purposes. With each report on such waters is enclosed a copy of a Leaflet "Waters for Agricultural Purposes in Western Australia".

The routine examination of existing water supplies to cities and towns was continued and samples were analysed from the Canning, Churchman's Brook and Victoria Reservoirs, the Wungong pipehead dam and the Mt. Eliza Reservoir. Existing or prospective water supplies for 21 country communities were examined.

In November 1956 the Goldfields Water Supply pipeline was again treated with copper sulphate for the control of a sponge growth. The copper sulphate solution was fed into the suction side of No. 1

TABLE 2.

AGRICULTURE, FORESTRY AND WATER SUPPLY DIVISION.

	Agriculture Department.	Public Works Department.	Metropolitan Water Supply Department.	War Service Land Settlement Scheme.	Public Health Department.	Departmental.	Education Department.	Industrial Development Department.	Police Department. C.I.B.	Forests Department.	Government Geologist.	Interdepartmental Corrosion Committee.	Free.	Pay—Public	Pay—Local Governing Bodies.	Pay—Department of Army.	Pay—Midland Junction Abattoirs Board.	Pay—Commonwealth Works Department.	TOTAL.
Cereals—																			
Barley Grain	13	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	13
Barley Plants	22	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	22
Oat Grain	143	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	143
Oat Plants	277	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	277
Wheat Grain	471	....	....	....	....	....	....	....	....	....	....	....	....	9	....	....	....	....	480
Wheat Plants	344	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	344
Fertiliser and Manures—																			
Basic Slag	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1
Blood and Bone	....	....	....	....	....	....	....	....	....	....	....	....	....	2	....	.....	....	....	2
Copper Ore	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2
Copper Sulphate	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	1
Fertiliser Act	14	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	14
Fowl Manure	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1
Garden Fertiliser	....	....	....	....	....	....	....	....	....	....	....	....	....	2	....	....	....	....	2
Limesand and Limestone	....	....	....	....	....	....	....	....	....	....	....	....	....	17	....	....	....	....	17
Magnesium Carbonate	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1
Rock Phosphate	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2
Superphosphate	6	....	....	....	....	....	....	....	....	....	....	....	....	4	....	....	....	....	10
Unspecified	9	....	....	....	....	....	....	....	....	....	....	....	....	3	....	....	....	....	12
Horticulture—																			
Apple Tree Leaves	14	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	14
Apricot Leaves	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2
Plum Tree Leaves	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2
Tobacco Leaf	1,671	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1,671
Vine Leaves and Petioles	68	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	68
Vine Fruit	24	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	24
Miscellaneous																			
Alkali Chlorides	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	1
Bone Char	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	1
Corrosion Deposit	....	1	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	2
Daphne	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1
Flour	5	....	....	....	....	1	....	....	....	....	....	....	....	5	....	....	....	....	11
Iron Oxide	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	1
Japanese Millet	72	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	72
Jars—for Boron	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2
Maltose	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	1
Salt	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1
Sediment	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	1
Sheep Faeces and Urine	254	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	254
Pasture and Fodders—																			
Animal Residue	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	1
Clover	321	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	321
Feeding Stuffs Act	45	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	45
Flax Chaff	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1
Hay	28	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	29
Linseed Meal	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1
Lucerne	14	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	15
Lupins	149	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	149
Meatmeal	1	....	....	....	....	....	....	....	....	....	....	....	....	2	....	....	2	....	5
Milk Powder	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1
Pasture—Mixed	279	....	....	....	....	40	....	....	....	....	....	....	....	....	....	....	....	....	319
Peanut Waste	....	....	....	....	....	....	....	2	....	....	....	....	....	....	....	....	....	....	2
Pea Plants	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	4
Poultry Food	16	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	16
Rat Cubes	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2
Silage	10	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	10
Stock Food	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	4
Tick Beans and Plants	81	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	81
Tree Lucerne	6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	6
Vetch	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	4
Whale Bone	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	1
Whale Meal	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2
Soils	281	8	2	....	....	2	....	....	....	....	....	....	....	24	....	....	....	....	317
Water	96	295	51	106	1	4	1	....	2	1	3	6	9	1,111	1	4	1	1	1,693
	4,768	304	53	106	1	49	1	2	2	1	3	6	9	1,187	1	4	4	1	6,502

Pumping Station for a period of 24 hours. The passage of the treated water along the pipeline was traced by sampling at approximately five mile intervals for a total distance of 74 miles. In all, 236 samples of water were analysed for copper and showed that the added copper was removed progressively as the water moved along the pipe, but not all of the copper had been removed in 74 miles of pipe. There was considerable mixing of the treated water with the water in front of and behind the treated water. This mixing increased with distance from the point of application of the copper sulphate and was more pronounced at the head of, than at the tail of, the treated plug of water. Because of the water requirements of the Goldfields it has not been possible to inspect the interior of the pipe to ascertain the effects of the treatment.

Fertilisers and Manures.

Analyses were made of 14 official Inspector's samples under the Fertilisers Act 1928-1955. Of these, nine samples complied with the analysis supplied by the Department of Agriculture as registered under the Act, four did not comply, and one did or did not comply depending on the interpretation of the limits of tolerance under the Act and Regulations.

An examination of two samples of copper fertilisers showed that for a natural ore of mixed mineral composition the copper was more "available" in the fine particles than in the coarse particles but that for a roasted copper ore there was no difference in "availability" with particle size.

Of the other fertilisers analysed main interest attaches to the trace element content of the fertilisers used in substantial quantities to supply the elements nitrogen, phosphorus and potassium.

Feeding Stuffs and Pastures.

Under the Feeding Stuffs Act 1928-1951 analyses were made of 45 samples taken by the Inspector. Of these, 24 complied for those constituents compulsorily registered under the Act and 14 complied with all of the constituents registered.

A wide variety of feeding stuffs and pastures were analysed, including (1) a number of pastures from the North West of the State, including monthly samples of several species to determine the quality of the pasture and changes in quality during growth, (2) a series of monthly samples of pasture (named species of plants) from Rottnest Island to ascertain the change in protein content with age of the plant, and hence the quality of the food of the quokka (Setonix) as it is suspected that these animals suffer from a protein deficiency during summer, (3) samples from the Cereal Grazing and Recovery Trial, oats and barley, from three Agricultural Research Stations.

Plant Nutrition.

Analyses of plant material grouped under this heading are mainly for (1) the effect of fertiliser treatment on plant composition (2) the diagnosis of unhealthy plants and (3) the effect of various fertilisers in correcting unthriftiness in plants. The plants and trees involved included apple, apricot, barley, beans, beet, clover, Daphne, grass, lucerne, lupins, millet, oats, peas, plum, tobacco, vines and wheat. The fertilisers used included, lime, magnesium carbonate, sodium carbonate, calcium gluconate, gypsum, superphosphate, rock phosphate, copper sulphate, copper ore, roasted copper ore, potassium chloride and sulphate, salt, zinc oxide, sulphate of ammonia, nitrate of soda, manganese sulphate and combinations of up to three or four of these. In addition a number of samples were analysed to ascertain the effect of cultural practices. This great variety is not suitable for summarising (there were 1,671 samples of tobacco leaf alone) but a few points may be mentioned.

1. The regular increase in phosphorus content of plants with increasing rates of phosphatic fertilisers.

2. The relative inefficiency of rock phosphate, whether finely ground or not, compared with superphosphate, especially in the year of application.

3. The general and regular response of potassium content of plants with increasing rates of potassium fertiliser.

4. The difficulty of field diagnosis of deficiency from the appearance of the plants.

5. The influence of different proportions of sand and clay in a soil on the composition of the plant.

6. The effect of nitrogenous fertilisers in increasing the protein content of the plant.

7. The relative efficiency of various methods of applying manganese fertiliser.

8. The much greater effect of zinc fertiliser on the zinc content of the plant than the effect of copper fertiliser on the copper content.

9. The marked increase in the chloride content of tobacco leaf by irrigation, with augmented increase in leaf chloride if the irrigation water is even only slightly saline.

10. The lack of effect of fertilisers not containing chloride on the chloride content of tobacco leaf.

11. The marked variability in the composition of plant material. In 1956 our past experience of this was confirmed and extended. Three adjacent vines of apparently uniform appearance were selected and from each vine 20 leaf petioles were obtained, selected for apparent uniformity. The 60 samples were analysed for nitrogen: for vine 1 the variation was from 0.21 per cent to 1.11 per cent., for vine 2, 0.35 per cent to 0.88 per cent. and vine 3, 0.41 per cent to 1.09 per cent.

12. A comparison of the Zeleny sedimentation test for wheat flour quality with the protein content.

13. The commencement of a protein survey of the wheat delivered in bulk in Western Australia.

14. Estimation of varietal differences in the urease activity of wheat.

FOOD, DRUGS, TOXICOLOGY AND INDUSTRIAL HYGIENE DIVISION.

The present Staff of this Division numbers thirteen, and is four more than the existing laboratory facilities were designed to accommodate. Of these four, two are located at the Annexe Laboratory, Lincoln Street, North Perth, and two are working in a section of the Division originally intended for occasional use where larger assemblies of apparatus are required for a specific purpose.

The variety of work undertaken by this Division and the scope of its activities are much the same as that of the previous year, although the total number of samples examined, 11,747, is a decrease of 1,594 on the number for 1955. This is due largely to the reduction by 1,569 in the number of investigational samples collected in connection with sewer corrosion research carried out in collaboration with the Metropolitan Water Supply, Sewerage and Drainage Department.

The major proportion of the activities of the Division consists of chemical work undertaken for the Departments of Public Health, Police, Agriculture, Public Works, Metropolitan Water Supply and for the Milk Board and Government Tender Board. In addition miscellaneous examinations were performed for other Government intrumentalities and the general public. The description and origin of the samples is shown in Table 3 (see page 79).

In all, 399 samples of foods were examined during the year. These included 226 samples of milk submitted for the Milk Board, chiefly legal samples taken in the course of a regular check on the standard and quality of milk supplies. 72 samples of cheese were analysed for the Dairy Branch of the Department of Agriculture as a check on the composition of the cheese produced by factories throughout the State. 25 samples of foodstuffs were submitted by the Government Tender Board and 20 by the Public Health Department. These were examined as a routine check on samples tendered for supply to Government hospitals and public institutions, and for specific instances of a suspected breach of the Food and Drug Regulations.

The investigations carried out seasonally in collaboration with the Department of Agriculture in an endeavour to correlate palatability of varieties of grapes with chemical criteria were continued in 1956. The need for further work was indicated.

143 exhibits were examined for the Police Department in connection with death by actual or suspected poisoning, death under anaesthetic or other Coroner's enquiries, and 154 specimens of blood and urine in cases of death by traffic accident or other form of violence. 32 exhibits were examined in connection with investigations by the Criminal Investigation Branch into criminal activity, and a small number from the suspected malicious poisoning of domestic animals.

25 animal toxicology specimens were received from the Department of Agriculture, largely in connection with the accidental poisoning of stock. The increased use of toxic pesticides has brought an increase in the number of deaths suspected of being due to these substances, and new methods have had to be applied for the identification of such poisons.

TABLE 3.

FOOD AND DRUG DIVISION, 1956.

	Public Health Department.	Agriculture Department.	Metropolitan Water Supply, Sewerage and Drainage Department.	Police Department and C.I.B. and Liquor Inspection Branch.	Mines Department.	Public Works Department.	Tender Board.	Other Government Departments.	Pay—Public.	Pay—Milk Board.	Pay—Hospitals.	Pay—W.A. Government Railways.	Pay—Midland Junction Abattoir Board.	Pay—Commonwealth Government Departments.	Pay—Other Departments, etc.	Free.	Departmental.	....
Foods—																		
Cows' Milk	1	....	....	....	....	....	....	....	....	226	....	....	....	....	....	....	....	227
Cheese	....	72	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	72
Tallow	....	....	....	....	....	....	....	....	5	....	....	....	16	....	....	....	....	21
Foods—Tendered Samples	....	....	....	....	....	....	25	....	....	....	....	....	....	....	....	....	....	25
Foods—General Samples	19	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	19
Apples	....	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	3
Salt	....	....	....	....	....	....	....	....	2	....	....	....	2	....	....	....	....	4
Grapes	....	28	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	28
Human Toxicology—																		
Exhibits (Toxicology)	3	....	....	143	....	....	....	....	....	....	....	....	....	....	....	....	....	146
Exhibits (Alcohol)	....	....	....	154	....	....	....	....	....	....	....	....	....	....	....	....	....	154
Specimens (Patients)	30	....	....	5	....	....	....	....	6	....	67	....	....	1	....	....	....	109
Animal Toxicology—																		
Specimens—Animal Deaths	....	25	....	6	....	....	....	....	....	....	....	....	....	....	....	....	....	31
Industrial Hygiene—																		
Blood and Urine (Lead)	6	....	....	....	....	....	....	....	11	....	3	36	....	....	....	....	....	56
Miscellaneous	7	....	....	....	....	....	....	5	3	....	....	....	....	2	....	....	2	19
Sewage—																		
Weekly Routine	....	....	2,854	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2,854
Investigational	....	....	7,012	....	....	....	....	....	....	....	....	....	....	....	....	....	....	7,012
Country Sewage	....	....	....	....	....	22	....	....	....	....	....	....	....	....	....	....	....	22
Miscellaneous	1	....	30	....	....	....	....	....	....	....	....	....	....	....	....	....	....	31
Pollution Surveys—																		
Ocean Beaches	....	....	145	....	....	....	....	....	....	....	....	....	....	....	....	....	....	145
Swan River	....	....	1	....	....	230	....	....	....	....	....	....	....	....	....	....	....	231
Bunbury (Leschenault Inlet)	....	....	....	....	....	50	....	....	....	....	....	....	....	....	....	....	....	50
Criminal Cases—Exhibits	1	....	....	32	....	....	....	....	....	....	....	....	....	....	....	....	....	33
Liquors and Wines	....	12	....	3	....	....	....	....	....	....	....	....	....	....	....	....	....	15
Pesticides, etc.	....	48	6	....	....	....	....	....	2	....	....	....	....	4	....	....	5	65
Cattle and Sheep Dips	....	24	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	24
Bones and Teeth (Fluorine)	....	23	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	23
Detergents and Cleansing Materials	....	....	....	....	....	....	41	....	....	....	....	....	....	....	....	....	....	41
Drugs and Medicines	14	....	....	....	....	....	....	10	2	....	4	....	....	....	....	....	....	30
Mine Air and Gas	....	....	....	....	40	....	....	....	2	....	....	....	....	....	....	....	....	42
Fruit Storage Experiments	....	20	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	29
Paints and Primer	1	....	....	....	....	3	19	....	1	....	....	....	....	....	....	....	2	26
Wall Boards—Fire Test	17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	17
Explosives and Fireworks	....	....	....	....	16	....	....	....	1	....	....	....	....	....	....	....	....	17
Oils and Oil Sludges	....	1	....	....	....	14	....	....	8	....	....	....	....	....	....	4	....	27
Petroleum Tests—Fluids and Solid Materials	....	....	....	....	....	....	....	....	5	....	....	....	....	....	....	....	8	13
Corrosion Problems	....	....	....	....	....	3	....	....	4	....	....	....	....	....	....	....	....	7
Human Milk	7	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	7
Miscellaneous—Unclassified	10	11	....	5	....	4	....	6	20	....	....	....	1	1	7	3	4	72
	117	276	10,048	348	56	326	85	21	72	226	74	36	19	8	11	11	13	11,747

75 samples were received in connection with problems of Industrial Hygiene. 56 specimens of urine and blood were examined from persons exposed to actual or potential lead hazards. These included 36 specimens of urine from workers at the West Australian Government Railways who were subject to a regular routine check.

The increased use of pesticides in recent years continues to be reflected in the number of these preparations examined during the year, namely 43. 28 of these samples were received from the Department of Agriculture, six from the Metropolitan Water Supply, Sewerage and Drainage Department, and nine from other sources. A series of experimental analyses for the Argentine Ant Control Authority was continued. Samples of grass which had been sprayed with chlordane and dieldrin were examined at intervals to determine the extent to which an effective residue would remain after exposure to weather.

24 samples of cattle and sheep dips from the Stock Branch were analysed as a measure of control of the concentration of dipping fluids.

23 samples of bones and teeth were received from the Animal Health and Nutrition Laboratory for determination of fluorine content in connection with their investigations into the supplementary feeding of phosphate to stock.

Fruit storage experiments were continued by the Department of Agriculture, and in this connection 26 samples of air containing carbon dioxide or sulphur dioxide were analysed.

The resistance to fire of various materials available as wall-boards was the subject of enquiry during the year, and a standard fire-test cabinet was constructed for the investigation. 17 materials were examined with interesting and informative results.

The collection and analyses of samples in monthly surveys of pollution of the Swan River were continued throughout the year, when 230 samples were examined. Consequent upon the decrease in the degree of pollution of the Leschenault Inlet, Bunbury, only two surveys were made, involving 50 samples.

The Annexe Laboratory situated at Lincoln Street, North Perth, continued to undertake the necessary chemical sewage control work and investigations for the Metropolitan Water Supply, Sewerage and Drainage Department, and examined a total of 10,041 samples during the year. 2,854 samples represented routine control samples taken in connection with the operation of the sewage treatment plants at Subiaco, Swanbourne and Fremantle. Systematic testing and research into the content and generation of hydrogen sulphide in sewage and its effect on corrosion of sewer pipes was continued, 7,012 samples were examined.

A total of 42 samples of mine airs and gases were analysed during the year in connection with safe working conditions in coal mines and investigations into the use of explosives in gold mines.

Of the 85 samples examined for the Government Tender Board, there were 19 samples of paints and 36 samples of detergent preparations submitted by tender for use in Government institutions. The unusually complex nature of these types of materials involved a considerable expenditure of time in order to be able properly to assess their relative value and efficiency for the purposes required.

30 samples of drugs and medicines were received, chiefly from the Public Health and Government Stores Departments. These were examined variously for identification, for purity, or for conformity to the standards of the British Pharmacopoeia.

As in previous years, a wide variety of miscellaneous samples were received. These included such diverse materials as—suspected oil finds, supposed ambergris, human milks, soaps, floor polishes, various corrosion problems, disinfectant fluid, brine, wool and "silk" fabrics, lupin seed, neatsfoot oil, tallows, suspected poisons in waters or in connection with the death of bees and of fish, citrus barks for identification of root stock, methanol for use in jet aircraft, lubricating and fuel oils, explosives and fireworks, and a large number of varied specimens in connection with the clinical diagnosis or medical treatment of patients.

FUEL TECHNOLOGY DIVISION.

Work on Bricoke with Department of Industrial Development.

A major portion of the time of the Division has been given to sampling and analysis of coal, char, briquettes, tar and liquor for the Department of Industrial Development, Bureau of Investigation and Research Pilot Plant, for production of bricoke from Collie coal at Welshpool. A total of six experimental runs involving 370 sample investigations and analyses have been covered.

The work called for is detailed and consumes much time. It is valuable and necessary for the development of bricoke production from Collie coal. It is, nevertheless, routine work for the most part and interrupts and makes difficult the pursuit of any continued line of research work of our own. For this reason very little work has been done on our own project of fluidised carbonisation of Collie coal.

The Welshpool development has also introduced some laboratory research problems of its own relating to surface activity of coal, char, tar and pitch which call for special investigation and the setting up and elaboration of new methods and apparatus.

It is hoped that the pilot plant work on Lurgi carbonisation will diminish at Welshpool and that we will then be able to work in liaison with them on fluid carbonisation and in our own laboratory.

In conjunction with Department of Industrial Development, Welshpool, the aeration of tars to improve their briquetting properties has been investigated. A small pilot plant has been erected to define temperatures of treatment. We have carried out analyses on the products emphasising the close association of coking property with phenolic content.

Work on Collie Coal.

Liaison has been maintained with developments of deep mine and open cut working faces at Collie and samples have been taken regularly. The briquetting qualities of the Hebe seam at different levels show anomalies which should be the subject of further sampling.

The development of the Co-operative Mine through the fault below the so-called siderite section has been watched. The ash content of the new development is lower than in the siderite section and the ash fusion point is higher. If these ash characteristics continue, the clinkering trouble associated with the present working parts of the Co-operative Mine should disappear.

Collie coal samples from some users have been examined regularly. It is useful to maintain this oversight of delivered coal to compare analyses and characteristics of coal received by consumers with the coal as sampled at working faces.

Work on the weathering of Collie coal during storage has been continued in conjunction with W.A. Government Railways. It has been established to our mutual satisfaction that coal can be

stored either under cover, or under water sprinklers, without losing strength unduly. It can be picked up again and fired under locomotives satisfactorily. An interesting feature is that coal which is dried out in transit in hot weather and thereby weakened mechanically, regains strength when it is saturated with water from sprinklers. It has been confirmed that coals with ash low in iron oxide are those most suitable for long period storage since they suffer less deterioration in calorific value.

Utilisation of Sawdust.

The utilisation of sawdust as a boiler fuel, especially when fired from spreader stokers, now finds a wide following throughout the State. A valuable fuel which ten years ago was usually dumped and wasted is now used preferentially on most sawmills in the South-West and is in good demand in the metropolitan area. The preferred method of firing is by spreader stoker but some practitioners remain loyal to step grates and have improved their practice with these as the result of our interest in the matter. The value of the development has been estimated at over £500,000 annually to the sawmilling industry alone in this State. Developments are also taking place in other States following our pioneering in Western Austraila.

At one works boiler of the metropolitan area the installation of automatic firing of sawdust was overseen. In the course of the work the firing and combustion in the boiler, which for a number of years now had been a considerable cause of nuisance in the surrounding residential neighbourhood, was modified and reduced the nuisance to such a small amount that complaints have discontinued.

Another boiler installation firing sawdust and trimmings has now been placed on automatic control and it is expected that this boiler too will cease to create the nuisance which it has at times in the past.

Relating to smut emission and sawdust handling, work has been done on cyclones and dust catchers. The performance of simple louvre settlement dust catchers has been investigated. An information circular on cyclones and dust emission has been drafted and discussed. Liaison with the State Sawmills and Sawmillers Association to do field work relating to our investigational findings is the desirable step on which we should now embark.

Dust Emission.

The general matter of dust emission from sources other than sawdust burning has had some attention. Protracted measurements made on a cement works helped them in improvements of their dust catching apparatus. A sedimentation apparatus for the measurement of sub-sieve sizes of dusts has been set up and has proved of great value in dealing with dust problems.

Domestic Heating.

A new departure has been made over the past year in the setting up of test facilities for solid fuel burning appliances. A number of fuel stove cookers, water heaters, room heaters and open fires have been tested and their fuel consumption has been ascertained. Field work has also been done on these appliances to demonstrate their performance. A new type of open fire has been tested which has convected air warming features and a control of chimney draught. This is in commercial production and is warmly reported on by those who have installed it. The importance of testing domestic appliances is that a major use of all fuels and sources of heat lies in the provision of cooking, water and space heating facilities.

If consideration is given to the provision of domestic heating services in the State in the future the alternatives are electricity, gas, oil and its products, coal and wood. The latter two solid fuels will always have a very strong following, especially if the efficiency of their use is increased.

Moreover, if development of gas services in the metropolitan area continues to lag, as it does at the present time, far behind electrical development, it may be found that domestic electric loads with marked diurnal peaks will not be acceptable to power stations. A policy of extended use of efficient solid fuel devices which provide both cooking and hot water systems together with efficient solid fuel open fires may in the future be one which we will have to adopt to relieve power station peak loads. Work on solid fuel devices is therefore fully justified although it is of a simple and unglamorous character. It is the intention to pursue it to a point where brief and reliable statements can become available to the public on the performance of any type of solid fuel appliances in which they are interested.

Our work has already encouragement from the C.S.I.R.O. Forestry Division as being in line with UNESCO investigations on use of wood fuel in South East Asia.

Plaster of Paris.

A firm, whom we advised on a new method of manufacture of plaster of paris, installed and put into operation a plant embodying our ideas. The method stemmed from our work on flash drying of coal.

The plant, although a full scale production unit without any pilot plant investigation to support its design, has operated as regards quantity put through satisfactorily from the start and over the course of six months has ironed out its difficulty in quality of its product. The method of manufacture used is one which has not before found a practical solution wherever and whenever it has been attempted over the course of the last 30 years. The success in this instance owes as much to the persistence of the operators as to the soundness of the advice given to them.

Bricks, Clays and Refractories.

A number of clays for common and refractory bricks have been examined for collapse temperature when heated under load. The characteristic curves obtained in this way are a good guide to behaviour in a kiln. They indicate the temperature of collapse. They also enable a clay which will shrink and burn off in a controlled manner to be distinguished from one which fuses sharply and gets out of control in kilning so that the bricks run and clinker. Such clinkering properties can frequently be blended out on the basis of the information supplied.

Colour, notably the pink or "cream" colour which has considerable popularity, has also been investigated in blends submitted. Some blends are satisfactory but in other cases light colour is obtained by mixing a white koalinitic clay with a red common clay. Where the white clay has a high temperature of vitrefication there is a strong probability that it will not be sufficiently burnt in the blend when kilned. The bricks thus produced could therefore prove unsatisfactory in service as their unburnt constituents would be prone to weathering.

Miscellaneous.

Some investigations of road surfacing materials were undertaken for a company supplying material to the Main Roads Board. Advice on fuel and industrial matters has been given to a number of consultants and other clients seeking information on Collie coal and other specific matters.

TABLE 4.

FUEL TECHNOLOGY DIVISION 1956.

	Departmental.	Government Geologist	Metropolitan Water Supply.	Industrial Development Department.	Public Works Department.	State Brickworks.	Pay, Public.	
Briquetting Experiments (Coal, Char, Tar, Gas Briquettes)	370	....	....	....	....	....	....	370
Weathering, Storage and Railway Locomotive Trials	17	....	....	....	....	....	....	17
Fuel Laboratory Survey	11	....	....	....	....	....	....	11
Boiler Trials (Coal and Coke)	....	....	....	....	....	....	89	89
Coal—								
Miscellaneous, Collie	....	....	....	2	....	....	20	22
Collie Drilling	....	29	....	....	....	....	....	29
Sawdust and Smuts	73	....	....	....	....	....	4	77
Clay Bricks and Refractories	....	....	....	....	....	6	15	21
Gypsum and Plaster	....	....	....	....	....	....	14	14
Cupola Trials	6	....	....	....	....	....	....	6
Pipe Coating	....	....	2	....	....	....	....	2
Gas (Oil)	....	....	....	....	....	....	1	1
Bituminous Concrete and Surfacing Materials	1	....	....	....	....	....	17	18
Heating Appliances	....	....	....	....	2	....	1	3
Hogged Wood	....	....	....	....	....	....	2	2
Dust Emission	....	....	....	....	....	....	3	3
Residue (Dry Cleaning)	....	....	....	....	....	....	1	1
	478	29	2	2	2	6	167	686

INDUSTRIAL CHEMISTRY DIVISION.

GENERAL.

The Unit Process Plant was completed in May with the installation of the 40 gallon kettle and the painting of the building.

All items of equipment have passed acceptance tests and a number have been in use in connection with research and problems submitted by manufacturers.

The piping and electrical conduit systems have been painted in the colours recommended by the Australian Standards Association, making identification easy.

UNIT PROCESS PLANT.

The forced circulation evaporator, which gave some trouble in operation early was eventually run successfully. Staff shortage has prevented this useful piece of equipment from being experimentally used so far.

Concentration of solutions of gelatine and of gum from Macrozamia sp. were sucessfully carried out using the climbing and falling film evaporator, which has proved an efficient and sensitive piece of equipment.

The rotary drum drier has been used to produce flake Macrozamia gum and for drying suspensions of finely divided solids.

Much and varied work has been carried out on the emulsifier and centrifugal machines, both operating successfully, the latter after initial troubles.

The Denver flotation plant was used in experimental work on the flotation of felspar. Apart from trouble in the ball-mill classifier circuit the plant worked quite well after initial operating difficulties had been resolved. Unfortunately the concentrate was contaminated with iron from the ball mill and cells. The cells have now been given protective coatings which are under test.

Ancillary services (steam, gas, compressed air, vacuum, hot water) have operated smoothly since the plant came into commission.

CLASSIFICATION OF WORK.

Work is broadly of two types:—

(a) Consultative.
(b) Short Term Investigations.

Developmental research cannot be undertaken successfully until staff is at its former levels. A little work has been possible at isolated intervals.

(a) Consultative Work.

It is once more a pleasure to record the active co-operation of manufacturers and suppliers which has enabled us to answer satisfactorily a large number of queries. These were of the usual varied character, embracing most of the engineering fields, constructional work, chemical and fancy goods manufacture. Since work on protective coatings (referred to below) began we have received an increasing number of queries. The field of protective coatings in Western Australia is a wide and only partially developed one.

(b) Short Term Investigations.

In July we began the monthly sampling of leaves of Darwinia citriodora and from July to January flowers were collected also, from two sources; one was near the old Bickley Reservoir and the other at Red Hill on the Toodyay Road. Samples of oil extracted were sent to the University of Adelaide for bacteriological work. Reports indicated that the oil from the flowers had appreciable bacteriostatic value, while that from the leaves had less strong action. Yield from both leaves and flowers increased up to January-Feburary. It appeard that the oil might have a commercial value. It has been shown that the plant can be readily propagated asexually or from seed.

Attempts to progagate Duboisia Hopwoodii for nicotine extraction again failed but the Queensland D. Leichardtii has been grown from seed and is flourishing in the nurseries. This latter plant yields hyoscine and hyoscyamine.

A suggestion that milk tankers might be constructed of mild steel with a plastic coating instead of stainless steel was investigated. The plastic chosen was an Epikote resin-based paint which combines hardness with remarkable elasticity and good chemical resistance. Test results were impressive and a report was issued. It is understood that negotiations with the Milk Board are now in progress. A mild steel cum plastic milk tanker of 3,000 gallons capacity would cost some £2,000 less than its stainless steel counterpart and there would be a marked saving in imports. Construction, too, would be simplified.

Preliminary work on flotation of wool grease showed that the method was applicable to local wool scours. Lack of staff has prevented the subject being developed. Parallel work in the cleaning of wool by solvent extraction was also begun but had to be stopped.

Specifications for Nickel and Chromium plating were provided for Public Works Department, Architectural Division at their request.

Discoloration in bricks was traced to the presence of vanadium.

Other work included analyses of bleached beeswaxes, purification of gum from Macrozamia sp. (this gum has been successfully spray dried), investigation of greasiness of roasted peanuts, and preliminary work in concentration of ilmenite on the Wilfley table.

The protective coatings field has offered many examples of interesting applications. Commercial considerations prohibit the description of these in detail but a few may briefly be mentioned:—

Lining of iron and concrete tanks for distillation of wine with an Epikote resin.

Identification marks on hypodermic needles for polio injections. Epikote resin paint gave very good results.

Lining of a pump rotator and stator, and of the impeller of another pump, with a neoprene.

Lining of the rear fuselage of trainer aircraft to combat the effects of acid spillage in the course of aerobatics.

Coating of tanks on aircraft used in aerial spraying.

Prevention of corrosion in tanks at wool-scouring works.

Non-slip concrete steps, using a neoprene preparation.

MINERALOGY, MINERAL TECHNOLOGY, AND GEOCHEMISTRY DIVISION.

One thousand and nineteen (1,019) samples were received during the year. The main sources of samples were as follows: General public, 665 (free 456, pay 209); State Batteries Branch, 217; Geological Survey Branch, 112. The description and origin of these samples is shown in Table 5.

Alloys and Metals.

The seven samples examined included solder, aluminium scrap and cast steel. An analysis was made of worn-out tungsten carbide drill inserts for a company interested in the recovery of the tungsten content.

Corrosion.

A series of examinations of copper tubing and corrosion products from the hot water service of the Royal Perth Hospital was continued for the Interdepartmental Committee on Corrosion.

Metallic Ores and Minerals.

Six hundred and sixty-two samples of metallic ores and minerals were received for identification and/or assay. Brief details of some of these groups are as follows:—

Copper.

Interest in copper ores was maintained, largely due to the demand for the oxidised ore for alleviating copper-deficiency in agricultural areas. 51 samples were received during the year.

Gold.

One hundred and sixty-five samples of gold tailings from State Batteries were assayed. Of these, 35 were umpire assays, the remainder being checks on battery assays. Twelve balance riders for State Batteries were checked for accuracy against standard National Physics Laboratory riders.

In addition to samples from State Batteries, 79 samples of ores and tailings were received from prospectors for gold assays.

Iron.

Ninety-six samples of iron ore were examined in connection with the state-wide survey being made by the Geological Survey Branch.

Lead.

Ten samples of lead ore were examined (one in connection with health hazards at the Ragged Hills Mine). In addition, 32 samples of concentrates and tailings, taken from parcels treated by the Northampton State Battery, were check assayed for lead and zinc.

Manganese.

Forty-four samples of manganese ore were assayed for manganese, iron and silica for the Bureau of Mineral Resources, Melbourne. The samples were taken during a survey of the Woodie Woodie, Skull Springs and other localities in the Pilbara G.F.

Tin.

Ten samples of pegmatite and granite from the Pilbara G.F. were examined in detail to assist the Government Geologist in the correlation of various scattered outcrops with the known tin-producing fields in that area.

Heavy Sands.

One hundred and seven samples of heavy sands were received during the year, reflecting the increasing interest in the ilmenite resources of the State. Samples were mainly from coastal areas ranging from Carnarvon to Esperance, though high grade samples were also received from the vicinity of Dumbleyung. In most cases, both the nature and the percentage composition of the heavy mineral fraction were determined.

Other Titanium Products.

At the request of the Department of Industrial Development information was collected on the economic and technical aspects of the production of titanium metal and titanium pigment.

From available data it was concluded that production of either the metal or the pigment from the raw materials available in this State would not at present be economically feasible.

Analyses were made of ilmenite concentrates obtained from preliminary work on commercial plants which have started, or are approaching, production. In addition, the angle of repose of these concentrates, at various moisture contents,

was measured for the information of the Director of Navigation and as a guide to shipping companies expecting to handle the product.

Radioactive Minerals.

Of the mineral specimens examined, fourteen showed radioactivity, one from Nullagine assaying 0.35 per cent. uranium oxide (U_3O_8). Specimens of yttrotantalite and euxenite showed considerably higher activity (see under Minerals for Determination), but aside from these the uranium content of the remaining samples was not significant.

A hand-picked specimen of monazite from Eleys was analysed for uranium and thorium to provide a radiometric standard.

Other Economic Minerals.

Sixty-three samples of "non-metallic" economic minerals were examined. Over half were in connection with lime production.

Lime (burnt).

Thirty-two samples of burnt lime were tested for free-lime content. Of the eight samples analysed only half met the W.A. Government Tender Board's Specification for caustic lime, namely, 86 per cent. CaO on the ignited sample.

Clay.

Sixteen samples of clay were received. Most were subjected to burning, porosity, colour and shrinkage tests to assess their value as ceramic raw-materials.

MINERALS FOR DETERMINATION.

Two hundred and thirty-two specimens were submitted for identification and evaluation. The following were of particular interest.

Yttrotantalite (a complex oxide of tantalum and rare earths, with minor amounts of niobium, calcium, uranium, thorium, titanium). Two specimens were received: one, from three miles N. of Woodstock Station (N.W. Division), showing a radioactivity equivalent to 5.4 per cent. U_3O_8. (this includes that due to both U_3O_8 and ThO_2). The other was forwarded from the Cooglegong tin-fields in the Pilbara.

Euxenite (uranium-bearing rare-earth niobate and titanate). A specimen of this rare mineral was received from seven miles S.S.W. of Yinnietharra Station homestead. Its radioactivity was equivalent to 10.1 per cent. U_3O_8.

Gadolinite (silicate of beryllium, iron and yttrium) was received from three miles N. of Woodstock Station.

NEW MINERAL LOCALITIES.

A number of minerals were identified from localities from which the occurrence of the species had not previously been recorded. These included:—

Ilmenite (oxide of iron and titanium). From Dalgaranga homestead, via Yalgoo.

Stibnite (antimony trisulphide). A specimen associated with quartz and pyrite was received from Dalgaranga homestead.

Micaceous Hematite and altered corundum (aluminium oxide) were received from Mullewa. The corundum was too altered to be of commercial value as an abrasive.

Zoisite (hydrated calcium-aluminium silicate) was reported from Turner River, 85m. S.E. of Port Hedland. It occurred in association with feldspar.

Actinolite (calcium magnesium iron amphibole) and *Enstatite* (magnesium silicate) occur as bunches of fine needles in a very pale green rock received from Ferguson, 8m. from Dardanup.

Manganese Ore was recorded for the first time from the Woodie Woodie Creek area in the Pilbara G.F.

MISCELLANEOUS.

Complete Analysis.

A complete analysis was carried out on a yellow resinous uranium-bearing mineral from M.C. 115, 13 miles S. of Nullagine. The Specific Gravity was 4.775 and Refractive Index over 1.85. As the material was metamict, no distinct X-ray diffraction pattern was obtained. The results of chemical analysis indicated that the sample was a hydrated alteration-product of yttrotantalite or other columbo-tantalite rare earth mineral. Until further work is carried out, such as controlled heat treatment for further X-ray work, and differential thermal analysis, it is not yet possible to associate this mineral with any known species.

Analytical results were as follows:—

	Per Cent.
Niobic Oxide, Nb_2O_5	34.71
Tantalic Oxide, Ta_2O_5	21.72
Titania, TiO_2	1.95
Tin Oxide, SnO_2	2.78
Tungstic Oxide, WO_3	Trace
Uranous oxide, UO_2	Nil
Uranic Oxide UO_3	4.54
Cerium group of Rare Earths, Ce_2O_3, etc.	1.57
Yttrium group of rare earths, Y_2O_3, etc.	2.10
Thoria, ThO_2	2.75
Zirconia, ZrO_2	Nil
Ferrous oxide, FeO	Nil
Ferric oxide, Fe_2O_3	1.42
Alumina, Al_2O_3	3.63
Silica, SiO_2	4.97
Manganous oxide, MnO	0.11
Zinc oxide, ZnO	Nil
Barium oxide, BaO	Nil
Lime, CaO	Nil
Magnesia, MgO	Nil
Lead Oxide, PbO	3.04
Potash, K_2O	0.03
Soda, Na_2O	0.09
Combined water, H_2O+	8.97
Moisture, H_2O-	5.70
Chlorine, Cl	Nil
Fluorine, F	0.02
	100.10
Minus $O = F_2$	0.02
ANALYST: D. Burns	100.08

Building Materials.

A sample of concrete taken from a half-million gallon tank at Bullfinch was examined for the Public Works Department to ascertain the cause of excessive detericration. Tests indicated that failure had probably been due mainly to sulphate attack. Material from the original sand pit was subsequently analysed and found to contain 5.83 per cent of gypsum.

Kalgoorlie Ores.

Progress was made in the detailed investigation of 577 specimens of gold ore from the mines of the Golden Mile, submitted by the Geological Survey Branch.

TABLE 5.

Mineralogy, Mineral Technology and Geochemistry Division.

	Pay—Public.	Free.	State Batteries.	Government Geologist.	State Mining Engineer.	Departmental.	Department of Industrial Development.	Public Works Department.	Agriculture Department.	Native Welfare Department.	Public Health Department.	Interdepartmental Committee on Corrosion.	Police Department.	TOTAL.
Alloys and Metals	5	1	....	....	....	....	....	1	....	....	....	....	....	7
Corrosion	....	....	....	....	....	....	....	1	....	....	....	3	....	4
Ceramics—														
Clays	....	16	....	....	....	....	1	....	....	....	....	....	....	17
Refractories	1	....	....	....	....	....	1	....	....	....	....	....	....	2
Metallic Ores and Minerals—														
Bismuth	2	2	....	....	....	....	....	....	....	....	....	....	....	4
Copper	9	41	....	....	....	....	....	....	....	1	....	....	....	51
Gold Ores	8	71	....	....	....	....	....	....	....	....	....	....	....	79
Gold Tailings (State Batteries)	....	....	130	....	....	....	....	....	....	....	....	....	....	130
Gold Tailings (Umpires)	....	....	35	....	....	....	....	....	....	....	....	....	....	35
Heavy Sands	35	72	....	....	....	....	....	....	....	....	....	....	....	107
Titanium Ores and Products other than Heavy Sands	26	....	....	....	....	....	....	....	....	1	....	....	....	27
Iron Ores	....	4	....	96	....	....	....	....	....	....	....	....	....	100
Lead Ores	2	7	32	....	....	....	....	....	....	....	1	....	....	42
Manganese Ores	48	5	....	3	....	....	....	....	....	....	....	....	....	56
Columbite	5	....	....	....	....	....	....	....	....	....	....	....	....	5
Tantalite	6	....	....	....	....	....	....	....	....	....	....	....	....	6
Uranium	....	1	....	....	....	....	....	....	....	....	....	....	....	1
Molybdenite	....	3	....	....	....	....	....	....	....	....	....	....	....	3
Tin Ore	....	1	....	....	....	....	....	....	....	....	....	....	....	1
Tungsten Ore	....	1	....	....	....	....	....	....	....	....	....	....	....	1
Minerals showing Radioactivity	....	13	....	....	....	1	....	....	....	....	....	....	....	14
Other Economic Minerals—														
Baryte	....	....	....	....	....	....	....	....	....	1	....	....	....	1
Bentonite	....	3	....	....	....	....	....	....	....	....	....	....	....	3
Beryl	....	3	....	....	....	....	....	....	....	1	....	....	....	4
Corundum	....	1	....	....	....	....	....	....	....	....	....	....	....	1
Dolomite	....	3	....	....	....	....	....	....	....	....	....	....	....	3
Glauconite Sand	....	....	....	....	....	....	....	....	1	....	....	....	....	1
Gypsum	....	1	....	....	....	....	1	....	....	....	....	....	....	2
Lime (burnt)	23	....	8	....	....	....	1	....	....	....	....	....	....	32
Limestone	....	3	....	3	....	....	....	....	....	....	....	....	....	6
Magnesite	8	....	....	....	....	....	....	....	....	....	....	....	....	8
Ochre	....	2	....	....	....	....	....	....	....	....	....	....	....	2
Mineral Specimens for Determination	18	199	....	10	3	....	....	....	....	1	....	....	1	232
Miscellaneous—														
Construction and Building Materials	....	3	....	....	....	....	....	6	....	....	....	....	....	9
Cement Raw Materials	9	....	....	....	....	....	....	....	....	....	....	....	....	9
Glass Wool	1	....	....	....	....	....	....	....	....	....	....	....	....	1
Standardisation of Riders	....	....	12	....	....	....	....	....	....	....	....	....	....	12
Complete Mineral Analysis	....	....	....	....	....	1	....	....	....	....	....	....	....	1
	206	456	217	112	3	2	4	8	1	5	1	3	1	1,019

DIVISION VIII

Annual Report of the Chief Inspector of Explosives for the Year 1956

THE UNDER SECRETARY FOR MINES:

For information of the Hon. Minister for Mines, I have the honour to report on the work and objectives of the Explosives Branch in 1956.

Importation of Explosives.—Adequate supplies which on occasions stocked the Woodman's Point and Kalgoorlie magazines to their licensed limits were maintained with the usual small fleet, supplemented in December by the Auxiliary ketch Falie. As formerly, a few tons came by rail and in iron-ore ships. Although conditions at the coast were generally favourable this year, attention is focussed on the wisdom of regulating despatch to avoid our recognised stormy season. Such a plan, necessarily linked with shipping schedules and availability of manufactured explosives, may operate shortly when a new 16,000 case vessel replaces the old wooden Wongala of three-quarters this capacity. Apart from obviating delay through bad weather, certain economies both at the forwarding and receiving points should accrue from the State's requirements being fulfilled by fewer but larger shipments appropriately spaced.

Quantities and Types of Explosives.—Comparison of Table 1 below with last year's returns discloses increased importations of explosives, detonators and fuse to the order of 15 per cent., 12 per cent., and 9 per cent. respectively. The disparity between these figures and the actual 8 per cent. rise in consumption is accountable to the present substantial reserves. Except for millisecond delay detonators and a few other lines not yet made in Australia, all explosives were the product of the Nobel factory at Deer Park near Melbourne. New varieties to hand included trial consignments of a modified Semigel and an experimental gelignite-like composition known as D.P. 12, both incorporating lanolin as a moisture-absorption inhibitor. This substance, readily available and superior to a vast array of fats, waxes and greases investigated, confers remarkable life on cartridges in wet shot-holes. Its ability to protect stored explosives from deterioration by humidity is still under examination. Detonators, unchanged for many years, are now marketed with P.E.T.N. replacing tetryl as a base charge.

TABLE No. 1.

Importation in 1956—cases of 50 lb. net weight.

Explosives—	
A.N. Gelatin Dynamite	4,765
A.N. Gelignite 60	66,730
Plastergel	500
A. 3 Monobel	620
Quarigel	400
Geophex	9,334
Ajax	500
Roxite	450
Semigel	34,308
Quarry Monobel	3,855
Monograin	3,787
D.P. No. 12	135
Blasting Powder	210
Whaling Powder and Charges	100
Detonators (Number)—	
Plain No. 6	3,450,000
Electric No. 6	137,000
Delay	129,670
Submarine No. 8	22,550
Fuse (Yards)—	
Safety	7,087,200
Detonating	105,000

Comparison with previous years.—The following figures summarize the importations since 1952:—

TABLE No. 2.

	1952.	1953.	1954.	1955.	1956.
Explosives (cases)	121,017	114,916	120,201	109,340	125,694
Detonators (number)	3,931,943	4,447,870	3,745,850	2,454,400	3,739,220
Fuse (yards)	5,368,000	6,438,400	7,363,200	6,512,600	7,192,200

Use of Explosives.—Records back over half a century indicate that gold mining consumes more explosives than all other industry combined, and the year under review shows no recession. Generally the requirements for various purposes remain at about the same ratio except in the instance of oil exploration, which has rapidly jumped from obscurity to become the second largest user. Geophex, the special high velocity gelignite employed in this geoseismic survey work, actually

exceeded by 502 cases the amount of explosive needed for winning coal. The main purposes to which explosives were put are tabulated below:—

TABLE No. 3.

Principal Consumers in 1956.

(Cases of 50 lb. net weight.)

Mining—	
Gold	79,020
Coal	8,832
Quarrying (including limestone for cement manufacture)	8,801
Lead	876
Tin	76
Iron	897
Manganese	553
Asbestos	3,650
Construction—	
Main Roads	315
Timber	154
Railway	18
Brickworks	330
Public Works	1,480
Oil Exploration	9,334
Whaling	100
Miscellaneous	1,834

Analyses and Tests.

TABLE No. 4.

	Determinations.
Explosives—	
Heat Testing, Sensitivity, Chemical Analysis	2,400
Fuse—	
Compliance with Mines Regulations Act requirement	605
Fireworks—	
Percussion, Firing Tests, Chemical Analysis	508
General—	
Police exhibits, packaging materials, electric shot firing equipment, chemicals used in heat testing, etc.	Several hundred

Licensed Storage.—Except for furthering the campaign against insecurely stored explosives and ordering repairs to several blast mounds at Woodman's Point Reserve, there is little to report. Last year's drive to account for all stored explosives in licensable quantity was continued with good results, but several cancellations due mainly to completion of works caused a slight overall fall in licenses. Firework retailers' licenses increased by 3.5 per cent.

In the following table, slightly different from former returns inasmuch that mining leases are now categorized as Government lands, the several classes of current licenses are shown:—

TABLE No. 5.

Licenses Issued under the Explosives Act.

Magazines on Government Reserves	56
Magazines on Government lands not reserves	64
Magazines, privately owned, on non-governmental land	98
Stores, Mode A	77
Store, Mode B	1
Fireworks—storage and sale	544
Fireworks—manufacture	2
Explosives, importation	2

The Quality and Packaging of Explosives.—Heat test determinations, the criteria of stability, were invariably satisfactory, despite occasional disparity between samples of the same batch and date of manufacture. These fluctuations, ascribed by some authorities to traces of copper from extruding machines used after a shut down period, are unimportant when depressed values lie above the safety limit, but a clearer explanation is nevertheless being sought by investigations now in progress. No exudation, or migration of nitroglycerin from the explosive composition, was detected, and the only instance of desensitization by moisture was that of a solitary case of gelignite, rejected because of accidental wetting in transit. With some powder-type explosives, spillage through imperfect end closing contaminated the bulk, which then had to be manually cleaned before passing for consumption. This defect, erratic but by no means heavy in incidence, could only be detected and rectified by opening every case—an impossible task with existing facilities and in measure undesirable because the liners cannot be resealed to original perfection. Packaging generally was satisfactory except for Geophex cases in which excessive ullage space appeared to give rise to an internal hammering effect from the 5lb. cartridges during handling.

Shipping and Unloading.—A serious situation threatened to develop early in February when A.V. Wongala alongside Woodman's Point, and M.V. Taranui standing in Owen's Anchorage failed to secure labour for unloading because of a strike. In total, 17,765 cases of explosives were held up. Although land magazine stocks of most lines were sufficient for a fortnight's industrial requirements, a heat wave at the time caused grave fears that temperature and humidity in the vessels' holds might initiate spoilage of the cargo. It was recalled how years ago, when explosives were imported from England, hot damp conditions during the Red Sea journey were blamed for periodic heavy deterioration. Apprehension was sustained by actual measurements which recorded 104°F in an almost saturated atmosphere under the wooden Wongala's decking. The situation aboard the Taranui of steel construction, would undoubtedly have been worse. All relevant detail was embodied in a report for deliberation by a conference of the several interests concerned, with the gratifying outcome that work commenced immediately. Both vessels were cleared between February 5th and 10th.

Later shipping movements in 1956 were almost without incident. To maintain the accelerated transfer from hold to magazine, however, modern rolling stock to replace or at least supplement the present equipment is essential. One of the vans is stamped 1898; this and others of probable similar vintage are believed to have been more or less discarded by the W.A.G.R. many years ago.

Inspection of Explosives.—The major activity, occupying a total of 30 to 40 days' work, was concentrated on explosives arriving at Woodman's Point Reserve. Explosives under observation and several overhaul jobs also came up for attention. All South-West licensed retailers and magazines, including those supplying collieries, were inspected in March, and although metropolitan and near-country centres could not be completely covered, various localities were visited to determine suitable magazine sites. This latter service, an essential part of the Branch's work, is being increasingly sought by users. Without prior advice on safety distances, industry may be considerably incommoded, as was the case when factory buildings at Spearwood were erected so close to a magazine, in itself a model of what explosives storage should be, that licensing for only about one-fifth of the intended capacity could be granted.

Inspections—General.—The usual watch was exercised as to ships' gear, slings, unloading platforms, roller conveyors and vehicles of all kinds for conveyance of explosives. Movements of ordnance at the Fremantle wharves again called for personal attention until, toward the end of the year, several

such operations took place from the naval jetty south of Woodman's Point. If this portends a step in the direction of excluding explosives from the harbour it will mark progress toward safety.

Results of Inspections.—Little if any deliberate disregard of regulations was shown by licensed storekeepers and magazine holders as a class. The same remark may be applied generally to the handling and transportation of civilian explosives. Naval munition transfers to and from ships maintained a high standard of safety except in one instance where deck cargo comprising methyl alcohol, sodium borate and cellulose adhesive was stored within a few feet of time fuses. The Army, under provisions of the Commonwealth Explosives Act, landed a consignment of 25 pdr. shell in October at Victoria Quay. The cases were conveyed by forklift through a wharf shed to rail trucks without mishap—but not without anxiety on the part of the Fremantle Harbour Trust and ourselves as to the consequences of explosion so near the town.

Defective Explosives.—Safety fuse showing bruise marks, one of which allegedly caused a misfire by extinguishing the burning powder core, was examined at a Darling Range quarry and thence returned to the manufacturer for explanation. Certain characteristics of the drum winder were held responsible without, however, affecting burning rate and continuity. Alternative reasons for failure such as cut-offs or severe damage to the fuse after delivery were suggested. From a fertilizer factory came three unexploded detonators crimped to remnants of fuse too short for examination. As the detonators themselves could be fired in contact with others, failure to remove sawdust or cut a fresh end of fuse may have been to blame.

Destruction of Explosives.—In addition to the routine burning of samples after examination, much material submitted by the Police and small quantities from private owners was destroyed. The condition of these explosives ranged from perfect to useless, if not dangerous, and in all instances of unknown age and history, destruction is believed the wisest course.

Accidents.—At a coronial inquiry into the death of a man struck by slag blasted from a heap under demolition, evidence showed that he ignored repeated warnings to take cover. There was no indication of faulty or misused explosives. An instance of two men being injured, one fatally, by explosion and fire at an untenanted Mt. Lawley house was peculiar inasmuch that gelignite found in the deceased's car had no connection with the tragedy. The cause was established as ignition of vapor from petrol, of which several gallons had been thrown about the premises. Traces were identified analytically on the seared linoleum and on one of the men's shoes.

A miner's death from carbon monoxide poisoning after firing out at North Kalgurli (1912) Ltd., though not directly investigated by the Explosives Branch, has since been subjected to much discussion centering around explosives composition, oxygen balance, the use of spacers and similar features of which a better understanding might assist in reducing these unfortunately recurrent disasters.

Investigation of Ground Vibration.—Although we do not possess vibrographic apparatus for measuring ground tremor set up by explosions, problems dealing with the effect at specified localities have been solved by application of a formula relating amplitude to distance and weight of a charge. No great accuracy is claimed because a constant entering into the equation can only be evaluated from vibrographic data. However, by assuming its highest accepted value for given soil and rock formations, the greatest possible amplitude may be determined. Comparisons with recognized standards serves to demonstrate safety or potential danger. Working along these lines, it has been possible to assure the Naval Armament Reserve Authorities at Byford that their magazines and other buildings will not suffer deterioration from blasting at an adjoining brick works quarry. A less decisive reply was given to the Main Roads Department regarding a controlled access road in South Coogee because in this instance noise and flyrock also had to be considered.

Pryotechnics.—Samples representing the usual numerous firework consignments all complied with requirements except for Hong Kong throwdowns, of which about half had burst to leave little more than shredded paper in the packets. Of the remainder, many failed to explode on hard impact. Analysis revealed erratic proportioning of the active silver fulminate which, almost absent in some, greatly exceeded the permissible 40 grains per thousand in the over sensitive specimens. As further explosions occurred during handling, several cases were destroyed. Another interesting finding was that of sparklers extinguishing prematurely; they were returned to the manufacturer.

An innovation in fireworks composition consisted in the replacement of gunpowder by a potassium benzoate-perchlorate resin mixture in certain exploding types submitted as samples by a British firm. Among advantages claimed was the virtual eliminations of "duds." Firing trials with small crackers produced very sharp explosions and shattering likely to be injurious at close quarters, and as regulations disallow substitution of gunpowder in exploding varieties, the new lines are not acceptable here pending discussion of the subject at the 1957 Explosives Conference.

The advisability of holding "bonfire night" earlier than the traditional November 5th celebrations was discussed by several local authorities from districts of severe fire hazard. The related subject of prohibiting firework sales during summer also came into prominence. The W.A. Fire Brigades Board and Explosives Branch align in principle with these views, whilst at the same time envisaging trade and other difficulties unless long notice of impending changes were given.

A product known as Atomic Flash Wool, offered for sale by a Perth toy shop, first came under notice by communication from the Superintendent of the N.S.W. Explosives Department, who sought to verify the assertion that supplies reaching Sydney had been "passed" by W.A. Used in legerdemain and stagecraft because of its property of flashing instantly on ignition, the "wool" on chemical examination proved to be a nitrated cotton of variable residual acidity—in short, an explosive of potentially unstable composition. Its preparation and sale were promptly banned.

A small fire aboard a vessel at Fremantle originated among fusee matches. The heads, on analysis, were found to be normal, but they were neither insulated one from another nor protected outwardly in a sealed metal container as required under shipping regulation.

Back yard explosives technology continues to intrigue juveniles, some of whose products reveal considerable understanding of the chemical aspects involved. Other experimenters, unfortunately, seem indifferent to the dangers of compounding certain reagents and the havoc wrought by blast, flame and disintegration. Small gumnut bombs are bad enough, but an instance of a much larger lethal article examined recently for the C.I.B. demands special mention. The remains, when pieced together, showed that a pickle bottle of explosive composition had been set in concrete in a half gallon can and sealed with pitch. Apparently abandoned after the fuse failed, the bomb was found by a boy who sustained serious injury on exploding it by a hammer blow. Traces of red lead and aluminium were detected—chemicals which with others similarly hazardous in admixture may be openly purchased without inciting suspicion. There seems no remedy except that, as in N.S.W., one avenue has been closed by strict control of chlorates

and similar reagents in teaching laboratories. Publicity in schools might be some deterrent, and yet there is always the class of child who would capitalise the knowledge thus acquired.

Woodman's Point Explosives Reserve.—Various routine matters such as reconditioning tracks and embankments to ensure safety with mechanical traction received due attention. More than half the total length, including all former poor sections, is now in good order. The year's most noteworthy development, however, was an agreement with the Fremantle Harbour Trust to share costs of a four-inch pipeline connecting the main in Cockburn Road with the jetty. Several hydrants, three smaller outlets and branches to the heat testing laboratory and other consuming points are to be installed.

The new service, expected to operate early in 1957, will at last furnish adequate means for fighting fire and watering ships.

Acknowledgments.—An increased throughput of explosives this year has made heavier demands on the staff, each member of which handled his extra duties efficiently. Those responsible for the clerical, typing and recording work are also to be commended. The Branch has enjoyed continual cordial association and co-operation with Commonwealth, State Government and private departments and individuals. Special reference is made to the Director of Chemical Laboratories, without whose analytical reports and advice many of our investigations would have been impossible to undertake.

F. F. ALLSOP,
Chief Inspector of Explosives.

DIVISION IX

Report of Chairman, Miner's Phthisis Board and Superintendent Mine Workers' Relief Act

Under Secretary for Mines:

I have the honour to submit for the information of the Honourable Minister for Mines, my report on this Branch of the Mines Department for the year, 1956.

The State Public Health Department under arrangements with this Department continued the periodical examination of mine workers, the work being carried on continuously by the Kalgoorlie District Hospital, and a mobile x-ray unit visited the Yilgarn, Coolgardie, Dundas and Phillips River Goldfields. In addition, a radiographer travelled by air and examined miners at Wittenoom Gorge and Yampi.

Mine Workers' Relief Act.

The examinations under the Mine Workers' Relief Act during the year totalled 5,067 as compared with 5,043 for the previous year, an increase of 24. The results of the examinations for 1956 together with figures for previous years are shown in the Tables annexed hereto. A graph is also attached illustrating the trend of the examinations since their inception in 1925. In explanation of these figures I desire to make the following comments.

Normal, etc.: These numbered 4,600 or 90.78 per cent. of the men examined, and include men having first class lives, or suffering from pneumoconiosis only. The figures for the previous year being 4,559 or 90.40 per cent.

Early Silicosis: These numbered 426 of which 25 were new cases and 401 had been previously reported, the figures for 1955 being 63 and 386 respectively. Early Silicotics represent 8.41 per cent. of the men examined, the percentage for the previous year being 8.90 per cent.

Advanced Silicosis: Of the 33 cases reported eight were men who advanced from early silicosis during the year, the other 25 having been reported previously. Advanced silicotics represent 0.65 per cent. of the men examined, the percentage for the previous year being 0.62 per cent.

Silicosis Plus Turberculosis: Four cases were reported compared with three in 1955.

Tuberculosis only: Four cases were reported compared with one in the previous year.

MINES REGULATION ACT.

Examinations under the Mines Regulation Act totalled 1,283. These were in addition to the 5,067 examinations under the Mine Workers' Relief Act. There was a decrease of 361 examinations under the Mines Regulation Act in 1956 as compared with those in 1955. Of the total of 1,283 men examined, 874 were new applicants and 409 re-examinees for the Initial Certificate.

Particulars of the examinations are as follows:—

New Applicants:	
Normal	856
Pneumoconiosis	6
Silicosis early	1
Silicosis advanced	Nil
Query Tuberculosis	8
Pneumoconiosis plus Query Tuberculosis	1
Other conditions	2
	874

Of the above applicants for admission into the industry 856 received the Initial Certificate (Form 2), three received Temporary Rejection Certificates (Form 3), 13 received Rejection Certificates (Form 4) and in two cases no certificate was issued. Thus of 874 applicants, 856 or 97.94 per cent., were eligible for employment anywhere on a mine.

Re-examinations:	
Normal	323
Pneumoconiosis	53
Silicosis Early	14
Query Tuberculosis	1
Pneumoconiosis plus Tuberculosis	1
Silicosis Early plus Query Tuberculosis	2
Other conditions	15
	409

These men had previously been examined and some were engaged in the industry prior to this examination. Three hundred and twenty-three received Initial Certificates (Form 2), one received a Temporary Rejection Certificate (Form 3), two received Rejection Certificates (Form 4), 41 received Re-admission Certificates (Form 5), 37 received Special Certificates (Form 9) and no certificate was issued in five cases. Thus of the 409 men examined, 364 men were eligible for employment anywhere on a mine, 37 were eligible for surface work only and eight were not eligible to work on a mine.

Grouping the two sets of figures discloses that the following Certificates were issued under the Mines Regulation Act.

Initial Certificate (Form 2)	1,179
Temporary Rejection Certificates (Form 3)	4
Rejection Certificates (Form 4)	15
Re-admission Certificates (Form 5)	41
Special Certificates (Form 9)	37
No Certificates	7
	1,283

The percentage of men of normal health (Initial Certificates) to the number examined was 91.89, compared with 91.73 per cent. in 1955.

THE MINERS' PHTHISIS ACT.

The amount of compensation paid during the year totalled £17,644 0s. 10d. compared with £18,828 15s. for the previous year, a decrease of £1,184 14s. 2d. which can be attributed to the death of some of the beneficiaries and the attainment of the age of 16 years by some of the dependant children.

The number of beneficiaries under the Act on the 31st December, 1956, was 158, being 15 ex-miners and 143 widows.

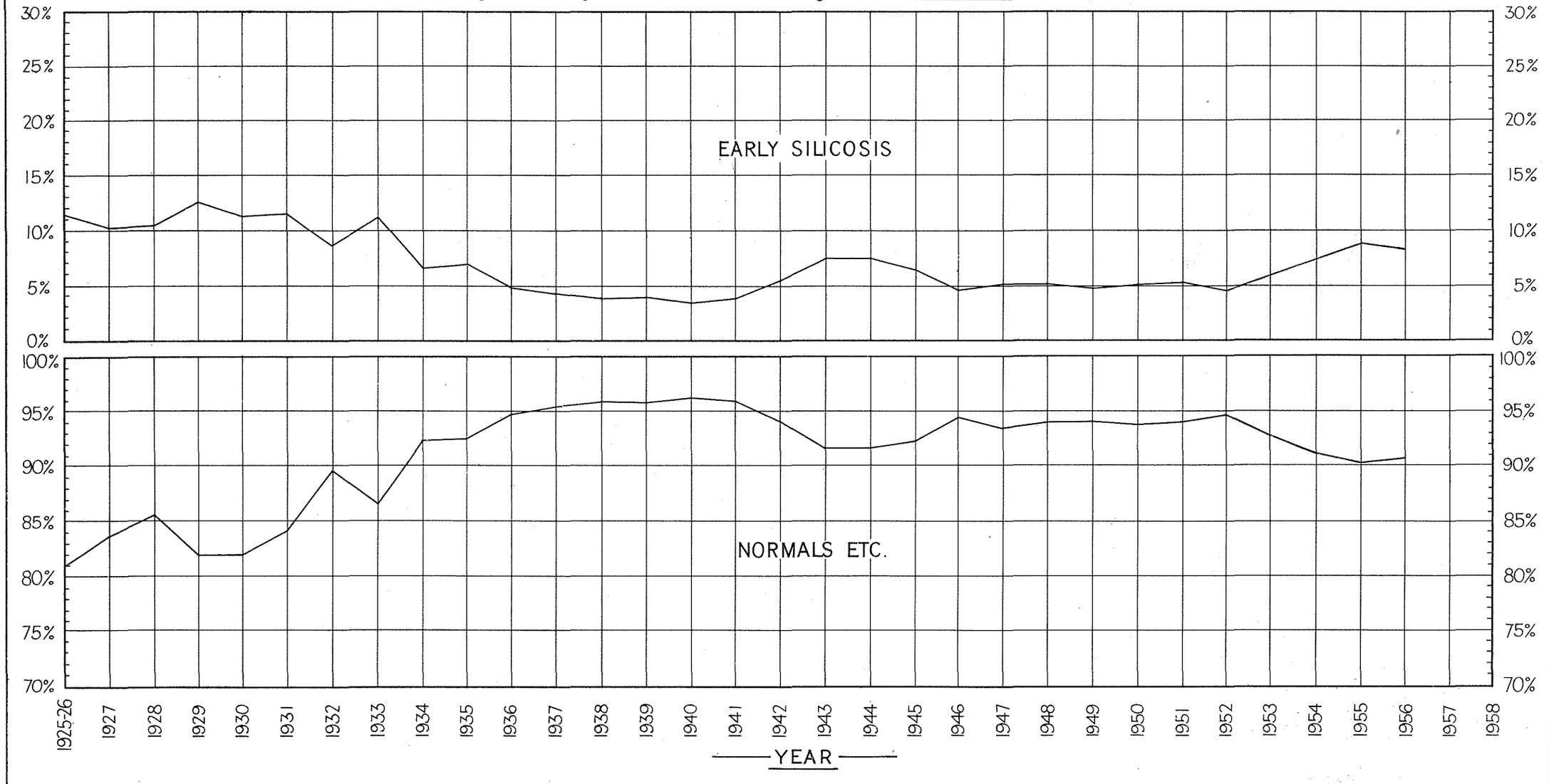
(Sgd.) W. Y. R. GANNON,

Chairman Miners' Phthisis Board,
and Superintendent Mine Workers' Relief Act.

PERIODICAL EXAMINATION OF MINE WORKERS

GRAPH Nº 1

Showing Percentages of Normals and Early Silicotics from 1925-26 onwards



PERIODICAL EXAMINATION OF MINE WORKERS

GRAPH No. 2

Showing Percentages of Silicosis Advanced, Silicosis plus Tuberculosis and Tuberculosis only, from 1925-26 onwards.

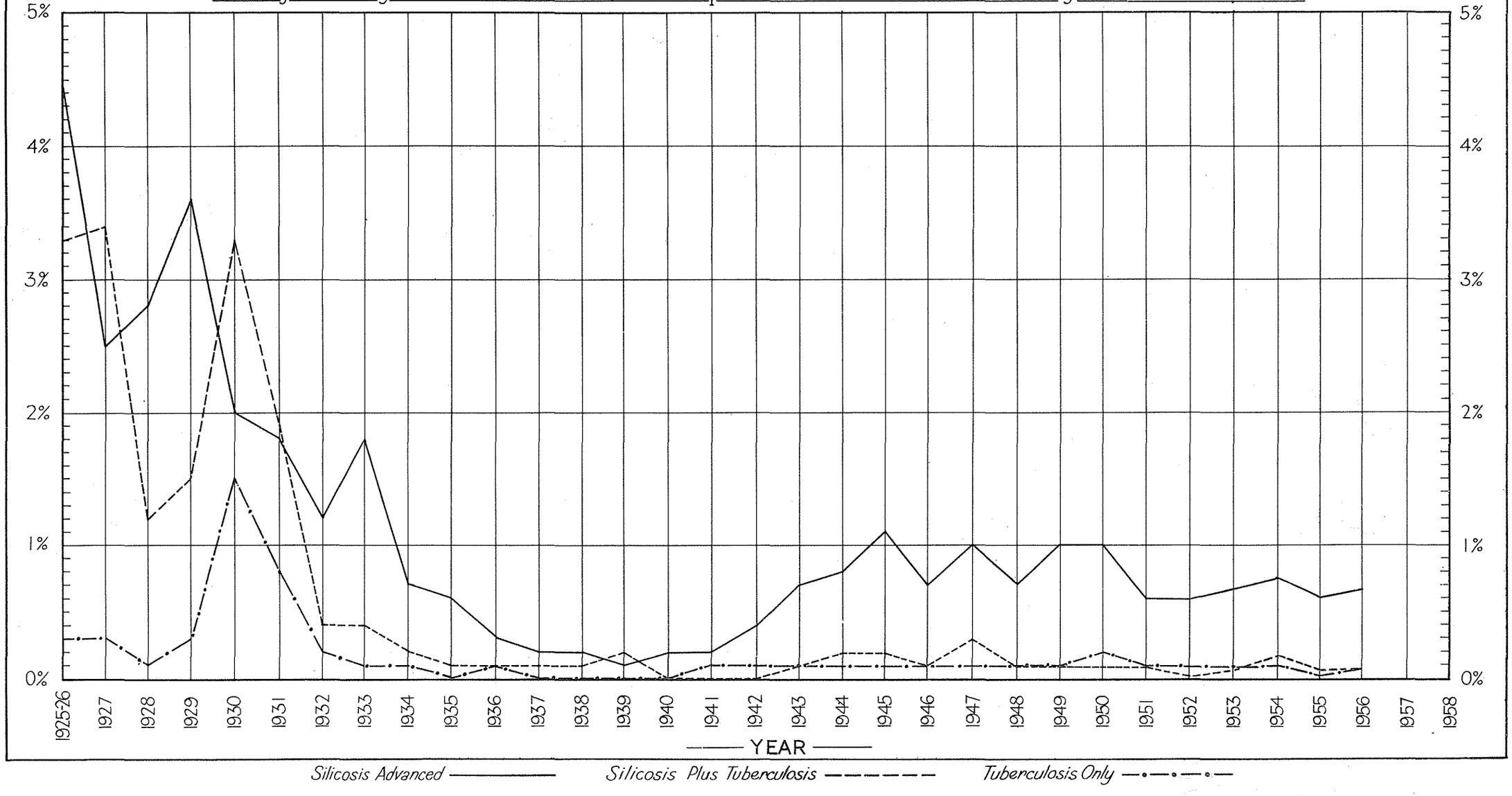


TABLE SHOWING RESULTS OF PERIODICAL EXAMINATION OF MINE WORKERS FROM INCEPTION OF EXAMINATIONS (1925).

Year of Examination.	Normal, etc.				Silicosis Early.					Silicosis Advanced.						Silicosis Plus Tuberculosis.							Tuberculosis Only.				Total Number of Men Examined.
	Previously reported as Normal, etc.	New Cases.	Total.	Per cent.	Previously reported as Normal, etc.	Previously reported as Silicosis Early.	New Cases.	Total.	Per cent.	Previously reported as Normal, etc.	Previously reported as Silicosis Early.	Previously reported as Silicosis Advanced.	New Cases.	Total.	Per cent.	Previously reported as Normal, etc.	Previously reported as Silicosis Early.	Previously reported as Silicosis Advanced.	Previously reported as Silicosis plus Tuberculosis.	New Cases.	Total.	Per cent.	Previously reported as Normal, etc.	New Cases.	Total.	Per cent.	
1925 1926	....	....	3,239	80·5	....	....	....	459	11·4	....	....	....	....	183	4·5	....	....	....	....	....	131	3·3	....	....	11	0·3	4,023
1927	2,290	826	3,116	83·6	....	348	33	381	10·2	....	....	85	8	93	2·5	13	27	62	....	26	128	3·4	....	....	10	0·3	3,728
1928	2,738	239	2,977	85·5	47	303	12	362	10·4	1	16	79	2	98	2·8	10	14	10	....	8	42	1·2	3	1	4	0·1	3,483
1929	2,099	21	2,120	81·9	100	224	2	326	12·6	....	34	60	....	94	3·6	8	14	19	....	....	41	1·6	7	....	7	0·3	2,588
1930	2,751	34	2,785	81·9	133	247	3	383	11·3	....	22	43	2	67	2·0	6	60	46	....	2	114	3·3	47	3	50	1·5	3,399
1931	2,530	....	2,530	84·0	94	252	....	346	11·5	....	18	35	....	53	1·8	4	35	19	....	....	58	1·9	25	....	25	0·8	3,012
1932	3,835	....	3,835	89·5	35	338	....	373	8·7	....	6	47	....	53	1·2	3	9	4	....	....	16	0·4	8	....	8	0·2	4,285
1933	2,920	....	2,920	86·5	57	322	....	379	11·2	1	15	44	....	60	1·8	2	9	4	....	....	15	0·4	3	....	3	0·1	3,377
1934	5,140	....	5,140	92·4	54	315	....	369	6·6	1	24	12	....	37	0·7	6	6	....	....	....	12	0·2	5	....	5	0·1	5,563
1935	4,437	....	4,437	92·3	35	303	....	338	7·0	....	24	2	....	26	0·6	....	5	....	....	....	5	0·1	2	....	2	0·0	4,808
1936	6,972	....	6,972	94·7	29	323	....	352	4·8	1	15	4	....	20	0·3	3	8	....	....	....	11	0·1	8	....	8	0·1	7,363
1937	7,487	....	7,487	95·4	15	319	....	334	4·3	....	14	4	....	18	0·2	1	10	....	....	....	11	0·1	2	....	2	0·0	7,852
1938	6,833	....	6,833	95·7	13	266	....	279	3·9	....	15	2	....	17	0·2	1	8	....	....	....	9	0·1	3	....	3	0·0	7,141
1939	6,670	....	6,670	95·6	18	264	....	282	4·0	....	7	3	....	10	0·1	1	9	1	....	....	11	0·2	2	....	2	0·0	6,975
1940	7,023	....	7,023	96·2	12	245	....	257	3·5	....	10	1	....	11	0·2	....	4	....	....	....	4	0·0	4	....	4	0·0	7,299
1941	6,840	....	6,840	95·8	32	248	....	280	3·9	....	11	3	....	14	0·2	....	....	....	....	....	....	....	7	....	7	0·1	7,141
1942	5,469	....	5,469	93·9	61	264	....	325	5·6	....	20	5	....	25	0·4	....	2	....	....	....	2	0·0	3	....	3	0·1	5,824
1943	3,932	....	3,932	91·5	63	262	....	325	7·6	....	25	7	....	32	0·7	....	5	....	....	....	5	0·1	4	....	4	0·1	4,298
1944	4,079	....	4,079	91·5	70	270	....	340	7·5	....	21	14	....	35	0·8	1	7	....	....	....	8	0·2	6	....	6	0·1	4,468
1945	3,071	....	3,071	92·1	54	166	....	220	6·6	....	26	10	....	36	1·1	3	2	....	....	....	5	0·2	2	....	2	0·1	3,334
1946	5,294	....	5,294	94·4	89	172	....	261	4·7	1	36	2	....	39	0·7	3	1	2	....	....	6	0·1	6	....	6	0·1	5,606
1947	6,021	....	6,021	93·3	101	237	....	338	5·2	....	49	9	....	58	1·0	13	11	1	....	....	25	0·3	8	....	8	0·1	6,450
1948	4,827	....	4,827	94·0	24	239	....	263	5·1	....	18	17	....	35	0·7	1	3	....	....	....	4	0·1	5	....	5	0·1	5,134
1949	5,162	....	5,162	94·0	24	239	....	263	4·8	....	20	31	....	51	1·0	3	2	....	1	....	6	0·1	7	....	7	0·1	5,489
1950	5,077	....	5,077	93·6	14	269	....	283	5·2	....	14	41	....	55	1·0	....	1	....	2	....	3	0·1	8	....	8	0·2	5,426
1951	4,642	....	4,642	93·9	13	248	....	261	5·3	....	9	20	....	29	0·6	....	4	1	1	....	6	0·1	4	....	4	0·1	4,942
1952	5,073	....	5,073	94·6	8	234	....	242	4·5	....	4	31	....	35	0·6	....	2	....	....	....	2	0·1	7	....	7	0·1	5,359
1953	4,474	....	4,474	93·03	74	225	....	299	6·22	....	8	24	....	32	0·6	....	2	....	....	....	2	0·1	2	....	2	0·1	4,809
1954	5,142	....	5,142	91·33	154	275	....	429	7·62	....	22	21	....	43	0·76	1	6	2	....	....	9	0·1	7	....	7	0·1	5,630
1955	4,559	....	4,559	90·40	63	386	....	449	8·90	....	9	22	....	31	·62	1	1	1	....	....	3	·06	1	....	1	·02	5,043
1956	4,600	....	4,600	90·78	25	401	....	426	8·41	....	8	25	....	33	·65	1	3	....	....	....	4	·08	4	....	4	·08	5,067

DIVISION X

Report of the Chief Coal Mining Engineer for the Year 1956

Under Secretary for Mines:

I have the honour to submit the Annual Report for the year ended December, 1956, on the operations of the Collie Coalfield.

The aggregate output of coal for the year was 830,005 tons, as compared with 903,791 tons for the previous year. This represents a decrease of 73,786 tons.

The above comprised 621,464 tons or 75.87 per cent. of deep mined coal, and 208,541 tons or 25.13 per cent. of open cut coal.

The respective outputs for the previous year were 599,667 tons or 66.35 per cent. of deep mined coal and 304,124 tons or 33.65 per cent of open cut coal.

The deep mined output is again a record in the history of the coalfield. No less than 88.5 per cent. of the deep mined coal was produced and conveyed by mechanical means and is the highest percentage of mechanically produced coal of any coalfield in Australia.

The total value of the coal produced was £2,797,506 at an average cost per ton of 67s. 5d. as compared with 69s. 4d. per ton for the previous year.

Details of the outputs of the individual companies and mines are shown on Table "A."

It will be noticed that the statistics show that out of a total deep mined output of 621,464 tons, no less than 236,308 tons or 38.02 per cent. of the total were produced from only two deep mines, viz. the Co-operative and the Neath Mines. As both mines are still in a partial state of development one can visualise their ultimate production when their development is complete. All the Amalgamated deep mines, with the exception of the Westralia, show an increase in spite of the fact that developments continued uninterruptedly during the year.

Apportionment of Coal:

The State Electricity Commission was again the largest consumer of coal, consuming 378,185 tons in the Metropolitan area and 55,472 tons at the Collie Power Station, making a total of 433,927 tons or 52.15 per cent. of the total consumption. This compares with 405,579 tons during the previous year, an increase of 28,348 tons or seven per cent. It is anticipated that the consumption by the State Electricity Commission will continue to increase for some time, especially when the Power Station at Bunbury comes into operation during 1957.

The next largest consumers were the Railways Commission consuming 298,276 tons or 36.07 per cent. of the total consumption. This compares with 318,986 tons for the previous year and is a reduction of 20,710 tons. During the last two years the Railway have reduced their consumption by no less than 76,872 tons, which for the coal industry is a most formidable decrease and it might well be that a further decrease will take place during 1957.

The coal consumed by private consumers was 26,570 tons of large coal and 35,015 tons of small coal, making a total of 61,585 tons as compared with 75,423 tons for the previous year. The private consumers have, during the last two years, decreased their total consumption from 117,080 during 1954 to 61,585 tons for the period under review, a reduction in two years of no less than 55,495 tons.

The total decrease by the Railways and private consumers during the last two years is 132,377 tons, which when added to that of the Cement Works, amount to over 200,000 tons or approximately 20 per cent. of the consumption during 1954.

The Kalgoorlie Electricity and Power Corporation consumed 36,197 tons during the year as compared with 37,977 tons during the previous year.

A summary of consumption during the years 1954 and 1956 is as follows:—

Year.	S.E.C.	Railways.	Private Consumers.	Cement Works.	K.E.P.C.	Total.
1954	401,237	375,148	117,080	81,617	42,374	1,017,456
1956	433,927	298,276	61,585	....	36,197	829,985
Increase	32,690	....	....	....	....	....
Decrease	....	76,872	55,495	81,617	6,177	187,471

An examination of the Griffin group of deep mines, not including the Hebe as it did not become a deep mine until April, shows a decrease in spite of the fact that little development was done during the year. Western No. 1 shows a decrease of over 12,000 tons whereas Western No. 2 shows an increase of approximately 21,000 tons.

DEVELOPMENTS.

Co-operative Mine.

This mine produced 127,779 tons or 20.56 per cent. of the total deep mined output. This is an increase of only 1,033 tons on the previous year. It is not a large increase but one must have

regard to the substantial increase in output during the last three years of well over 100 per cent. It would not have been prudent to have substantially increased the output during the year as production was limited to only one panel with a limited life. It was essential, therefore, to develop new workings on the South side of the fault so as to increase the amount of pit-room. This policy was commenced early during the year and was vigorously pursued. Coal was reached later during the year, transport arrangements in the drift were completed and arrangements for the permanent ventilation system were commenced.

During the coming year developments for new workings will be commenced when a further increase in output should take place.

It must however be realised that there is a distinct possibility that further severe faulting may exist at a comparatively short distance of approximately 20 chains south of the existing fault. In order to ascertain, or otherwise, the abovementioned possibility it is suggested that further boring should be undertaken. In the meantime the main dip headings should advance rapidly to locate or otherwise the presence of the probable area of faulting.

Neath: A further increase in output took place during the year from 102,296 tons during 1955 to 108,529 tons during the year under review, an increase of 6,233 tons. During the last two years this mine has increased its output by approximately 40,000 tons per year.

There was no cessation in developments during this period except that during 1956 developments were retarded for the purpose of the installation of the permanent belt in the main tunnel. When this work was completed the developments of the main dips were again undertaken and accelerated.

The headings referred to have approximately another 80 chains to advance until they reach the supposed fault on the South-East extremity of the lease. When this extremity is reached the mine will then be worked on the Retreating System. At present there is developed approximately 250,000 tons of extractable coal which could be brought into production at a short notice. The development headings continue to gain on the production faces and will therefore increase the amount of coal in reserve.

Although this mine is still in the development stages it produced, during the year under review, no less that 13 per cent. of the total output, and 17.5 per cent. of the deep mined output.

Bertha Fault: There is a large area of coal available South of the Bertha Fault and it is suggested the area be bored in order to ascertain the geological conditions.

Stockton: This mine produced an output of 71,398 tons during the period under review as compared with 70,073 tons the previous year.

Although it is the only hand-getting mine at Collie the output produced was 8.6 per cent. of the total, including the open cuts, or 11.49 per cent. for the deep mines only. It was thus the third largest producer of all the deep mines. Its output was only exceeded by the Co-operative and Neath Mines.

The future of this mine has been considered on many occasions and the Department have submitted recommendations to the Company. The recommendations, although made during 1950, are still sound and have in fact remained undisputed by the Company, and would be implemented by the Company if finality was reached with regard to the future of the industry.

It is true there is an amended form of implementing the recommendations, but in whichever form they are implemented the result would be that the efficiency and economy of this mine would rank amongst the best at Collie.

Ewington: In spite of pursuing an intensive development programme this mine increased its output from 11,172 tons during 1955 to 27,979 tons during the period under review. This increase, of no less than 16,807 tons or 150 per cent. on the 1955 output, as well as pursuing the development programme is very encouraging, especially as it has been accomplished most efficiently and economically. All concerned are to be commended for the progress made.

The policy of the management is to continue the programme of development until same is well in advance of the production faces. Such a policy is an indisputable part of efficient mining.

Two seams of coal are available within reasonable distance of each other and properly developed this mine should become a useful contributor to the aggregate output of the deep mines and the future of Collie.

Westralia and Black Diamond: The future of these two mines was the subject of much controversy during the year.

The fact that the consumption of coal was continuing to decrease made it obvious that the market for coal had changed from a "sellers" to a "buyers" market, and a very selective one at that.

In order to meet the stringent conditions imposed by the consumers regarding the quality of the coal it would have been essential for the Company to have installed a washing and/or picking belt at the Westralia Mine. The cost of such a plant together with a water clarification plant and sidings would cost in the region of £150,000. Such an expenditure could not be justified in the absence of assured markets at attractive prices and over a period sufficiently long to recover the above mentioned large expenditure. The consumers were not prepared to offer such terms. The Company were therefore forced to carry on under the existing circumstances.

The Westralia seam is contaminated with a dirt band of approximately 2′ 3″ thick in the middle of the seam, a most awkward position for mechanised mining.

A significant point is that the Westralia and Black Diamond coal was screened at the Co-operative Mine and the product delivered from the screening plant was a mixture of the three seams, viz. Co-operative, Westralia and Black Diamond. Any contamination of this product by dirt from the Westralia Mine therefore involved the Co-operative Mine and if the consumers refused to accept this product then the future of the Co-operative under these circumstances was jeopardised. Rather than risk this the Company decided to cease production at the end of the year and consequently both mines were closed down.

Western No. 1: It has been stated in previous reports that this mine had reached its potential output on the existing system of work. Subsequent operations and outputs of the mine have proved this contention to be correct.

The output for the period under review was 53,921 tons as compared with 66,264 tons for the previous year. Most of this reduction was due to short time working caused by a reduced demand for coal. It is not anticipated that the output will alter much during the current year unless the management alter their system of developing the mine by doing so in the lower seam first.

It is granted that normally in coal mining the highest or top seam of the series is worked first and developing the other seams in descending order. This principle is sound only in gaseous mines and mines with explosive coal dust. In such circumstances the main transport and main intake would be in the bottom seam but always the subsidiary ventilation and main returns would be in the highest or top seam of the series. The purpose of this policy is to gravitate the noxious and inflammable gases of their own accord to the uppermost level.

This principle concedes no advantage in seams not containing gases or explosive coal dust. Such is the case at Collie and no advantage is obtained in exploiting the top seam first and the others in descending order. In fact the contrary is the case due to the fact that the strata at Collie is saturated with water, and to drive headings in the bottom seam first must ultimately drain the seams above.

Western No. 1 is no exception and the problem at this mine is essentially one of drainage rather than mining. Hence the suggestion made on many occasions that at this mine the lower seam should be developed first so as to drain the property and the two seams above.

Western No. 2: Better progress was made with the developments at this mine, also with production. The main development slants advanced a distance of 260 yards, which is a considerable improvement on that of the previous year.

Further attempts were made with headings advancing East to reach a point immediately in front of the main dip headings in order to, if possible, forewin the main dips which were stopped late during 1953 as the result of an inrush of slurry. Unfortunately each attempt was foiled due to vugs and inrushes of slurry. Further attempts will be made as it is essential for the future of the mine to have the main dips re-opened in order to have the main haulage and ventilation roads approximately in the centre of the lease, also to allow developments on the East side to balance production from the West side of the mine.

The output for the year was an increase of over 100 per cent. on the previous year, from 19,976 tons during 1955 to 40,239 tons in 1956, an increase of 20,263 tons, which is the largest increase at any deep mine for the year, and making the mine the fifth largest producer of the deep mines. A further increase in output should take place during 1957.

Wyvern: The output of the mine decreased from 53,655 tons during 1955 to 47,502 tons in 1956. Most of the output was produced from splitting the pillars in a panel on the right hand side and a few production places on the left hand side.

During the year the splitting of the pillars referred to came to an end, so also did most of the production places on the left hand side. The latter was caused by faulting.

Production was maintained by resorting to taking canches off the pillar sides and this policy will have to continue until the lateral headings in the panel pierce the fault and win a small parcel of coal inside.

An examination of the working plan in conjunction with surface bores on the South East reveals that the country is saturated with faults and it is extremely doubtful if production faces of any value could be developed in the South East area. It is a matter for careful investigation by all concerned.

Phoenix: This mine produced 28,997 tons as compared with 33,463 tons the previous year. The reduction in output is chiefly accounted for by geological disturbances that intruded the workings during the year.

The system of work is an adaptation of the retreating system and in view of the good results yielded since it was introduced it is difficult to comprehend why the management do not adopt the full retreating system and lay out the mine so as to split pillars on the retreating system.

The roof conditions at this mine are such that consideration should be given to complete extraction on the retreating system. If same could be successfully accomplished, and there is every reason to believe that it could be, then the life of the mine is considerably enhanced as well as the economics.

This is a matter that should be given serious consideration by all concerned.

Centaur: The life of this mine is obscure as no developments have taken place in the dip headings since July, 1955.

Under the above circumstances, which if continued for very much longer, the end of the mine is in sight as the amount of coal developed for extraction is limited and when exhausted the mine will cease production unless in the meantime the dip headings are allowed to advance.

The output for the year was 21,966 tons as compared with 26,012 tons for the previous year, a reduction in output of 4,046 tons.

Considering the short life of the mine one would have expected a progressive increase each year but such has not eventuated. On the contrary the output has been a fluctuating one.

Some geological disturbances were encountered in the dip headings but same can only be regarded as local and should in no way deter the management from continuing the drivage of the dip headings.

Hebe: Developments at this mine continue satisfactorily and considering the adverse conditions met in the dip headings, good progress was made during the year.

The seam worked is the Hebe and is 42 ft. thick. Its quality and dimensions offer tremendous potentialities and the management should give the matter much serious consideration in designing the system of work best suited to exploit the potentialities mentioned.

The successful development of this mine will demand a very high standard of management.

General: In view of the circumstances existing during the year the progress made in the most important mines was satisfactory.

It was a most turbulent year for all concerned, but in spite of this, the output of the deep mines during the year was the highest on record. Much deep mined output was lost due to a shortage of wagons and some short-time working by a few of the mines due to inadequate demand.

Having regard to the circumstances mentioned and the production of the deep mines during the period under review then it is not difficult to visualise that in the near future the deep mines can produce all the State requirements and with some reorganisation within the industry the economics of same can be vastly improved.

There are many matters of a domestic nature at most of the mines that the managements would be well advised to study to much advantage. The matter of roof control is still treated with complacency although most of the routine difficulties emanate from this source. It is my considered opinion that a close study of the subject is warranted as many economies can be effected. When the subject is mastered and good roof control established then much anxiety and expense will be eliminated. It will be accompanied by an improved continuity of output, more efficient results and, last but not least, a lesser number of accidents.

In conjunction with the above subject is the matter of the efficient drainage of the seams, as well as at the actual production faces. There are few seams at Collie that have a good hard or competent floor. In fact almost all the floors when saturated with water become very soft. In some of the mines it is converted into a mud. Without efficient drainage the very foundations of roof support are damaged and when a roof breaks it is inevitably accepted as a bad roof, whereas actually the roof fractures are caused by a bad floor, the latter being manufactured by bad drainage.

A prop erected on a dry floor as a roof support is an entirely different proposition to one erected on a wet floor. The former will take weight and resist roof movement immediately

whereas the latter will sink into the floor as the weight persists and before it takes weight the roof will have fractured due to its lack of elasticity.

In order to stimulate some interest in this important aspect of mining, attached to this report are graphical results of experiments carried out in Great Britain under actual mining conditions. The result of these experiments clearly indicate and confirm the aforementioned statements regarding the necessity of efficient drainage.

It must be appreciated that with a wet and soft floor not only do the props sink into it but so also do the pillars to a much lesser extent, and therefore to suggest that either the props or the bars be hitched into the coal sides is no cure.

It is to be hoped that this matter receives the attention it deserves as it is the cause of many roof difficulties and failures at Collie.

It is my firm opinion that in laying out a mine or a panel within a mine the first consideration should be given to efficient drainage as in doing so one is also giving consideration to good roof control. Without a good floor there cannot be good roof control.

Another matter requiring attention is the maintenance of the haulage or transport system. It is one matter to instal a system but an entirely different matter to maintain it in an efficient state. No mine can be more efficient than its own transport and ventilation system. They are both matters which warrant much attention. There are, in my opinion, too many stoppages, breakdowns and consequent accidents in the transport systems. It has been proved conclusively that breakdowns in the haulage system are a prolific source of accidents to the employees and to reduce the breakdowns to a minimum is also to keep the accidents from this source to a minimum.

Accidents.—The total number of serious accidents was 149 as compared with 148 for the previous year. There were 15 surface accidents and 133 underground, as compared with 34 and 115 respectively for the previous year. Most of these accidents can be classified as avoidable and prevented with reasonable care.

The rate per 100 men employed, per 100,000 tons produced and per 10,000 manshifts worked, show no appreciable change and compare favourably with other coalfields.

It is regrettable to record one fatal accident during the year which occurred at Muja Open Cut on 8th February. It occurred to Mr. S. J. Anderson who was riding on the footboard of a truck proceeding out of the Cut. Another truck proceeding into the Cut skidded whilst passing the outgoing truck and the traffic indicator struck the deceased on the back of the head fracturing the base of the skull.

(Sgd.) G. MORGAN,
Chief Coal Mining Engineer.

TABLE "A."

TABULATED DATA SHOWING ESTIMATED TONNAGE AND VALUE OF COAL SOLD IN 1956 FROM INDIVIDUAL MINES AS COMPARED WITH 1955.

Mines.	1955.		1956.		Increase on 1955.	Decrease on 1955.	Estimated Value, 1955.	Estimated Value, 1956.
	Output.	Percentage of Total.	Output.	Percentage of Total.				
Deep Mines—								
Co-operative	126,746	14·02	127,779	15·39	1,032	....	419,339	424,848
Proprietary	3,118	·35	....	....	....	3,118	11,077	....
Neath	102,296	11·32	108,529	13·08	6,233	....	353,308	360,342
Stockton	70,073	7·75	71,398	8·60	1,325	....	232,086	238,605
Black Diamond	21,359	2·36	29,859	3·60	8,500	....	69,961	99,513
Westralia	29,870	3·31	23,400	2·82	....	6,470	99,381	78,455
Ewington	11,172	1·24	27,979	3·37	16,807	....	37,424	93,268
Griffin	116	·01	....	....	....	116	416	....
Wyvern	53,655	5·94	47,502	5·72	....	6,153	193,333	162,283
Phoenix	33,463	3·70	28,997	3·49	....	4,466	120,564	98,670
Centaur	26,012	2·88	21,966	2·65	....	4,046	93,686	74,707
Hebe	35,547	3·93	39,895	4·80	4,348	....	128,162	135,964
Western No. 1	66,264	7·33	53,921	6·50	....	12,343	239,247	183,909
Western No. 2	19,976	2·21	40,239	4·85	20,263	....	71,916	137,803
Total	599,667	66·35	621,464	74·87	21,797	....	2,069,900	2,088,367
Open Cuts—								
Stockton	53,465	5·96	15,417	1·86	....	38,048	181,328	52,386
Ewington	98,453	10·89	71,253	8·58	....	27,200	332,697	240,751
Muja	84,762	9·34	76,578	9·23	....	8,184	305,334	260,842
Western No. 3	67,444	7·46	45,293	5·46	....	22,151	242,815	155,159
Total	304,124	33·65	208,541	25·13	....	95,583	1,062,174	709,138
Deep Mines	599,667	66·35	621,464	74·87	21,797	....	2,069,900	2,088,367
Open Cuts	304,124	33·65	208,541	25·13	....	95,583	1,062,174	709,138
GRAND TOTAL	903,791	100·00	830,005	100·00	73,786	....	3,132,074	2,797,505

TABLE "B."

Comparison of Overall Production Losses for 1955 *and* 1956 *showing where Losses Occurred.*

Year.	Pit Top Meetings.	Railway Wagon Shortage.	Strikes.	Other Causes.	Total.
1955	2,485	15,160	5,190	6,560	29,395
1956	2,397	22,720	14,800	1,000	40,917
Increase on 1955	....	7,560	9,610	....	11,522
Decrease on 1955	88	....	....	5,560	....

TABLE C.

Tabulation showing Estimated Apportionment of Coal Sold during 1956.

Colliery.	Locos.	Per cent.	Trams Power.	Per cent.	Private Large.	Per cent.	Private Small.	Per cent.	Kalgoorlie Electric and Power Corp.	Per cent.	Collie Power House.	Per cent.	Total.
Co-operative Black Diamond Westralia	84,911	10·25	42,407	5·12	3,732	0·45	....	....	....	....	50,291	6·06	181,341
Ewington Open Cut Ewington	34,657	4·18	52,600*	6·39	7,433	0·90	355	0·04	....	....	3,928	0·47	98,973
Neath	16,986	2·10	91,147	10·98	70	0·01	....	....	....	....	326	0·04	108,529
Stockton Stockton Open Cut	54,769	6·60	26,767	5·12	4,209	0·51	....	....	....	....	1,018	0·12	86,763
Wyvern	1,141	0·12	5,875†	0·71	4,975	0·60	10,232	1·24	25,267	3·05	12	....	47,502
Phoenix	....	....	18,122	2·18	915	0·11	9,933	1·20	....	....	23	....	28,993
Centaur Hebe Muja Open Cut	52,325	6·35	60,557	7·31	2,415	0·29	14,390	1·74	8,614	1·04	132	0·01	138,433
Western No. 1	12,612	1·52	36,353	4·26	2,534	0·31	105	0·01	2,316	0·28	....	....	53,920
Western No. 2 Western No. 3 Open Cut	40,875	4·95	44,357	5·35	287	0·03	....	....	....	....	12	....	85,531
Total	298,276	36·07	378,185‡	45·42	26,570	3·21	35,015	4·23	36,197	4·37	55,742	6·70	829,985

* Includes 17,553 for S.E.C. Gas. † Includes 13 tons for S.E.C. Gas. ‡ Includes 17,566 tons for S.E.C. Gas.

TABLE D.

Tabulation showing Estimated Apportionment of Collie Coal Sold during the Five Years 1952–1956.

Year.	Railways.	Per cent.	S.E.C.	Per cent.	Collie Power Station.	Per cent.	Cement Works.	Per cent.	Kalgoorlie Electric and Power Corpn.	Per cent.	Private Consumers.	Per cent.	Total.
1952	298,587	35·94	338,913	40·79	38,247	4·60	53,826	6·48	....	....	201,284	12·19	830,857
1953	370,382	41·83	269,744	30·46	44,689	5·05	66,846	7·55	25,294	2·86	108,493	12·25	885,448
1954	375,148	36·87	349,634	34·37	51,603	5·07	81,617	8·02	42,374	4·17	117,080	11·50	1,017,456
1955	318,986	35·30	353,802	39·15	51,777	5·73	65,826	7·28	37,977	4·20	75,423	8·34	903,791
1956	298,276	35·94	378,185 (*a*)	45·57	55,742	6·72	....	....	36,197	4·36	61,585	7·42	829,985
Increase or Decrease since 1952	—311	....	+39,272	....	+17,495	....	—53,826	....	+36,197	....	—39,699	....	—872
Per cent. Increase since 1952	—·10	....	+11·6	....	+14·57	....	—100·00	....	+100·00	....	—39·19	....	—·11

(*a*) Includes 17,566 tons for S.E.C. Gas.

TABLE E.

Collie Coal Produced 1947–1956 (*as officially reported to the Mines Department by the Producers*).

	1947.	1948.	1949.	1950.	1951.	1952.	1953.	1954.	1955.	1956.
Open Cuts	148,345	145,948	206,650	258,310	368,330	411,344	393,147	410,616	304,130	208,541
Deep Mines	582,161	586,990	543,944	556,042	480,145	419,117	493,035	607,727	599,662	621,464
Aggregate All Mines	730,509	732,938	750,594	814,352	848,475	830,461	886,182	1,018,343	903,792	830,005
Percentage Open Cuts to Aggregate	20·31	19·91	27·53	31·72	43·41	49·53	44·36	40·32	33·65	25·13
Percentage Deep Mines to Aggregate	79·69	80·09	72·47	68·28	56·59	50·47	55·64	59·68	63·35	74·87
Persons Employed	1,032	1,064	1,044	1,099	1,125	1,281	1,463	1,560	1,386	1,219

TABLE F.

SERIOUS ACCIDENTS—COLLIE COALFIELD, 1956.

Month	Major Injuries—Exclusive of Fatal.																						Minor Injuries.											
	Fractures.											Amputations.						Loss of Eye.	Serious Internal.	Hernia.	Dislocations.	Other Major.	Total Major.	Fractures.											
	Head.	Shoulder.	Arm.	Hand.	Spine.	Rib.	Pelvis	Thigh.	Leg.	Ankle.	Foot.	Arm.	Hand.	Finger.	Leg.	Foot.	Toe.							Finger.	Toe.	Head.	Eyes.	Shoulder.	Arm.	Hand.	Back.	Rib.	Leg.	Foot.	Other Minor.	Total Minor.
Jan.	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	1	....	....	2	....	....	....	....	....	1	1	1	....	1	....	4
Feb.	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	1	....	....	1	1	....	1	3	....	....	5	....	1	12
Mar.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	1	....	....	....	....	1	1	1	1	1	....	2	....	7
April.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	3	5	....	4	1	....	14
May	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	1	....	....	1	1	....	....	1	5	....	....	1	4	13
June	....	....	....	....	....	....	....	....	....	....	1	1	....	1	....	....	....	....	....	....	....	1	4	....	....	....	....	....	1	1	11	....	2	1	3	19
July	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	1	5	1	1	5	....	3	17
Aug.	....	....	....	....	....	....	....	....	....	....	1	....	....	1	....	....	....	....	....	....	....	....	2	....	....	....	....	....	....	1	1	....	....	....	....	2
Sept.	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	1	....	....	2	....	....	....	....	....	2	6	6	....	3	....	....	17
Oct.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	3	2	....	4	1	3	14
Nov.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	3	2	1	....	1	2	10
Dec.	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	1	....	....	....	....	....	2	3	....	1	....	....	7
Total	....	....	1	....	....	....	....	....	1	....	3	1	....	3	....	....	....	....	....	3	....	2	14	1	....	2	4	1	8	30	38	3	25	8	16	136

TABLE G.

ACCIDENT RATE FOR INDIVIDUAL MINES, SHOWING COMPARISON WITH 1955 (NOT INCLUDING CENTRAL WORKSHOPS AND OPEN CUTS).

Serious Accidents.

Name of Mine.	Number of Accidents.				Total Number Accidents.		Number Employed.		Rate per 100 men Employed.		Rate per 100,000 tons Produced.		Rate per 10,000 man-shifts Worked.	
	Surface.		Underground.											
	1955.	1956.	1955.	1956.	1955.	1956.	1955.	1956.	1955.	1956.	1955.	1956.	1955.	1956.
Co-operative	10	4	21	23	31	27	214	196	14·48	13·78	24·51	21·13	5·12	5·03
Proprietary*	3	....	3	....	6	....	41	....	14·63	....	192·43	....	5·53	....
Neath	8	....	18	20	26	20	178	174	14·60	11·49	25·52	18·43	5·13	4·27
Stockton	6	1	10	22	16	23	122	119	13·11	19·33	22·81	32·21	4·73	7·45
Westralia	1	3	14	6	15	9	71	49	21·12	18·37	50·21	30·14	7·41	6·47
Black Diamond....	....	1	4	9	4	10	41	49	9·75	20·41	18·26	33·49	3·37	7·59
Ewington	....	1	4	1	4	2	34	42	11·76	4·76	35·80	7·15	4·04	1·67
Griffin*	1	....	....	....	1	....	25	....	4·00	....	862·07	....	1·43	....
Wyvern	1	1	13	10	14	11	105	100	13·33	11·00	26·09	23·16	4·89	4·36
Phoenix	....	....	5	7	5	7	44	43	11·36	16·28	14·94	24·14	4·22	6·45
Centaur	1	1	3	3	4	4	69	62	5·79	6·45	15·37	18·21	2·04	2·48
Hebe	....	1	1	3	1	4	45	55	2·22	7·27	28·13	10·03	0·78	2·77
Western No. 1	3	1	16	16	19	17	128	126	14·84	13·49	28·67	31·53	5·61	5·44
Western No. 2	....	1	3	13	3	14	52	61	5·76	22·95	15·50	34·79	2·22	8·99
Total	34	15	115	133	149	148	1,169	1,076	12·74	13·66	25·01	23·83	4·62	5·19

* These mines not in operation during 1956.

The above does not include 1 accident at Muja Open Cut and 1 accident at Western No. 3 Open Cut.

TABLE H.

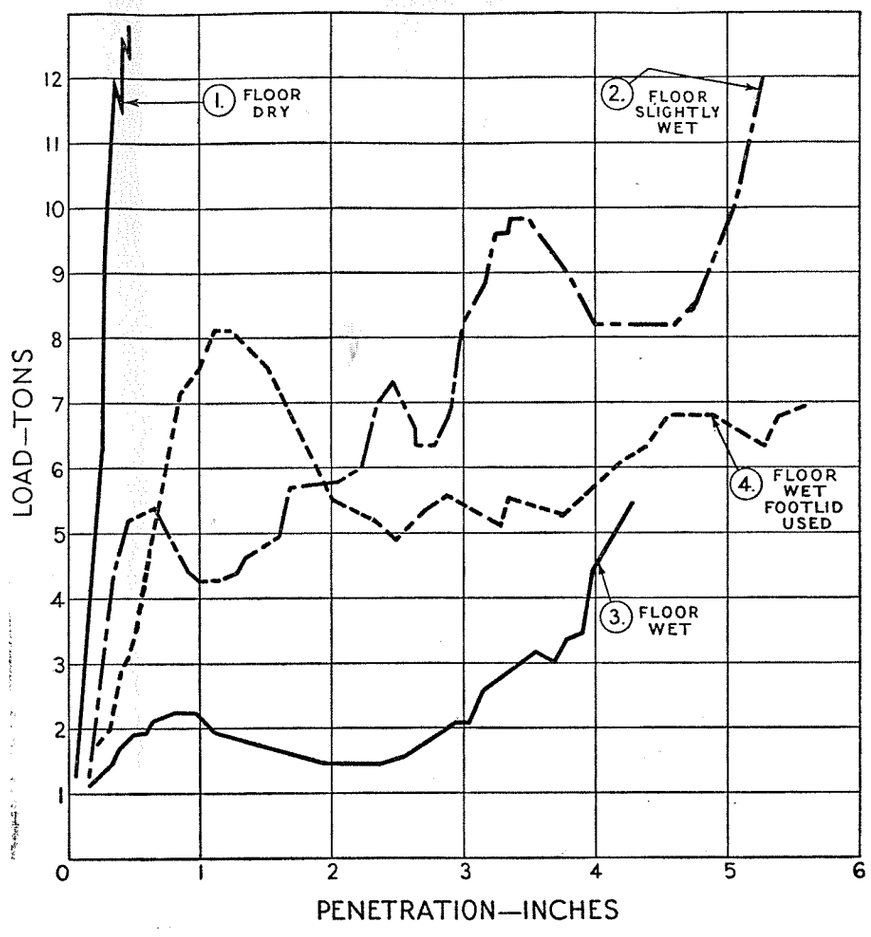
TABLE SHOWING FATAL ACCIDENT RATE PER 1,000 PERSONS EMPLOYED FOR EACH YEAR AND PROGRESSIVELY SINCE 1929 TO DATE.

Year.	Men Employed.		Fatal Accidents.		Death Rate per 1,000.	
	Current.	Progressive.	Current.	Progressive.	Current.	Progressive.
1929	858	858	4	4	4·66	4·66
1930	896	1,754	....	....	....	2·28
1931	752	2,506	1	5	1·35	2·00
1932	604	3,110	....	5	....	1·61
1933	626	3,736	1	6	1·59	1·61
1934	624	4,360	....	6	....	1·38
1935	689	5,049	2	8	2·90	1·58
1936	768	5,817	....	8	....	1·37
1937	723	6,540	....	8	....	1·22
1938	765	7,305	1	9	1·31	1·23
1939	752	8,057	1	10	1·33	1·24
1940	713	8,770	3	13	4·21	1·48
1941	781	9,551	2	15	2·56	1·57
1942	822	10,373	2	17	2·43	1·64
1943	838	11,211	1	18	1·19	1·60
1944	880	12,091	1	19	1·13	1·57
1945	860	12,951	1	20	1·16	1·54
1946	955	13,096	1	21	1·05	1·51
1947	1,032	14,938	....	21	....	1·40
1948	1,064	16,002	....	21	....	1·31
1949	1,044	17,046	1	22	0·96	1·29
1950	1,099	18,145	1	23	0·91	1·27
1951	1,125	19,270	2	25	1·77	1·29
1952	1,281	20,551	2	27	1·56	1·31
1953	1,463	22,014	2	29	1·37	1·32
1954	1,560	23,574	....	29	....	1·23
1955	1,386	24,060	1	30	0·72	1·24
1956	1,219	25,279	1	31	0·82	1·23

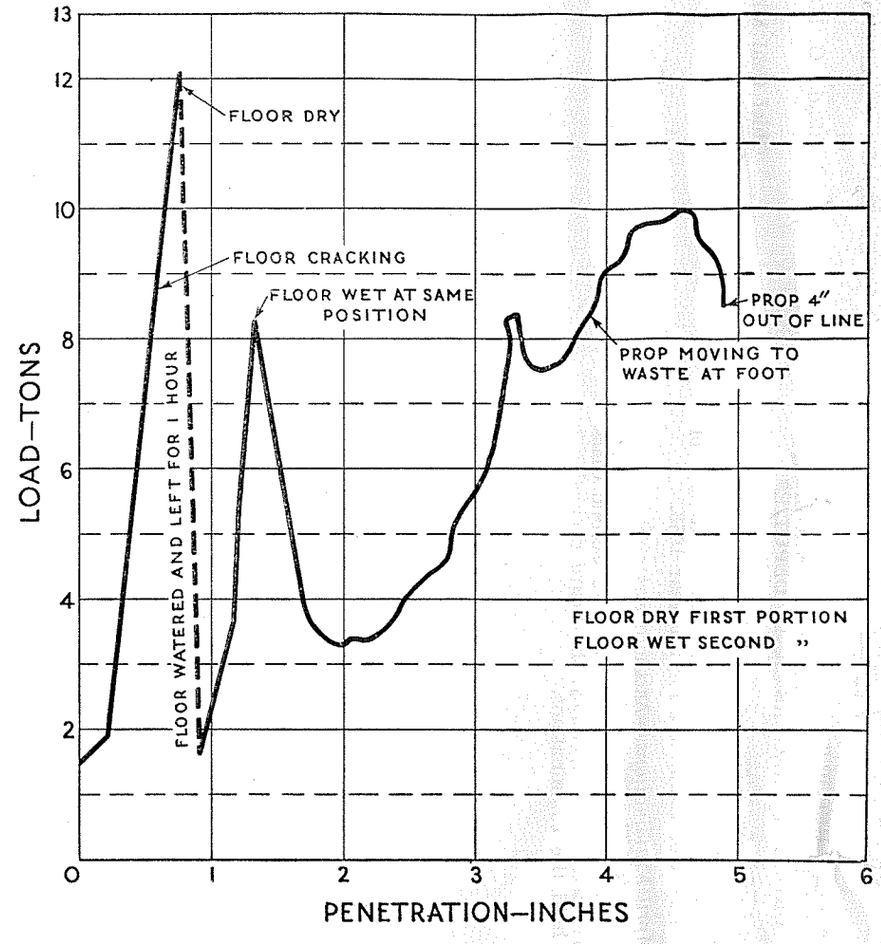
PENETRATION TESTS

Showing the effect on floors by props erected under dry and wet conditions

GRAPH A



GRAPH B



COAL MINES REGULATION ACT, 1946-1951.

ANNUAL REPORT OF THE BOARD OF EXAMINERS FOR MINE MANAGERS, UNDER MANAGERS AND DEPUTIES.

The Under Secretary for Mines:

We submit herewith for the information of the Hon. Minister for Mines, the Annual Report of the Board of Examiners for the year 1956.

April Examinations.—As there was only one applicant for Third Class Certificate of Competency and no applicants for either First or Second Class Certificates of Competency, the Board decided not to hold the examinations.

October Examinations.—There were no applicants for the October examinations.

(Sgd.) G. MORGAN,
Chairman,
Chief Coal Mining Engineer.

(Sgd.) H. A. ELLIS,
Member,
Government Geologist.

(Sgd.) C. K. SWEENEY,
Member.
Senior Inspector of Mines.

MINING STATISTICS

to 31st December, 1956

Table of Contents

TABLE I.

PRODUCTION OF GOLD AND SILVER FROM ALL SOURCES, SHOWING IN FINE OUNCES THE OUTPUT AS REPORTED TO THE MINES DEPARTMENT DURING 1956, AND THE TOTAL PRODUCTION TO DATE.

(*Note.*—Lease numbers in brackets indicate that the holding was *voided* during the year.)

(*Note.*—* Denotes mainly derived from treatment of tailings. † Denotes mainly derived from Silver Lead Ores and Concentrates. ‡ Denotes mainly derived from Copper Ores and Concentrates. § Concentrates. || Tantalum.)

Mining Centre.	Number of Lease.	Registered Name of Company or Lease.	Total for 1956.					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 (2,240 lb.).	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240 lb.).	Fine ozs.	Fine ozs.
Kimberley Goldfield.												
Brockman		Voided leases	....	....	....	....	....	....	....	1,545·75	1,455·34	....
		Sundry claims	....	....	....	....	....	7·62	7·62	2,484·00	1,871·92	....
Hall's Creek		Voided leases	....	....	....	....	....	....	....	423·00	477·76	....
		Sundry claims	....	....	....	....	....	27·73	....	217·05	179·57	12·64
Mary		Voided leases	....	....	....	....	....	82·66	951·52	399·00	210·03	....
		Sundry claims	....	....	....	....	....	....	14·36	46·85	53·66	....
Mt. Dockrell		Voided leases	....	....	....	....	....	9·17	13·66	1,173·70	1,206·09	93·00
		Sundry claims	....	....	....	....	....	18·89	31·31	160·00	89·64	....
Panton		Voided leases	....	....	....	....	....	....	....	42·95	140·47	....
		Sundry claims	....	....	....	....	....	....	6·28	6·15	18·01	....
Ruby Creek	G.M.L. 97	Ruby Queen	....	....	60·00	35·12	....	....	....	3,039·25	1,718·38	2·14
		Voided leases	....	....	....	....	....	....	16·05	12,902·20	9,619·82	....
		Sundry claims	....	....	....	....	....	12·71	....	281·25	183·30	....
		From Goldfield generally :—										
		Sundry claims	....	....	....	....	....	....	....	....	....	†20·98
		Reported by Banks and Gold Dealers	8·08	135·90	....	....	....	8,816·42	1,738·71	·75	2·53	....
		Totals	**8·08**	**135·90**	**60·00**	**35·12**	....	**8,975·20**	**2,779·51**	**22,721·90**	**17,226·52**	**128·76**

West Kimberley Goldfield.

Napier Range	M.C. 29	Devonian Silver Lead Mine	....	....	....	....	....	....	....	....	....	....	13,575·29
	From Goldfield generally :— Sundry claims				....	....	....	1·30	24·68	1·00	2·49	....	
	Totals		....	....	....	....	....	**1·30**	**24·68**	**1·00**	**2·49**	**13,575·29**	

Pilbara Goldfield.

MARBLE BAR DISTRICT.

Bamboo Creek	1120	Bamboo Queen	....	....	13·00	6·36	....	....	....	70·50	23·56	·34
	1107	Bulletin	....	....	....	....	....	....	....	845·50	416·91	2·02
	850	Federation	....	....	....	....	....	....	8·22	3,026·00	2,203·86	6·35
	1118	Kitchener	....	....	19·00	8·14	....	....	....	100·00	40·03	1·05
	1095, 1096, 1097	Mt. Prophecy Leases	....	....	44·00	6·78	....	....	24·50	2,054·00	908·03	49·63
	817	Prince Charlie	....	....	399·00	312·70	....	....	3·68	4,586·00	4,021·65	64·43
	1072	Princess May	....	....	....	....	....	....	....	92·50	24·27	....
	924	True Blue	....	....	61·50	8·54	....	....	....	2,378·75	93·76	....
		Voided leases	....	....	....	....	....	13·54	560·19	46,237·85	53,505·43	2·62
		Sundry claims	....	....	....	....	....	8·97	307·83	5,174·85	3,022·97	7·21
Boodalyerrie	....	Voided leases	....	....	....	....	....	....	292·07	120·25	587·86	....
		Sundry claims	....	....	....	....	....	....	7·16	....	....	....
Braeside	....	Sundry claims	....	....	....	....	†5,708·91	....	....	....	....	†25,079·64
Lalla Rookh	....	Voided leases	....	....	....	....	....	....	4·78	3,612·00	4,696·33	574·01
		Sundry claims	....	....	....	....	....	....	....	7,943·00	7,675·09	....
Marble Bar	G.M.L. 930, (956)	Alexander Leases	....	....	....	....	....	....	....	354·50	120·94	·81
	1094	Blue Bar	....	....	72·75	11·60	....	....	....	433·75	62·65	....
	927, 928, 934, 1014	Halley's Comet	....	....	....	....	....	....	....	6,360·00	6,390·33	680·36
	1125	Laura Dawn	....	....	15·00	16·67	....	....	....	43·00	53·47	3·06
	1121	Little Portree	....	....	....	....	....	....	....	103·00	66·88	6·93
	1127	New Atlas	....	....	....	....	....	45·98	....	....	....	2·72
	1089	Repeater	....	....	....	....	....	....	....	548·20	123·83	6·26
		Voided leases	....	....	....	....	....	....	199·09	165,930·29	151,637·42	583·57
		Sundry claims	....	....	168·25	50·71	....	67·08	251·77	20,627·29	12,750·38	9·43
North Pole	1122, (1123), 1124	Normay Leases	....	....	110·00	36·88	....	....	....	1,575·00	1,331·31	1,755·28
		Voided leases	....	....	....	....	....	....	....	4,339·00	1,930·51	260·08
		Sundry claims	....	....	....	....	....	....	....	669·75	298·62	15·82
North Shaw	....	Voided leases	....	....	....	....	....	7·53	....	1,072·45	996·29	....
		Sundry claims	....	....	....	....	....	2·84	579·91	179·75	121·72	....

Table I.—*Production of Gold and Silver from all sources, etc.*—continued.

Mining Centre.	Number of Lease.	Registered Name of Company or Lease.	Total for 1956.					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 (2,240 lb.).	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240 lb.).	Fine ozs.	Fine ozs.
PILBARA GOLDFIELD—continued.												
MARBLE BAR DISTRICT—*continued.*												
Pilgangoora	M.C. 291	Northern Territory Pros. & Dev. Co. Ltd.	....	2·12	....	§35·14	....	....	2·12	....	§35·14	....
		Voided leases	....	....	....	....	....	16·65	....	2,255·00	403·60	....
		Sundry claims	....	....	....	....	....	161·08	45·64	481·60	146·39	....
Sharks	G.M.L. 1080, 1081, etc.	Table Top Leases	....	....	....	....	....	....	....	1,071·25	588·30	17·28
		Voided leases	....	....	....	....	....	1·43	....	1,739·50	1,969·65	1·16
		Sundry claims	....	....	....	....	....	163·14	47·93	1,150·75	1,668·11	·97
Talga Talga	....	Voided leases	....	....	....	....	....	....	93·15	1,799·00	1,760·68	....
		Sundry claims	....	....	....	....	....	76·17	85·18	1,975·90	1,499·86	·70
Tambourah	1139	Stella Kathleen	....	....	27·00	3·93	....	....	....	27·00	3·93	....
		Voided leases	....	....	....	....	....	....	73·90	1,576·50	1,882·29	....
		Sundry claims	....	....	....	....	....	89·52	294·75	3,742·25	2,689·78	....
Warrawoona	1013	Trump	....	....	198·50	21·11	....	....	....	4,284·05	652·36	10·36
		Voided leases	....	....	....	....	....	....	16·99	13,049·25	18,958·41	13·34
		Sundry claims	....	....	....	....	....	70·98	623·67	6,632·79	4,247·38	·08
Western Shaw	....	Voided leases	....	....	....	....	....	....	....	1,222·50	957·80	....
		Sundry claims	....	....	....	....	....	22·34	67·47	71·50	81·49	....
Wodgina	....	Sundry claims	....	....	....	....	....	....	43·37	·50	....	3·25
Wyman's Well	1084	New Copenhagen	....	....	....	....	....	....	....	510·00	144·74	1·35
		Voided leases	....	....	....	....	....	....	42·86	2,977·29	1,258·44	....
		Sundry claims	....	....	80·50	19·24	....	4·47	51·52	2,684·96	1,310·53	1·47
Yandicoogina	....	Voided leases	....	....	....	....	....	....	140·76	3,159·20	6,218·83	....
		Sundry claims	....	....	....	....	....	4·32	239·89	574·50	642·82	40·96
		From District generally :—										
		Sundry Parcels treated at :										
		State Battery, Bamboo Creek	....	....	....	*67·46	....	....	....	40·00	*11,239·58	190·95
		State Battery, Marble Bar	....	....	....	....	....	....	....	12·00	*11,181·91	1·15
		Various Works	....	....	....	....	....	....	....	237·95	1,908·24	5·54
		Reported by Banks and Gold Dealers	15·00	....	....	....	....	14,493·52	456·00	....	15·41	10·53
		Totals	**15·00**	**2·12**	**1,208·50**	**605·26**	**5,708·91**	**15,249·56**	**4,564·40**	**329,752·42**	**324,569·77**	**29,410·71**

NULLAGINE DISTRICT.

Eastern Creek	....	Voided leases	....	....	....	....	....	8·96	8·19	5,594·00	9,854·21	14·76
		Sundry claims	....	....	....	....	....	....	12·74	1,409·10	1,600·71	16·90
Elsie	....	Voided leases	....	....	....	....	....	....	....	586·25	1,675·91	....
		Sundry claims	....	....	....	....	....	....	8·28	58·00	188·08	....
McPhee's Creek	....	Voided leases	....	....	....	....	....	....	....	113·00	137·92	....
		Sundry claims	....	....	....	....	....	....	....	134·00	197·09	....
Middle Creek	G.M.L. (279L)	All Nations	....	....	....	....	....	....	....	1,277·50	356·03	·87
	229L	Barton	....	....	398·00	199·86	....	1·22	....	6,927·00	3,876·25	35·28
	231L, etc.	Blue Spec. Mining Co., N.L.	....	....	....	972·01	3·90	....	....	53,391·41	31,988·42	10·99
		Voided leases	....	....	....	....	....	....	1·02	17,182·15	11,362·58	7·50
		Sundry claims	....	....	19·50	27·55	....	....	....	5,592·60	2,363·12	....
Mosquito Creek	....	Voided leases	....	....	....	....	....	1·07	30·12	8,392·30	12,839·13	....
		Sundry claims	....	....	....	....	....	....	181·64	3,707·44	3,789·21	....
Nullagine	G.M.L. 292L	Alice	....	95·19	20·00	67·73	....	3·85	1,148·71	127·10	322·37	63·45
	G.M.L. 311L	Conglomerate	....	....	....	....	....	....	....	84·00	6·43	·43
	G.M.L. (294L)	Nullagine View	....	....	....	....	....	....	289·63	41·00	397·35	23·69
		Voided leases	....	....	....	....	....	....	309·96	9,067·75	12,972·68	12·80
		Sundry claims	....	....	98·00	23·97	....	315·53	678·24	6,354·55	10,478·13	15·22
Spinaway Well	M.C. 34L, 35L	Stubbs & Baker	....	....	....	....	....	....	....	....	....	‡ 320·18
Twenty Mile Sandy	M.C. 112L	Voided leases	....	....	....	....	....	....	16·97	7,243·70	9,007·72	·32
		Sundry claims	....	....	18·00	5·41	....	33·10	30·50	7,710·85	6,271·27	2·76
	From District Generally :—											
	Sundry Parcels treated at :											
	Barton Battery		....	....	....	....	....	....	....	....	*45·19	....
	McKinnon, W.M., (D.Cs. 10L, 14L, 15L)		....	....	....	7·20	....	3·89	2·23	....	*7·20	....
	Various Works		....	....	....	....	....	....	....	124·50	8,110·35	1·37
	Reported by Banks and Gold Dealers		52·91	....	....	....	....	9,973·84	115·55	....	29·81	5·80
	Totals		**52·91**	**95·19**	**553·50**	**1,303·73**	**3·90**	**10,341·46**	**2,833·78**	**135,118·20**	**127,877·16**	**532·32**

West Pilbara Goldfield.

Croydon	....	Voided leases	....	....	....	....	....	....	....	8·00	5·44	....
Hong Kong	....	Voided leases	....	....	....	....	....	....	....	331·00	442·45	....
		Sundry claims	....	....	....	....	....	21·40	·02	9·00	3·15	....
Lower Nicol	....	Voided leases	....	....	....	....	....	....	1·10	653·20	402·22	....
		Sundry claims	....	....	....	....	....	10·44	2·71	10·00	11·41	....
Mallina	....	Voided leases	....	....	....	....	....	....	....	141·60	128·44	....

Table I.—*Production of Gold and Silver from all sources*—continued.

Mining Centre.	Number of Lease.	Registered Name of Company or Lease.	Total for 1956. Alluvial. Fine ozs.	Dollied and Specimens. Fine ozs.	Ore treated. Tons (2,240 lb.).	Gold therefrom. Fine ozs.	Silver. Fine ozs.	Total Production. Alluvial. Fine ozs.	Dollied and Specimens. Fine ozs.	Ore treated. Tons (2,240 lb.).	Gold therefrom. Fine ozs.	Silver. Fine ozs.
WEST PILBARA GOLDFIELD—continued.												
Nicol	....	Voided leases	....	....	....	....	....	....	....	30·00	11·47	....
Pilbara	D.C. 2	J. A. Johnston & Sons	....	....	....	....	....	9·90	....	....	§19·25	....
		Voided leases	....	....	....	....	....	....	48·12	267·00	413·59	....
		Sundry claims	....	....	....	....	....	1·11	86·24	163·00	255·42	....
Roebourne	G.M.L. 173	Corderoy Mines, Ltd.	....	....	....	....	....	....	....	1,954·50	471·13	10·79
		Voided leases	....	....	....	....	....	....	....	442·36	952·91	374·36
		Sundry claims	....	....	....	....	....	15·47	3·29	1,934·85	754·91	114·06
Station Peak	....	Voided leases	....	....	....	....	....	177·74	41·37	11,016·00	11,388·18	·08
		Sundry claims	·69	....	....	....	....	·69	....	86·50	77·23	....
Towranna	....	Voided leases	....	....	....	....	....	....	2·62	3,965·80	5,187·51	....
		Sundry claims	....	....	....	....	....	....	....	22·00	12·35	....
Upper Nicol	....	Sundry claims	....	....	....	....	....	....	....	6·50	2·57	....
Weerianna	....	Voided leases	....	....	....	....	....	....	....	3,200·15	3,214·45	....
		Sundry claims	....	....	....	....	....	....	....	336·00	135·26	1·29
Whim Creek	....	Voided leases	....	....	....	....	....	....	....	....	....	‡883·80
	From Goldfield generally :—											
	Sundry Parcels treated at :											
	Various Works		....	....	....	....	....	....	....	....	102·39	4·90
	Sundry claims and leases		....	....	....	....	....	....	11·77	....	....	†491·10
	Reported by Banks and Gold Dealers		....	....	....	....	....	6,098·03	177·50	103·50	228·32	·81
		Totals	·69	....	....	....	....	**6,334·78**	**374·74**	**24,680·96**	**24,220·15**	**1,881·19**
Ashburton Goldfield.												
Belvedere	....	Voided leases	....	....	....	....	....	....	9·88	1,560·00	435·86	176·48
Dead Finish	....	Voided leases	....	....	....	....	....	....	....	1,699·00	874·60	·03
		Sundry claims	....	....	....	....	....	....	11·89	104·25	245·08	....

Linden Station	....	Sundry claims	....	....	....	....	....	....	....	....	128·35	203·51	....
Melrose	....	Voided leases	....	....	....	....	....	....	....	....	2,704·00	840·26	213·11
		Sundry claims	....	....	....	....	....	12·41	21·88	562·00	262·78	6·40
Mt. Edith	....	Sundry claims	....	....	....	....	....	....	....	5·00	3·97	....
Mt. Mortimer	....	Sundry claims	....	....	....	....	....	364·63	315·64	44·50	40·25	74·47
Uaroo	....	Voided leases	....	....	....	....	....	....	....	....	....	† 7,713·22
	From Goldfield generally :—											
		Sundry claims	....	....	....	†388·06	....	....	....	....	....	†31,447·71
		Reported by Banks and Gold Dealers	1·16	....	....	....	8,889·09	123·17	....	7·12	....	
		Totals	**1·16**	....	....	**388·06**	**9,266·13**	**482·46**	**6,807·10**	**2,913·43**	**39,631·42**	

Gascoyne Goldfield.

Bangemall	....	Voided leases	....	....	....	....	....	....	6·22	350·70	313·82	....
		Sundry claims	....	....	....	....	....	88·97	33·55	36·30	203·47	....
	From Goldfield generally :—											
		Reported by Banks and Gold Dealers	....	....	....	....	....	604·47	23·20	....	....	....
		Totals	....	....	....	....	....	**693·44**	**62·97**	**387·00**	**517·29**	....

Peak Hill Goldfield.

Bulloo Downs	....	Voided leases	....	....	....	....	....	....	....	....	....	....	†50·09
Egerton	....	Voided leases	....	....	....	....	....	62·31	224·68	7,292·25	6,604·91	....
		Sundry claims	....	....	....	....	....	235·35	23·51	1,501·77	791·34	....
Horseshoe	G.M.L. 569P	Anglo-Westralian Mining Pty., Ltd.	....	....	....	....	....	....	....	135,872·00	22,870·80	1,407·05
		Prior to transfer to present holders	....	....	....	....	....	....	....	3,914·00	894·44	....
	G.M.L. 575P	Labourchere Main Lode	....	....	....	....	....	....	....	535·00	60·38	....
		Voided leases	....	....	....	....	....	15·57	1,975·37	4,371·38	2,684·27	2·00
		Sundry claims	....	....	....	....	....	20·12	829·58	1,939·55	728·57	....
Jumblebar	....	Voided leases	....	....	....	....	....	....	172·75	7,526·25	2,561·95	·58
		Sundry claims	....	....	....	....	....	13·79	65·95	1,048·05	574·16	....
Mt. Fraser	....	Voided leases	....	....	....	....	....	....	....	389·50	320·96	....
		Sundry claims	....	....	....	....	....	88·28	40·61	400·75	341·14	....
Mt. Seabrook	....	Voided leases	....	....	....	....	....	....	5·05	620·25	428·26	....
		Sundry claims	....	....	....	....	....	....	....	1,089·35	803·12	....

Table I.—*Production of Gold and Silver from all sources, etc.*—continued.

Mining Centre.	Number of Lease.	Registered Name of Company or Lease.	Total for 1956. Alluvial. Fine ozs.	Dollied and Specimens. Fine ozs.	Ore treated. Tons (2,240 lb.).	Gold therefrom. Fine ozs.	Silver. Fine ozs.	Total Production. Alluvial. Fine ozs.	Dollied and Specimens. Fine ozs.	Ore treated. Tons (2,240 lb.).	Gold therefrom. Fine ozs.	Silver. Fine ozs.
PEAK HILL GOLDFIELD—continued.												
Peak Hill	G.M.L. 512P	Atlantic	....	....	....	....	....	1·69	2·87	4,703·75	589·15	....
	G.M.L. 511P	Commercial	....	....	....	....	....	....	....	3,745·25	591·05	....
	G.M.L. 584P	Dazzel Star	....	....	....	....	....	....	....	293·00	75·34	....
	G.M.L. 567P	Miner Bird	....	....	44·00	15·83	....	....	....	1,587·50	741·14	....
	G.M.L. 553P	Morning Star	....	....	....	....	....	....	4·43	2,804·25	410·09	....
	G.M.L. 587P	Murray Heath	....	....	....	....	....	....	....	41·00	6·17	....
	G.M.L. 506P	No. 1 North	....	....	....	....	....	....	86·47	7,139·20	1,652·34	....
	G.M.L. 492P	North Star	....	....	....	....	....	23·20	69·63	13,186·50	2,079·21	....
		Voided leases	....	....	....	....	....	7·39	920·21	521,841·33	247,054·04	2,285·63
		Sundry claims	....	....	....	....	....	61·51	306·63	34,399·85	8,946·16	....
Ravelstone	....	Voided leases	....	....	....	....	....	....	101·64	4,219·85	3,117·68	....
		Sundry claims	....	....	....	....	....	....	....	553·60	283·17	....
Wilgeena	....	Voided leases	....	....	....	....	....	....	23·54	230·50	156·25	....
Wilthorpe	....	Voided leases	....	....	....	....	....	....	....	47·00	20·93	....
		Sundry claims	....	....	....	....	....	....	....	89·00	25·71	....
Yowereena	....	Voided leases	....	....	....	....	....	....	....	19·50	36·46	....
		Sundry claims	....	....	....	....	....	....	....	117·25	203·16	....
	From Goldfield generally :—											
	Sundry Parcels treated at :											
	Australian Machinery & Investment Co.		....	....	....	....	....	....	....	....	*1,686·20	....
	State Battery, Peak Hill		....	....	....	....	....	....	3·05	15·00	*7,168·89	....
	Various Works		....	....	....	....	....	....	....	30·00	*5,661·37	23·12
	Reported by Banks and Gold Dealers		....	....	....	....	....	2,847·65	444·36	....	12·51	....
	Totals		....	....	44·00	15·83	....	**3,376·86**	**5,300·33**	**761,563·43**	**320,181·32**	**3,768·47**

East Murchison Goldfield.

LAWLERS DISTRICT.

Kathleen Valley	....	Voided leases	....	....	....	....	....	....	144·85	80,503·66	49,020·54	....
		Sundry claims	....	....	78·00	29·42	....	14·37	526·03	5,693·75	2,631·17	....

Lawlers	G.M.L. 1236	Waroonga	....	....	....	....	....	....	....	....	99·40	·50
		Voided leases	....	....	....	....	....	25·51	692·45	1,622,917·40	575,150·65	14,803·08
		Sundry claims	....	....	....	....	....	400·21	451·61	17,347·48	9,568·69	268·34
Sir Samuel	....	Voided leases	....	....	....	....	....	....	359·03	275,417·55	141,829·52	10,234·80
		Sundry claims	....	....	75·00	18·15	....	53·89	64·96	7,698·00	4,568·39	·02
	From District generally :—											
	Sundry Parcels treated at :											
	State Battery, Sir Samuel	....	....	....	....	....	....	....	....	53·50	*2,356·81	....
	Vanguard Cyanide Plant	....	....	....	....	....	....	....	....	4·00	*1,014·04	3·18
	Western Machinery Co. Pty., Ltd.	....	....	....	....	....	....	....	....	5·00	*4,291·25	29·00
	Prior to transfer to present holders	....	....	....	....	....	....	....	....	....	*1,371·33	15·64
	Various Works	....	....	....	....	....	....	2·12	2·35	1,711·53	*30,788·76	936·21
	Reported by Banks and Gold Dealers	....	....	....	....	....	....	6,408·20	101·91	·05	10·00	....
	Totals	....	....	**153·00**	**47·57**	....	**6,904·30**	**2,343·19**	**2,011,351·92**	**822,700·55**	**26,290·77**

WILUNA DISTRICT.

Coles	....	Voided leases	....	....	....	....	....	....	....	....	2,765·50	1,240·40	....
		Sundry claims	....	....	....	....	....	....	21·03	3,844·50	1,507·23	....
Corboys	....	Voided leases	....	....	....	....	....	5·24	1·25	14,946·29	11,036·71	5·00
		Sundry claims	....	....	....	....	....	21·58	....	9,082·35	5,210·79	....
Gum Creek	....	Voided leases	....	....	....	....	....	20·75	....	1,380·00	595·73	....
		Sundry claims	....	....	....	....	....	....	1·36	407·25	131·08	....
Mt. Eureka	....	Voided leases	....	....	....	....	....	....	....	142·25	96·36	....
		Sundry claims	....	....	....	....	....	....	....	783·75	548·56	....
Mt. Keith	....	Voided leases	....	....	....	....	....	....	44·54	20,259·50	13,551·08	....
		Sundry claims	....	....	....	....	....	4·81	227·29	3,862·50	2,480·03	....
New England	....	Voided leases	....	....	....	....	....	5·74	95·70	5,364·25	3,490·87	....
		Sundry claims	....	....	....	....	....	9·31	5·78	4,534·75	3,111·97	....
Wiluna	G.M.L. 280J	Lake Violet Consols Deeps	....	....	....	75·58	....	....	....	....	107·62	....
	679J	Lone Hand	....	....	....	....	....	....	....	1,604·75	127·50	....
		Voided leases	....	....	....	....	....	....	574·76	8,776,381·90	1,788,772·66	10,044·63
		Sundry claims	....	....	....	....	....	105·39	225·82	27,419·40	10,885·40	·33
	From District generally :—											
	Sundry Parcels treated at :											
	L.T.T. 1335H, A. Cella	....	....	....	*24·54	....	....	....	....	....	*24·54	....
	L.T.T. 1302H, H. G. Woosnam	....	....	....	*6·91	....	....	....	....	....	*133·53	·04
	State Battery, Wiluna	....	....	....	....	....	....	....	....	637·00	*23,679·00	219·70
	Various Works	....	....	....	....	....	....	....	....	139·00	5,164·05	12·68
	Reported by Banks and Gold Dealers	....	....	....	....	....	52·03	56·58	....	58·77	....
	Totals	....	....	....	**107·03**	....	**224·85**	**1,254·11**	**8,873,554·94**	**1,871,953·88**	**10,282·38**

Table I.—*Production of Gold and Silver from all sources, etc.*—continued.

Mining Centre.	Number of Lease.	Registered Name of Company or Lease.	Total for 1956.					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 (2,240 lb.).	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240 lb.).	Fine ozs.	Fine ozs.
EAST MURCHISON GOLDFIELD—continued.												
BLACK RANGE DISTRICT.												
Barrambie	....	Voided leases	....	....	....	....	....	....	22·49	18,443·92	17,355·15	125·60
		Sundry claims	....	....	76·00	81·74	....	5·07	170·20	909·55	997·25	....
Bellchambers	....	Voided leases	....	....	....	....	....	....	111·80	4,349·27	3,130·56	....
		Sundry claims	....	....	174·50	10·89	....	....	....	1,182·80	557·95	....
Birrigrin	....	Voided leases	....	....	....	....	....	....	820·68	12,042·93	15,086·09	....
		Sundry claims	....	....	....	....	....	....	179·92	2,487·55	1,238·22	....
Currans	....	Voided leases	....	....	....	....	....	18·24	222·89	7,252·25	3,116·68	....
		Sundry claims	....	....	....	....	....	....	29·38	2,158·75	827·18	....
Errolls	....	Voided leases	....	....	....	....	....	14·17	152·29	14,170·50	9,328·92	....
		Sundry claims	....	....	....	....	....	6·53	399·11	964·75	595·45	....
Hancocks	....	Voided leases	....	....	....	....	....	....	6,968·16	33,726·00	36,664·76	55·72
		Sundry claims	....	....	....	....	....	4·21	142·89	8,459·10	3,219·53	....
Maninga Marley	....	Voided leases	....	....	....	....	....	....	195·20	60,833·48	48,494·40	22·55
		Sundry claims	....	....	....	....	....	....	158·16	3,079·65	1,768·16	....
Montague	....	Voided leases	....	....	....	....	....	....	100·17	79,550·60	23,444·82	....
		Sundry claims	....	....	....	....	....	....	71·09	5,041·35	3,171·19	....
Nunngarra	....	Voided leases	....	....	....	....	....	25·94	952·34	9,509·00	3,655·49	....
		Sundry claims	....	....	....	....	....	50·27	1,458·98	7,636·40	2,953·69	....
Sandstone	G.M.L. 958B	Lady Mary	....	....	....	....	....	....	383·35	7,165·75	7,119·35	2·35
		Voided leases	....	....	....	....	....	4·75	4,363·69	696,431·82	447,563·94	11,754·22
		Sundry claims	....	....	61·25	24·42	....	44·95	1,421·07	15,594·70	6,872·99	....
Youanmi	....	Voided leases	....	....	....	....	....	·36	126·92	731,497·55	273,884·97	10,474·10
		Sundry claims	....	....	....	....	....	1·07	18·79	6,258·55	1,814·66	....

From District generally :—													
Sundry Parcels treated at :													
State Battery, Sandstone	....	....	....	....	....	....	....	....	290·50	23,572·27	61·02
State Battery, Youanmi	....	....	....	....	....	....	....	....	40·00	5,504·08	....
L.T.T. 1362H, Bozanich, Giles & Paskov	....	....	12·00	·48	....	....	....	....	12·00	·48	....
Various Works	....	....	....	....	....	....	....	....	92·50	11,496·25	....
Reported by Banks and Gold Dealers	....	....	....	....	....	1,491·85	52·23	....	20·38	....
Totals	....	....	**323·75**	**117·53**	....	**1,667·41**	**18,521·80**	**1,729,181·22**	**953,454·86**	**22,495·56**

Murchison Goldfield.

CUE DISTRICT.

Big Bell	G.M.L. (2050), etc.	Big Bell Mines, Ltd.	....	....	....	*480·90	83·35	....	....	5,538,877·00	730,349·62	251,790·41
	(2050)	(Little Bell)	....	....	....	....	....	....	4·49	579·75	60·95	....
	2274	Silver City	....	....	36·75	18·45	....	....	....	36·75	18·45	....
		Voided leases	....	....	....	....	....	....	....	401·00	422·83	....
		Sundry claims	....	....	170·50	122·30	6·61	·39	6·32	553·25	479·76	6·61
Cuddingwarra	....	Voided leases	....	....	....	....	....	10·59	132·46	102,115·91	56,152·11	100·71
		Sundry claims	....	....	14·50	19·00	5·59	18·46	384·38	9,921·14	5,671·55	16·85
Cue	G.M.L. 2262	Table Top	....	....	55·75	19·77	3·02	....	....	1,325·30	1,078·05	3·92
	2247	Victory	....	....	....	....	....	....	....	226·75	125·38	....
		Voided leases	....	....	....	....	....	202·71	911·60	288,796·44	221,102·80	69·11
		Sundry claims	....	....	187·30	67·99	1·49	252·92	894·70	46,392·84	20,430·31	4·24
Eelya	G.M.L. 2241	Eagle Hawk	....	....	....	....	....	....	....	1,408·75	417·30	....
		Voided leases	....	....	....	....	....	....	8·78	1,069·00	1,811·26	....
		Sundry claims	....	....	....	....	....	6·20	143·81	2,309·90	1,099·24	1·31
Mindoolak	....	Voided leases	....	....	....	....	....	3·07	2·54	9,380·28	5,672·31	42·97
		Sundry claims	....	....	....	....	....	....	29·30	3,299·60	2,345·43	....
Reedy	G.M.L. 2253	Rand No. 3	....	....	....	....	....	....	....	4,152·25	1,356·56	....
		Voided leases	....	....	....	....	....	1·46	216·72	725,487·43	238,924·59	20,467·28
		Sundry claims	....	....	....	....	....	170·71	137·16	7,084·00	2,667·35	·62
Tuckabianna	G.M.L. 2237	Gidgee	....	....	....	....	....	....	297·73	2,765·90	2,095·49	33·57
	2244	Winston	....	....	64·30	69·19	1·75	....	671·45	694·30	326·22	4·05
		Voided leases	....	....	....	....	....	649·70	324·77	13,152·23	7,465·12	....
		Sundry claims	·94	....	123·75	11·74	....	154·26	489·40	4,999·85	2,712·36	·20
Tuckanarra	....	Voided leases	....	....	....	....	....	85·37	3,511·10	19,490·00	22,828·99	172·77
		Sundry claims	....	....	....	....	....	115·23	792·07	10,190·80	10,307·86	....
Weld Range	....	Voided leases	....	....	....	....	....	....	23·64	2,169·75	1,137·11	....
		Sundry claims	....	....	....	....	....	....	3·90	1,438·50	1,136·41	....

Table I.—*Production of Gold and Silver from all sources, etc.*—continued.

Mining Centre.	Number of Lease.	Registered Name of Company or Lease.	Total for 1956.					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 (2,240 lb.).	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240 lb.).	Fine ozs.	Fine ozs.
MURCHISON GOLDFIELD—continued.												
CUE DISTRICT—*continued.*												
		From District generally :—										
		Sundry Parcels treated at :										
		State Battery, Cue	....	....	....	*278·26	....	....	....	76·25	*26,344·90	123·99
		State Battery, Tuckanarra	....	....	....	....	....	....	....	518·50	*5,535·57	....
		L.T.T. 1346H, F. W. Turner	....	....	115·25	8·13	....	....	....	115·25	8·13	....
		L.T.T. 1330H, F. W. Turner	....	....	485·50	27·18	....	....	....	566·75	31·53	....
		Various Works	....	....	....	....	....	....	....	7,340·27	*29,481·92	1,147·77
		Reported by Banks and Gold Dealers	....	....	....	....	....	3,417·28	109·87	....	22·62	·07
		Totals	**·94**	....	**1,253·60**	**1,122·91**	**101·81**	**5,088·35**	**9,096·19**	**6,806,935·69**	**1,399,620·08**	**273,986·45**
MEEKATHARRA DISTRICT.												
Abbott's	....	Voided leases	....	....	....	....	....	....	26·45	36,841·35	38,775·28	....
		Sundry claims	....	....	38·30	19·23	....	....	5·29	3,819·57	2,347·89	....
Burnakura	G.M.L. (1849N)	New Alliance	....	....	....	....	....	....	....	132·25	114·39	....
		Voided leases	....	....	....	....	....	....	3,247·59	39,040·45	30,775·77	26·90
		Sundry claims	....	....	....	....	....	17·03	129·24	2,486·55	1,310·84	1·54
Chesterfield	G.M.L. 1942N, 1946N	Margueretta Leases	....	....	....	....	....	....	....	1,990·00	524·17	....
	1942N	(Margueritta)	....	....	....	....	....	....	....	732·00	197·73	7·74
	1946N	(Margueritta East)	....	....	....	....	....	....	....	1,420·00	250·09	10·65
		Voided leases	....	....	....	....	....	29·02	420·32	6,875·26	7,500·57	·80
		Sundry claims	....	....	....	....	....	....	42·19	960·55	740·97	....
Gabanintha	1948N	Fortuna	....	....	....	....	....	....	....	3,181·75	915·97	....
	(1972N)	New Brew	....	....	77·25	8·68	....	....	....	77·25	8·68	....
	(1943N)	Nance	....	....	....	....	....	....	....	39·50	47·41	....
		Voided leases	....	....	....	....	....	11·79	38·14	29,692·85	21,216·82	815·57
		Sundry claims	....	....	....	....	....	16·78	159·05	5,018·25	2,917·97	....
Garden Gully	....	Voided leases	....	....	....	....	....	26·36	74·91	30,272·07	21,864·74	1,102·59
		Sundry claims	....	....	....	....	....	....	18·74	2,914·69	1,719·14	....
Gum Creek	....	Voided leases	....	....	....	....	....	25·27	91·96	3,893·08	3,819·91	....
		Sundry claims	....	....	....	....	....	4·37	84·86	727·25	636·85	....

Holden's	1551N	New Waterloo	....	....	....	....	....	....	·99	1,468·00	918·92	....
		Voided leases	....	....	....	....	....	....	18·00	16,593·00	6,401·50	....
		Sundry claims	....	....	....	....	....	164·95	49·07	425·15	279·25	....
Jillawarra	....	Voided leases	....	....	....	....	....	....	1,263·53	1,999·80	3,565·40	....
		Sundry claims	....	....	....	....	....	173·02	150·04	440·75	403·14	....
Meeka Pools	....	Voided leases	....	....	....	....	....	....	....	111·58	82·27	....
		Sundry claims	....	....	....	....	....	....	2·84	233·57	205·38	....
Meekatharra	G.M.L. 1922N	Albury Heath	....	....	45·00	58·57	....	....	13·16	1,344·25	1,865·98	....
	(1855N)	Commodore	....	....	....	....	....	....	....	1,282·75	403·61	....
	1559N	Ingliston	....	....	82·25	70·32	....	....	498·32	1,928·35	1,761·93	....
	(1971N)	Ingliston Alberts	....	....	....	*22·84	....	....	....	68·75	34·86	....
	1951N	Lucky Wheel	....	....	....	....	....	....	....	12·50	3·81	....
	1577N	Mopoke	....	....	....	....	....	....	12·47	1,361·50	827·50	....
	1956N	New Australia	....	....	....	·84	....	....	107·61	46·75	408·20	....
	(1923N)	Peter Pan	....	....	....	....	....	....	....	337·25	30·92	....
	1529N	Prohibition	....	....	....	9·44	....	....	....	3,950·00	1,927·46	4·25
	1529N	(Prohibition Gold M. Co. N.L.)	....	....	....	....	....	....	....	24,844·25	4,978·31	11·83
	1529N	Prior to Transfer	....	....	....	....	....	....	....	29,422·00	4,971·30	....
	R.C. 75N	C. J. S. White and W. E. Fisher	....	....	....	....	....	173·82	43·80	372·50	131·88	....
		Voided leases	....	....	....	....	....	3·88	1,520·32	1,706,394·37	924,563·09	2,455·04
		Sundry claims	35·91	....	248·00	40·23	....	279·84	982·76	26,752·40	10,878·63	....
Mistletoe	....	Voided leases	....	....	....	....	....	4·15	1,000·24	417·00	486·21	....
		Sundry claims	....	....	....	....	....	119·14	71·85	19·75	2·03	....
Mt. Maitland	....	Voided leases	....	....	....	....	....	....	....	88·00	80·11	....
		Sundry claims	....	....	....	....	....	....	....	420·75	240·86	....
Munara Gully	....	Voided leases	....	....	....	....	....	....	....	13,283·50	6,559·93	....
		Sundry claims	....	....	....	....	....	....	34·23	1,009·75	373·74	....
Nannine	G.M.L. 1872N	Blue Pedro	....	....	....	....	....	4·06	15·26	9,566·40	2,021·11	....
	1941N	Caledonia Gold Mine	....	....	....	....	....	....	....	3,747·00	1,047·71	....
	1958N	Mt. Hall	....	....	....	....	....	....	....	36·00	3·08	....
		Voided leases	....	....	....	....	....	43·25	828·76	116,140·48	73,408·98	167·45
		Sundry claims	16·70	....	....	....	....	136·78	1,248·76	6,169·43	4,669·01	....
Quinns	....	Voided leases	....	....	....	....	....	7·30	1,186·50	33,356·91	13,464·37	90·70
		Sundry claims	....	....	....	....	....	15·07	1,289·65	3,841·67	2,718·33	....
Ruby Well	....	Voided leases	....	....	....	....	....	....	43·46	7,461·00	4,046·70	....
		Sundry claims	....	....	....	....	....	1,015·87	409·39	520·25	629·60	....
Stake Well	....	Voided leases	....	....	....	....	....	....	200·12	21,362·00	9,566·18	....
		Sundry claims	....	....	....	....	....	31·91	34·73	1,003·60	584·54	....
Star of the East	....	Voided leases	....	....	....	....	....	....	....	27,244·00	20,305·40	...
		Sundry claims	....	....	....	....	....	....	....	127·62	94·97	...

Table I.—*Production of Gold and Silver from all sources, etc.*—continued.

Mining Centre.	Number of Lease.	Registered Name of Company or Lease.	Total for 1956. Alluvial. Fine ozs.	Dollied and Specimens. Fine ozs.	Ore treated. Tons (2,240 lb.).	Gold therefrom. Fine ozs.	Silver. Fine ozs.	Total Production. Alluvial. Fine ozs.	Dollied and Specimens. Fine ozs.	Ore treated. Tons (2,240 lb.).	Gold therefrom. Fine ozs.	Silver. Fine ozs.
MURCHISON GOLDFIELD—continued.												
MEEKATHARRA DISTRICT—*continued.*												
Yaloginda	1853N	Blue Bird	....	....	439·25	106·33	....	....	....	8,556·25	2,636·53	....
		Voided leases	....	....	....	....	....	19·03	1,972·23	28,175·54	14,609·36	8·68
		Sundry claims	....	....	57·25	2·82	....	61·89	647·51	11,081·92	5,028·61	....
		From District generally :—										
		Sundry Parcels treated at :										
		L.T.T. 1351H Vivian Gold N.L....	....	....	....	*46·64	....	....	....	858·00	178·77	....
		L.T.T. (1295H) D. Rinaldi & J. Young	....	....	....	....	....	....	....	1,732·50	115·09	....
		L.T.T. 1325H L. V. Rinaldi	....	....	....	....	....	....	....	....	·50	‡49·03
		State Battery, Meekatharra	....	....	....	231·81	....	....	....	130·00	*27,492·30	24·34
		Various Works	....	....	....	....	....	....	....	172·75	*13,601·19	342·17
		Reported by Banks and Gold Dealers	25·66	....	....	8·38	....	12,211·37	179·70	13·50	65·31	·60
		Totals	**78·27**	....	**987·30**	**626·13**	....	**14,595·95**	**18,164·04**	**2,286,039·71**	**1,304,359·05**	**5,119·88**
DAY DAWN DISTRICT.												
Day Dawn	G.M.L. 573D, etc.	Mountain View Gold, N.L.	....	....	41·75	13·31	....	....	....	12,831·10	17,335·23	217·60
		Prior to transfer to present holders	....	....	....	....	....	....	94·05	10,060·78	32,623·97	....
	576D	(New Fingall)	....	....	....	....	....	6·12	6·84	3,230·00	1,226·01	....
		Voided leases	....	....	....	....	....	160·64	826·65	1,922,088·36	1,225,599·75	169,210·44
		Sundry claims	....	....	....	....	....	96·42	523·56	13,558·26	6,730·74	1·55
Lake Austin	....	Voided leases	....	....	....	....	....	613·00	3,079·62	36,872·20	51,050·49	....
		Sundry claims	....	....	27·00	23·41	2·23	59·07	965·49	3,299·44	1,319·62	4·60
Mainland	....	Voided leases	....	....	....	....	....	·41	3,296·77	7,575·62	25,026·07	....
		Sundry claims	....	....	....	....	....	17·85	771·56	1,337·95	701·31	....
Pinnacles	G.M.L. 676D	Eclipse Amalgamated North	....	....	....	....	....	....	....	159·00	15·58	....
	670D	Eclipse North	....	....	....	....	....	....	....	141·25	11·18	....
		Voided leases	....	....	....	....	....	4·90	1,213·68	18,280·00	9,915·71	....
		Sundry claims	....	....	173·75	18·18	....	62·93	509·50	4,602·92	1,783·68	....

From District generally :—														
Sundry Parcels treated at :														
Various Work	....	....	....	....	....	....	....	....	....	16·61	988·00	*1,988·33	....	
Reported by Banks and Gold Dealers	1·26	....	....	....	....	2,216·13	37·30	....	12·57	·01				
Totals	**1·26**	....	**242·50**	**54·90**	**2·23**	**3,237·47**	**11,341·63**	**2,035,024·88**	**1,375,340·24**	**169,434·20**				

MOUNT MAGNET DISTRICT.

Jumbulyer	G.M.L. 1410M	Gold Bug	....	....	50·25	19·56	....	....	2·20	888·10	262·99	....		
		Voided leases	....	....	....	....	....	....	13·37	680·10	361·74	....		
		Sundry claims	....	....	11·00	7·49	....	20·32	116·27	1,216·70	886·47	....		
Lennon Ville	....	Voided leases	....	....	....	....	....	....	3,226·91	151,502·55	128,568·28	459·62		
		Sundry claims	....	....	172·50	15·31	....	23·30	108·82	14,334·82	5,516·28	....		
Mt. Magnet	1476M	Cascade	....	....	....	....	....	....	....	10·50	7·14	....		
	1527M	Eclipse	....	....	....	9·96	....	....	....	181·50	79·77	1·34		
	1255M, etc.	Edward Carson leases	....	....	....	....	....	1·82	....	18,015·50	12,891·77	7·76		
	1455M	Evening Star	....	....	210·00	30·27	....	....	....	614·00	77·91	....		
	1287M	Havelock	....	....	....	....	....	....	11·05	4,332·50	840·14	....		
	1282M, etc.	Hill 50 Gold Mine, N.L.	....	....	106,479·00	83,719·73	2,291·14	....	....	982,105·90	448,601·75	9,923·72		
	1246M	(Neptune)	....	....	....	....	....	....	829·41	8,787·65	4,122·61	·21		
	1479M	Hill 50 Consolidated, N.L.	....	....	....	....	....	....	....	68·00	5·10	....		
	1361M	Jupiter	....	....	....	....	....	....	·83	658·05	261·71	....		
	1444M	Late Comer	....	....	....	....	....	....	2·53	469·50	387·57	....		
	1447M	Morning Star	....	....	754·00	149·56	....	....	....	1,434·65	359·40	....		
	1536M	Pat Omeara	....	....	34·00	·68	....	....	....	34·00	·68	....		
	1505M	Perseverance	....	....	....	....	....	....	....	107·25	11·40	....		
		Voided leases	....	....	....	....	....	29·26	9,811·54	834,262·31	312,761·69	851·39		
		Sundry claims	·81	....	245·75	62·37	....	123·08	2,626·24	60,397·65	29,761·98	4·49		
Mt. Magnet, East		Voided leases	....	....	....	....	....	63·29	764·53	5,522·28	22,811·75	....		
		Sundry claims	....	....	....	....	....	....	37·22	418·25	428·29	....		
Moyagee	1538M	Moyagee	....	....	....	....	....	....	....	33·75	34·02	....		
		Voided leases	....	....	....	....	....	....	23·59	12,439·10	18,299·16	757·77		
		Sundry claims	....	....	....	....	....	14·44	176·21	1,516·25	1,746·42	....		
Paynesville	....	Voided leases	....	....	....	....	....	....	1,613·34	449·77	1,116·15	....		
		Sundry claims	....	....	....	....	....	3·36	540·21	882·57	1,372·00	....		
Winjangoo	....	Voided leases	....	....	....	....	....	·99	191·88	72·00	69·98	....		
		Sundry claims	....	....	....	....	....	....	223·32	237·53	71·58	....		
From District generally :—														
Sundry Parcels treated at :														
State Battery, Boogardie	....	....	92·00	13·74	....	....	....	348·26	*34,513·68	6·87				
Various Works	....	....	....	....	....	....	....	56·06	*18,949·24	10·04				
Reported by Banks and Gold Dealers	....	·11	....	....	....	2,286·91	114·39	8·00	113·15	·22				
Totals	**·81**	**·11**	**108,048·50**	**84,028·67**	**2,291·14**	**2,566·77**	**20,433·86**	**2,102,085·05**	**1,025,291·80**	**12,023·43**				

Table I.—*Production of Gold and Silver from all sources, etc.*—continued.

Mining Centre.	Number of Lease.	Registered Name of Company or Lease.	Total for 1956.					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 (2,240 lb.).	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240 lb.).	Fine ozs.	Fine ozs.
Yalgoo Goldfield.												
Bilberatha	....	Voided leases	....	....	....	....	....	1·27	90·94	3,384·50	1,845·05	....
		Sundry claims	....	....	....	....	....	....	6·64	3,075·05	1,401·56	....
Carlaminda	....	Voided leases	....	....	....	....	....	1·28	3·39	2,056·57	862·42	3·30
		Sundry claims	....	....	....	....	....	....	....	1,368·50	600·68	....
Field's Find	G.M.L. (1113) (1220)	Field's Find Central leases	....	....	....	....	....	....	....	10·00	10·13	·49
	(1113)	Fields Find	....	....	....	....	....	....	....	44·00	17·96	·10
	(1220)	Fields Find Central	....	....	....	....	....	....	....	5·00	3·53	....
	1119	Fields Find Central West	....	....	....	....	....	....	....	156·75	39·26	·80
	(1114) 1119	Fields Find Central West leases	....	....	....	....	....	....	....	4,625·00	1,074·53	56·69
	1207	Rose Marie	....	....	....	....	....	....	....	418·67	252·10	1·52
		Voided leases	....	....	....	....	....	....	226·72	45,475·96	32,547·10	....
		Sundry claims	....	....	....	....	....	5·77	188·67	5,458·85	1,777·91	....
Goodingnow	1063	Ark	....	....	....	....	....	....	12·49	2,270·50	1,927·29	....
	1025	Carnation	....	....	....	....	....	....	....	18,926·05	13,993·00	....
	1145	Oversight	....	....	....	....	....	....	10·62	2,338·35	875·92	....
		Voided leases	....	....	....	....	....	146·70	288·66	60,077·31	51,418·40	....
		Sundry claims	....	....	....	....	....	152·96	169·70	10,222·30	5,100·59	....
Gullewa	....	Voided leases	....	....	....	....	....	....	19·05	39,913·60	20,966·51	113·70
		Sundry claims	....	....	....	....	....	....	170·45	4,391·25	1,918·24	....
Kirkalucka	....	Voided leases	....	....	....	....	....	....	....	61·25	45·10	....
		Sundry claims	....	....	....	....	....	....	17·79	257·30	126·29	....
Messenger's Patch	....	Voided leases	....	....	....	....	....	8·64	349·71	39,836·51	28,564·95	1,083·01
		Sundry claims	....	....	....	....	....	463·12	333·98	1,595·10	588·36	·07
Mt. Farmer	....	Voided leases	....	....	....	....	....	....	....	64·00	40·19	....
		Sundry claims	....	....	....	....	....	....	....	462·90	145·06	....
Mt. Gibson	....	Voided leases	....	....	....	....	....	....	6·44	526·50	888·70	....
		Sundry claims	....	....	....	....	....	1·66	44·72	1,134·60	498·90	1·00
Ninghan	....	Voided leases	....	....	....	....	....	....	....	10·00	1·41	....
		Sundry claims	....	....	....	....	....	....	....	324·75	123·28	....

Noongal	1201	Hard to Find	....	....	....	....	....	....	....	....	114·00	111·83	....
	1203	Revival	....	....	....	....	....	....	....	....	80·00	132·93	4·04
		Voided leases	....	....	....	....	....	7·88	31·96	11,069·75	5,526·90	....
		Sundry claims	....	....	....	....	....	39·32	310·31	8,499·05	3,561·25	....
Nyounda	....	Voided leases	....	....	....	....	....	....	217·63	416·00	183·91	....
		Sundry claims	....	....	....	....	....	....	30·88	829·00	206·46	....
Pinyalling	....	Voided leases	....	....	....	....	....	....	313·79	2,318·90	1,146·19	....
		Sundry claims	....	....	....	....	....	3·13	134·09	1,492·50	954·82	....
Retaliation	....	Voided leases	....	....	....	....	....	....	....	5,089·25	1,872·98	....
		Sundry claims	....	....	....	....	....	....	....	778·25	304·71	....
Rothsay	....	Voided leases	....	....	....	....	....	....	24·06	40,680·75	10,777·98	....
		Sundry claims	....	....	....	....	....	....	·73	6,469·50	2,562·03	....
Wadgingarra	....	Voided leases	....	....	....	....	....	....	....	691·11	650·63	....
		Sundry claims	....	....	....	....	....	....	....	2,131·30	559·83	....
Wardawarra	....	Voided leases	....	....	....	....	....	....	....	10,760·50	5,862·04	....
		Sundry claims	....	....	....	....	....	....	....	933·75	369·87	....
Warriedar	....	Voided leases	....	....	....	....	....	....	....	13,661·50	4,607·88	7·30
		Sundry claims	....	....	....	....	....	....	2·84	8,782·85	1,892·46	....
Yalgoo	....	Voided leases	....	....	....	....	....	....	3·23	6,314·50	9,965·18	....
		Sundry claims	....	....	....	....	....	....	23·56	2,622·75	1,010·02	....
Yuin	....	Voided leases	....	....	....	....	....	....	127·12	68,139·50	27,908·57	130·13
		Sundry claims	....	....	....	....	....	....	4·70	335·50	67·53	....
	From Goldfield generally :—											
	Sundry Parcels treated at :—											
	State Battery, Paynes Find	....	....	....	....	....	....	....	....	38·50	*4,532·78	....
	State Battery, Warriedar	....	....	....	....	....	....	....	....	....	*6,537·13	·37
	State Battery, Yalgoo	....	....	....	....	....	....	....	....	....	*1,200·51	....
	Various Works	....	....	....	....	....	....	9·42	....	664·00	*3,325·00	99·84
	Reported by Banks and Gold Dealers	....	....	....	....	....	....	946·11	58·32	....	48·90	·20
	Totals	....	....	....	....	....	....	**1,787·26**	**3,223·19**	**441,403·83**	**263,534·74**	**1,502·56**

Mt. Margaret Goldfield.

MOUNT MORGANS DISTRICT.

Australia United	....	Voided leases	....	....	....	....	....	....	....	....	1,911·63	15,913·69	23,305·76	1·76
		Sundry claims	....	....	....	....	....	....	....	....	580·98	1,307·50	2,227·65	....
Eucalyptus	....	Voided leases	....	....	....	....	....	....	....	....	2,878·56	1,603·85	3,251·01	....
		Sundry claims	....	....	....	....	....	....	....	....	591·62	2,160·30	2,011·78	....

Table I.—*Production of Gold and Silver from all sources, etc.*—continued.

Mining Centre.	Number of Lease.	Registered Name of Company or Lease.	Total for 1956.					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 (2,240 lb.).	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240 lb.).	Fine ozs.	Fine ozs.
MOUNT MARGARET GOLDFIELD—continued.												
MOUNT MORGANS DISTRICT—*continued.*												
Linden	(529F)	Second Fortune	....	....	....	....	....	....	....	543·00	292·75	....
		Voided leases	....	....	....	....	....	7·53	566·97	72,376·81	65,915·60	·68
		Sundry claims	....	....	....	....	....	132·11	244·96	19,272·35	13,768·96	....
Mt. Margaret	....	Voided leases	....	....	....	....	....	12·13	1·89	8,900·39	5,291·51	12·55
		Sundry claims	....	....	....	....	....	25·22	111·18	1,790·10	661·42	....
Mt. Morgans	399F, etc.	Morgans Gold Mines, Ltd.	....	....	....	....	....	....	....	4,591·05	13,849·14	....
		Prior to transfer to present holders	....	....	....	....	....	....	16·66	779,578·43	354,225·86	5,552·63
		Voided leases	....	....	....	....	....	17·95	148·79	61,354·50	34,786·53	77·86
		Sundry claims	....	....	3·50	5·59	....	36·41	398·78	5,104·07	3,396·77	....
Murrin Murrin	....	Voided leases	....	....	....	....	....	10·43	231·35	136,940·22	104,029·97	29·60
		Sundry claims	....	....	....	....	....	51·15	557·24	6,485·58	4,460·45	....
Redcastle	557F	Trixie	....	8·66	....	....	....	....	37·09	167·75	50·71	....
		Voided leases	....	....	....	....	....	4·49	436·54	4,107·20	4,043·41	....
		Sundry claims	....	....	....	....	....	....	113·84	1,183·57	642·45	....
Yundamindra	560F	Linden (W.A.) Gold, N.L.	....	....	402·00	153·77	....	....	....	3,872·00	1,680·35	30·68
		Voided leases	....	....	....	....	....	....	110·93	78,485·85	49,894·35	5·82
		Sundry claims	....	....	....	....	....	3·01	271·93	6,674·35	4,789·46	....
		From District generally :—										
		Sundry Parcels treated at :—										
		C. C. Crocker—Anniversary Battery	....	....	....	....	....	....	....	10·00	26·96	....
		State Battery, Linden	....	....	....	....	....	....	9·16	299·54	*15,499·36	....
		United Aborigines Mission (M.A. 12F)	....	....	....	....	....	113·08	18·87	403·00	135·50	·09
		Various Works	....	....	....	....	....	....	....	1,257·81	*8,561·39	99·97
		Reported by Banks and Gold Dealers	....	....	....	....	....	3,073·03	141·84	10·30	95·75	·68
		Totals	....	**8·66**	**405·50**	**159·36**	....	**3,486·54**	**9,380·81**	**1,214,393·21**	**716,894·85**	**5,812·32**
MOUNT MALCOLM DISTRICT.												
Cardinia	1795C	Rangoon	....	....	....	....	....	....	6·49	330·00	178·07	....
		Voided leases	....	....	....	....	....	13·87	1,591·66	5,201·74	4,049·91	....
		Sundry claims	....	....	....	....	....	4·25	121·91	1,865·25	575·01	·66

Diorite	....	Voided leases	....	....	....	....	....	....	945·65	38,879·03	35,144·28	33·18
		Sundry claims	....	....	....	....	....	11·21	332·13	4,626·80	4,467·93	....
Dodger's Well	....	Voided leases	....	....	....	....	....	....	57·90	1,373·30	1,936·52	....
		Sundry claims	....	....	....	....	....	·95	28·32	1,440·25	904·23	....
Lake Darlot	(1834C)	Monte Christo	....	....	....	....	....	....	....	3,789·00	255·14	....
		Voided leases	....	....	....	....	....	....	4,482·18	70,928·46	52,038·63	7·56
		Sundry claims	....	....	40·53	74·13	....	129·92	906·52	8,612·87	5,771·46	2·60
Leonora	(1837C)	Great Gwalia	....	....	....	....	....	....	....	200·00	45·75	....
	1829C	Jessie Alma	....	123·59	....	....	....	....	578·11	623·50	1,834·51	....
	(1788C)	Little Gwalia	....	....	....	....	....	....	....	1,576·00	530·53	....
	1579C, etc.	Sons of Gwalia, Ltd.	....	....	113,598·00	27,376·36	2,263·42	....	....	6,063,460·53	2,362,405·15	168,824·30
		Prior to transfer to present holders	....	....	....	....	....	....	....	109,081·00	55,989·21	8·66
		Voided leases	....	....	....	....	....	....	1,866·86	174,799·00	90,621·56	94·57
		Sundry claims	....	5·40	14·10	33·68	....	37·73	367·26	18,352·35	11,739·19	....
Malcolm	....	Voided leases	....	....	....	....	....	11·65	47·07	62,656·53	47,563·43	....
		Sundry claims	....	....	4·00	·17	....	5·75	33·39	4,576·47	2,711·34	·12
Merton Dale	....	Voided leases	....	....	....	....	....	....	....	89,024·75	60,935·32	1,497·58
		Sundry claims	....	....	....	....	....	5·42	85·74	3,216·41	2,295·52	....
Mt. Clifford	1844C	Beau Don	....	163·16	18·00	2·81	....	....	163·16	32·00	148·64	....
		Voided leases	....	....	....	....	....	....	1,623·35	9,556·96	16,492·17	....
		Sundry claims	....	....	....	....	....	53·98	1,860·00	5,569·70	3,485·47	....
Pig Well	....	Voided leases	....	....	....	....	....	....	....	13,587·32	14,676·58	63·68
		Sundry claims	....	....	....	....	....	....	34·61	2,896·65	1,225·46	....
Randwick	....	Voided leases	....	....	....	....	....	....	246·76	10,912·65	9,736·57	....
		Sundry claims	....	....	....	....	....	66·57	164·02	2,488·64	1,307·45	....
Webster's Find	....	Voided leases	....	....	....	....	....	30·30	....	22,167·50	14,377·65	....
		Sundry claims	....	....	....	....	....	36·84	695·68	2,356·15	1,530·56	....
Wilsons Creek	....	Voided leases	....	....	....	....	....	....	....	333·50	168·27	....
		Sundry claims	....	....	....	....	....	·70	4·24	316·00	261·12	....
Wilsons Patch	....	Voided leases	....	....	....	....	....	....	99·38	28,863·35	13,050·19	1·05
		Sundry claims	....	....	....	....	....	4·68	54·46	1,612·16	1,416·41	....
	From District generally :—											
	Sundry Parcels treated at :—											
	State Battery, Darlot		....	....	....	....	....	....	....	18·00	*786·34	....
	Reefer Cyanide Plant		....	....	....	....	....	....	....	20·00	*3,125·37	22·38
	Various Works		....	....	....	....	....	....	....	789·50	*221,75·93	135·97
	Reported by Banks and Gold Dealers		4·91	....	....	....	....	3,507·53	252·83	21·50	51·57	....
	Totals		**4·91**	**292·15**	**113,674·63**	**27,487·15**	**2,263·42**	**3,921·35**	**16,649·68**	**6,766,154·82**	**2,846,008·44**	**170,692·31**

Table I.—*Production of Gold and Silver from all sources, etc.*—continued.

Mining Centre.	Number of Lease.	Registered Name of Company or Lease.	Total for 1956.					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 (2,240 lb.).	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240 lb.).	Fine ozs.	Fine ozs.
MOUNT MARGARET GOLDFIELD—continued.												
MOUNT MARGARET DISTRICT.												
Burtville	2446T	Boomerang	....	....	....	....	....	....	....	1,833·65	9,144·49	462·30
	2138T	Nil Desperandum	....	....	5·50	12·89	....	....	5·30	1,940·47	4,523·90	....
		Voided leases	....	....	....	....	....	4·89	413·80	70,494·33	108,785·83	485·97
		Sundry claims	....	....	....	....	....	2·65	208·27	7,409·66	5,505·29	....
Duketon	....	Voided leases	....	....	....	....	....	5·35	3,216·10	31,889·42	22,542·63	....
		Sundry claims	....	....	31·50	21·37	....	61·45	528·26	2,438·15	2,190·62	29·76
Eagle's Nest	....	Voided leases	....	....	....	....	....	....	145·34	534·50	1,238·22	....
		Sundry claims	....	....	....	....	....	24·07	487·05	1,046·35	360·11	....
Erlistoun	2500T	Westralia	....	....	....	....	....	....	....	....	*122·50	....
		Voided leases	....	....	....	....	....	10·07	393·41	156,730·90	101,512·60	4,327·81
		Sundry claims	....	....	31·00	36·63	....	1,181·65	165·05	5,706·59	3,885·61	....
Euro	....	Voided leases	....	....	....	....	....	....	65·14	91,821·50	37,678·25	....
		Sundry claims	....	....	74·00	13·99	....	4·87	73·04	1,507·00	835·30	....
Laverton	2514T	Gladiator	....	....	....	....	....	....	....	2,551·50	402·86	....
	2245T, etc.	Lancefield Leases	....	....	6,006·00	380·15	....	....	....	46,969·75	5,067·62	22·62
	2478T	Lancefield North	....	....	....	....	....	....	....	2,235·25	438·99	....
	2489T	Wedge	....	....	....	....	....	....	....	222·00	21·19	....
	2245T	Lancefield Extended West	....	....	....	....	....	....	....	881·25	846·77	....
	2541T	Mary Mack	....	....	92·00	11·21	....	....	....	92·00	11·21	....
		Voided leases	....	....	....	....	....	28·59	2,028·85	2,075,638·37	813,222·85	56,923·16
		Sundry claims	....	....	48·00	9·63	....	215·58	1,492·90	17,482·50	9,243·70	....
Mt. Barnicoat	....	Voided leases	....	....	....	....	....	....	23·08	2,370·00	2,251·99	....
		Sundry claims	....	....	....	....	....	....	·68	1,309·75	1,087·77	....
Mt. Shenton	....	Voided leases	....	....	....	....	....	....	....	15·00	26·25	....
		Sundry claims	....	....	....	....	....	....	....	279·25	209·67	....
		From District generally :—										
		Sundry Parcels treated at :										
		State Battery, Laverton	....	....	....	1,440·31	10·84	....	....	97·50	18,639·19	391·84
		United Gold Recoveries Pty., Ltd.	....	....	....	....	....	....	....	·25	*3,786·44	3,374·06
		Various Works	....	....	....	....	....	....	....	214·75	*19,403·68	·24
		Reported by Banks and Gold Dealers	....	....	....	....	....	2,531·53	108·08	....	26·76	....
		Totals	....	....	**6,288·00**	**1,926·18**	**10·84**	**4,070·70**	**9,354·35**	**2,523,711·64**	**1,173,012·69**	**66,017·76**

North Coolgardie Goldfield.

MENZIES DISTRICT.

Comet Vale	5766Z	Coonega Extended	....	....	38·25	8·47	....	....	....	54·75	23·81	....
	5775Z	Gladsome East	....	....	40·75	10·15	....	....	....	40·75	10·15	....
	5757Z	King of the Hills	....	....	....	....	....	....	....	156·75	42·43	....
		Voided leases	....	....	....	....	....	....	419·74	267,188·22	193,191·04	5,355·33
		Sundry claims	....	....	2·00	2·12	....	....	40·19	1,910·91	1,000·43	....
Goongarrie	5740Z	Gull's Blow	....	....	....	....	....	....	164·75	348·75	221·44	....
		Voided leases	....	....	....	....	....	·94	1,385·26	29,848·04	18,095·35	....
		Sundry claims	....	....	47·75	40·70	....	46·46	2,088·07	2,807·02	3,200·91	....
Menzies	5543Z	Black Swan	....	....	....	....	....	....	....	1,080·63	1,644·69	9·08
	5736Z	Bodington	....	4·56	....	....	....	....	134·83	100·50	154·47	....
	(5773Z)	Dunlop's	....	....	48·50	5·07	....	....	....	195·00	18·65	....
	5511Z	First Hit	....	....	60·75	27·37	....	....	....	3,420·00	6,526·60	21·25
	5511Z, etc.	First Hit G.M.'s (1934), Ltd.	....	....	....	....	....	....	....	68,473·70	49,060·96	6,676·23
	5542Z	Good Block Lease	....	....	11·50	3·19	....	....	7·32	2,498·75	2,896·04	....
	5714Z	Lady Harriet North	....	....	27·00	4·99	....	....	....	108·00	18·13	....
	5549Z	Lady Harriet	....	....	....	....	....	....	....	728·00	291·44	....
	5520Z	Mignonette	....	....	....	....	....	....	....	543·50	378·92	....
	5774Z	Spion Kopp	....	....	797·25	136·26	....	....	....	797·25	136·26	....
	(5749Z)	Woolgar	....	....	115·25	54·67	....	....	....	1,094·25	549·02	....
	(5752Z) . .	Woolgar South	....	....	....	....	....	....	....	120·00	58·53	....
		Voided leases	....	....	....	....	....	45·42	1,125·41	934,445·50	725,962·51	13,586·39
		Sundry claims	....	....	517·75	103·40	....	49·50	623·61	34,530·44	25,266·57	776·49
Mt. Ida	5701Z, etc.	MoonlightWiluna G.M.s, Ltd.	....	....	30,754·00	17,174·42	....	....	40·77	166,801·86	89,496·61	787·54
		Prior to transfer to present holders	....	....	....	....	....	....	....	31,833·25	16,021·98	891·37
		Voided leases	....	....	....	....	....	....	92·21	68,731·17	72,679·14	106·63
		Sundry claims	....	....	22·00	5·69	....	48·14	436·08	16,066·16	8,235·71	·12
Twin Hills	....	Voided leases	....	....	....	....	....	....	....	582·30	574·93	....
		Sundry claims	....	....	....	....	....	....	....	97·80	86·69	....
	From District generally :—											
	Sundry Parcels treated at :											
	Lady Harriet Battery		....	....	....	....	....	....	....	279·50	*19,381·31	30·00
	Mt. Ida, State Battery (A. Grey)		....	....	....	*36·33	....	....	....	1,866·25	*7,479·12	·05
	Various Works		....	....	....	....	....	....	....	2,528·30	*39,363·16	3,032·11
	Reported by Banks and Gold Dealers		15·83	....	....	....	....	1,484·76	387·80	85·00	14·69	....
	Totals		**15·83**	**4·56**	**32,482·75**	**17,612·83**	....	**1,675·22**	**6,946·04**	**1,639,362·30**	**1,282,081·69**	**31,272·59**

ULARRING DISTRICT.

Davyhurst	1016U, etc.	New Coolgardie G.M.s., N.L.	....	....	8,305·00	4,045·23	....	....	....	132,198·00	67,724·52	15,808·01
	1016U, 1085U....	(New Callion)	....	....	....	....	....	....	....	5,293·30	2,002·37	119·67
		Voided leases	....	....	....	....	....	2·93	152·64	166,783·32	126,011·36	5,408·47
		Sundry claims	....	....	....	....	....	....	208·48	13,653·94	5,690·39	....

Table I.—*Production of Gold and Silver from all sources, etc.*—continued.

Mining Centre.	Number of Lease.	Registered Name of Company or Lease.	Total for 1956.					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 (2,240 lb.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240 lb.)	Fine ozs.	Fine ozs.
NORTH COOLGARDIE GOLDFIELD—*continued.*												
ULARRING DISTRICT—*continued.*												
Morley's	1101U	Emerald	....	....	723·00	222·23	....	....	26·24	3,508·50	2,260·71	....
	1094U	First Hit	....	....	742·75	1,256·86	....	....	....	3,027·50	6,186·55	....
	1168U	Hazel Dawn	....	....	22·00	48·09	....	....	....	22·00	48·09	....
	1081U	Mabel Gertrude	....	....	27·50	22·05	....	....	17·19	1,566·50	1,916·51	....
	1089U	Paramount	....	....	659·00	547·28	....	....	1·49	3,725·50	3,373·10	....
	1163U	Two Chinamen	....	....	9·25	15·28	....	....	....	9·25	15·28	....
		Voided leases	....	....	....	....	....	....	3,854·94	2,956·50	5,944·69	10·54
		Sundry claims	....	....	22·50	9·59	....	2·16	932·23	1,743·00	2,527·60	....
Mulline	1107U	Ajax West	....	....	....	....	....	....	1·37	5,845·25	5,428·32	....
	1070U	Riverina	....	....	....	....	....	....	....	267·00	70·41	....
	1070U	(Riverina Gold Mines Pty., Ltd.	....	....	....	....	....	....	....	32,085·50	11,669·45	·07
		Voided leases	....	....	....	....	....	....	274·09	102,637·22	103,360·32	530·75
		Sundry claims	....	....	77·00	178·63	....	10·82	198·67	10,815·39	8,942·59	1·10
Mulwarrie	1153U	Four Mile	....	....	5·00	42·43	....	....	....	61·00	319·35	....
	1113U	Oakley	....	....	296·00	381·25	....	....	....	2,966·00	4,484·00	....
		Voided leases	....	....	....	....	....	....	165·29	19,480·68	26,369·21	38·47
		Sundry claims	....	....	....	....	....	·80	282·29	3,106·33	2,722·13	....
Ularring	....	Voided leases	....	....	....	....	....	....	563·34	9,771·60	13,907·76	....
		Sundry claims	....	....	....	....	....	....	....	671·50	309·48	....
		From District generally :—										
		Sundry Parcels treated at :										
		State Battery, Mulline	....	....	....	....	....	....	....	639·99	*16,459·89	....
		State Battery, Mulwarrie	....	....	....	....	....	....	....	613·18	*6,564·16	....
		Riverina South Battery	....	....	....	*45·18	....	....	....	....	*900·46	....
		Various Works	....	....	....	....	....	....	15·82	268·15	9,639·15	11·15
		Reported by Banks and Gold Dealers	....	....	....	....	....	112·81	64·00	100·00	23·48	....
		Totals	....	....	10,889·00	6,814·10	....	129·52	6,758·08	523,816·10	434,871·33	21,928·23

NIAGARA DISTRICT.

Desdemona	....	Voided leases	....	....	....	....	....	....	7·12	9,809·00	7,555·81	12·04
		Sundry claims	....	....	....	....	....	....	10·35	2,225·45	892·48	....
Kookynie	928G	Altona	....	....	988·00	370·17	·44	....	....	4,569·50	4,409·27	·44
	911G	Cosmopolitan South	....	....	57·00	26·26	....	....	....	2,190·00	1,103·93	....
	933G	New Gladstone	....	....	96·25	18·36	....	....	....	456·25	142·83	....
	937G	Victory	....	....	10·00	13·54	....	....	....	10·00	13·54	....
		Voided leases	....	....	....	....	....	3·35	347·30	744,917·21	394,601·81	5,375·97
		Sundry claims	1·69	....	66·75	28·80	....	60·92	106·60	9,030·55	6,762·75	3·02
Niagara	....	Voided leases	....	....	....	....	....	....	104·54	85,876·50	52,365·05	....
		Sundry claims	....	....	....	....	....	28·10	97·22	14,645·16	8,257·78	....
Tampa	....	Voided leases	....	....	....	....	....	....	41·58	50,477·57	23,287·71	174·24
		Sundry claims	....	....	....	....	....	32·60	283·40	8,041·33	4,113·02	....
		From District generally :—										
		Sundry Parcels treated at :										
		Various Works	....	....	....	....	....	....	....	1,220·50	*20,884·22	120·98
		Reported by Banks and Gold Dealers	....	....	....	....	....	1,593·39	823·66	....	63·53	....
		Totals	**1·69**	....	**1,218·00**	**457·13**	**·44**	**1,718·36**	**1,821·77**	**933,469·02**	**524,453·73**	**5,686·69**

YERILLA DISTRICT.

Edjudina	....	Voided leases	....	....	....	....	....	....	18·44	35,523·70	43,374·79	37·79
		Sundry claims	....	....	....	....	....	....	28·52	6,948·58	4,827·25	·69
Patricia	....	Voided leases	....	....	....	....	....	....	....	4,158·50	5,396·40	25·40
		Sundry claims	....	....	....	....	....	....	....	47·00	20·78	....
Pingin	....	Voided leases	....	....	....	....	....	....	48·34	17,463·30	10,742·77	....
		Sundry claims	....	....	....	....	....	....	154·86	5,642·59	3,475·75	....
Yarri	1320R	Margaret	....	....	130·00	39·68	....	....	....	3,774·00	1,165·27	....
	(1330R)	Margaret North	....	....	....	....	....	....	....	260·00	12·84	....
	1327R	Nil Desperandum	....	....	....	....	....	....	....	319·00	73·68	....
	1126R, etc.	Porphyry (1939) G.M., N.L.	....	....	....	....	....	....	....	66,715·00	9,867·95	261·86
	1126R, etc.	(Edjudina Gold Mining Co. N.L.)	....	....	....	....	....	....	....	30,220·00	5,409·93	507·51
		Prior to transfer	....	....	....	....	....	....	....	124·50	38·89	....
		Voided leases	....	....	....	....	....	6·30	87·08	44,324·75	21,235·42	2·00
		Sundry claims	....	....	218·50	48·11	....	·87	5·93	17,058·55	6,102·93	·98
Yerilla	....	Voided leases	....	....	....	....	....	....	3,107·25	16,481·43	12,925·74	13·93
		Sundry claims	....	....	....	....	....	19·30	97·63	2,752·83	1,590·03	....
Yilgangie	1176R, etc.	Western Mining Corporation	....	....	2,684·00	2,651·94	453·54	....	....	16,224·75	16,196·16	2,205·56
		Prior to transfer to present holders	....	....	....	....	....	....	·85	1,244·75	1,830·28	....
		Voided leases	....	....	....	....	....	....	9·94	2,432·75	1,500·80	....
		Sundry claims	....	....	....	....	....	121·67	98·20	3,302·30	2,020·38	·63

Table I.—*Production of Gold and Silver from all sources, etc.*—continued

Mining Centre.	Number of Lease.	Registered Name of Company or Lease.	Total for 1956.					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 (2,240 lb.).	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240 lb.).	Fine ozs.	Fine ozs.
NORTH COOLGARDIE GOLDFIELD—continued.												
YERILLA DISTRICT—*(continued).*												
From District generally :—												
Sundry Parcels treated at :												
State Battery Yarri			....	....	....	....	....	....	....	276·50	*9,060·18	11·65
State Battery, Yerilla			....	....	....	....	....	....	....	....	*43·52	....
Various Works			....	....	....	....	....	2·17	....	642·25	6,049·24	....
Reported by Banks and Gold Dealers			....	....	....	....	....	1,161·60	160·08	....	27·36	....
Totals			....	....	**3,032·50**	**2,739·73**	**453·54**	**1,311·91**	**3,817·12**	**275,937·03**	**162,988·34**	**3,068·00**
Broad Arrow Goldfield.												
Bardoc	....	Voided leases	....	....	....	....	....	....	2,335·41	85,370·59	55,699·50	203·60
		Sundry claims	....	....	103·50	19·34	....	54·95	1,214·83	17,171·53	8,238·43	....
Black Flag	(2284W)	Barlock	....	....	....	....	....	....	....	54·00	22·88	....
	2229W	Bellevue	....	....	678·00	239·74	....	....	208·36	1,961·25	2,767·40	....
		Voided leases	....	....	....	....	....	27·81	405·90	48,223·79	28,152·20	....
		Sundry claims	....	....	14·25	5·56	....	712·92	251·59	8,041·96	4,966·57	....
Broad Arrow	(2039W)	Golden Arrow	....	....	....	....	....	....	....	5,674·75	864·42	....
	(2254W)	Grace Darling Extended	....	....	....	....	....	....	....	2,457·50	1,058·51	....
		Voided leases	....	....	....	....	....	70·32	10,453·81	147,763·69	118,165·12	20·23
		Sundry claims	....	....	1,083·50	155·71	....	1,007·72	3,046·17	33,669·39	16,818·33	·11
Cane Grass	....	Voided leases	....	....	....	....	....	....	27·77	669·82	460·72	....
		Sundry claims	....	....	....	....	....	....	227·55	717·45	505·06	....
Carnage	....	Voided leases	....	....	....	....	....	176·04	659·31	2,402·00	2,170·67	....
		Sundry claims	....	....	....	....	....	....	6·61	1,840·08	874·56	....
Cashmans	....	Voided leases	....	....	....	....	....	67·51	813·76	8,172·15	7,090·91	....
		Sundry claims	....	....	....	....	....	....	40·31	1,205·12	361·74	·05

Christmas Reef	2286W....	Golden Fleece	....	....	9·00	7·62	....	....	....	9·00	7·62	....
	2279W....	New Mexico....	....	....	....	....	....	....	....	51·50	147·19	....
	2253W....	New Mexico South	....	....	112·75	213·59	....	....	....	734·50	1,773·06	....
		Voided leases	....	....	....	....	....	....	55·49	1,856·12	3,599·03	....
		Sundry claims	....	....	85·75	23·47	....	....	441·85	3,028·39	2,933·41	....
Fenbark	(2188W)	Golden Penny	....	....	....	....	....	....	....	2,873·25	630·89	....
		Voided leases	....	....	....	....	....	....	4·42	3,897·75	2,080·79	....
		Sundry claims	....	....	32·50	3·16	....	....	51·96	3,031·52	1,000·47	....
Grant's Patch	2261W....	Bent Tree	....	....	316·00	40·32	....	....	....	1,277·00	327·53	....
	2277W....	Coronation	....	....	144·50	51·10	....	....	....	144·50	51·10	....
	2278W....	Prince of Wales Syndicate	....	....	82·25	280·72	....	....	....	82·25	280·72	....
	2277W, 2278W	(Ora Banda Amalgamated Mines N.L. (in liquidation))	....	....	125·25	207·98	....	....	....	961·00	1,146·17	....
	2208W....	Wentworth	....	....	18·50	5·46	....	....	1·30	3,901·75	1,160·47	....
	(2224W)	Whip-Pole	....	....	....	....	....	....	12·20	1,057·35	422·08	....
		Voided leases	....	....	....	....	....	....	260·63	197,211·89	78,077·59	175·00
		Sundry claims	....	....	358·75	29·16	....	....	356·66	6,506·79	3,096·31	....
Ora Banda	T.A. 42W, M.A. 41W, etc.	Associated Northern Ora Banda N.L.	....	....	....	....	....	....	....	2,786·50	464·53	21·07
		Prior to transfer to present holders	....	....	....	....	....	....	....	315,958·95	123,252·22	1,664·70
	2270W,(2269W)	Gimlet South Leases	....	....	1,075·00	171·20	....	....	....	4,557·75	931·10	....
	2280W....	New Victorious	....	....	11·50	6·14	....	....	....	29·50	13·62	....
	2289W....	Trafalgar	....	....	516·00	34·58	....	....	....	516·00	34·58	....
		Voided leases	....	....	....	....	....	....	846·13	103,811·32	27,390·64	....
		Sundry claims	....	....	247·50	36·72	....	....	467·18	13,618·25	4,493·86	....
Paddington	2287W....	Pakeha	....	....	463·75	94·99	....	....	....	567·00	119·77	....
		Voided leases	....	....	....	....	....	5,566·30	463·31	195,119·31	86,278·23	32·15
		Sundry claims	....	....	33·00	1·16	....	1,714·16	291·43	16,949·48	9,199·11	....
Riches Find	2285W....	Lady Correl	....	....	28·00	43·92	....	....	8·22	59·50	77·81	....
		Voided leases	....	....	....	....	....	....	13·42	7,583·59	6,017·88	71·36
		Sundry claims	....	....	....	....	....	....	296·26	1,943·75	2,289·23	·13
Siberia	....	Voided leases	....	....	....	....	....	1·07	2,649·28	28,928·97	31,751·34	....
		Sundry claims	....	28·54	62·75	15·93	....	289·06	1,261·72	21,257·79	12,880·54	....
Smithfield	2264W....	King of Kings	....	....	1,367·75	123·47	....	....	19·19	6,709·50	855·55	....
		Voided leases	....	....	....	....	....	....	....	4,700·71	1,174·69	....
		Sundry claims	....	....	....	....	....	....	124·29	3,255·84	1,275·89	....
	From Goldfield generally :—											
	Sundry Parcels treated at :											
	State Battery, Ora Banda		....	....	....	*110·99	....	....	....	128·05	*23,838·84	2·50
	Golden Arrow Battery		....	....	....	*5·85	....	....	....	80·75	*4,333·07	2·30
	Various Works		....	....	....	....	....	2,275·66	1·24	16,967·02	49,501·99	3,103·45
	Reported by Banks and Gold Dealers		·26	....	....	·70	....	10,002·85	145·62	61·68	91·05	....
	Totals		**·26**	**28·54**	**6,969·75**	**1,928·58**	....	**21,966·37**	**27,463·18**	**1,337,610·84**	**731,216·99**	**5,296·65**

Table I.—*Production of Gold and Silver from all sources, etc.*—continued.

Mining Centre.	Number of Lease.	Registered Name of Company or Lease.	Total for 1956.					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 (2,240 lb.).	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240 lb.).	Fine ozs.	Fine ozs.
North-East Coolgardie Goldfield.												
KANOWNA DISTRICT.												
Gindalbi	(1582X)	Enterprise	....	....	59·50	4·81	....	....	....	59·50	4·81	....
	(1576X)	Kurrajong	....	....	39·25	5·82	....	....	....	74·25	12·41	....
		Voided leases	....	....	....	....	....	....	1,151·99	46,046·78	41,730·91	38·31
		Sundry claims	....	....	88·25	23·94	....	....	716·52	5,534·02	3,192·22	....
Gordon	....	Voided leases	....	....	....	....	....	....	682·54	53,900·58	20,072·51	517·61
		Sundry claims	....	....	....	....	....	....	177·38	2,155·70	1,194·71	....
Kalpini	....	Voided leases	....	....	....	....	....	....	38·73	13,543·50	6,753·78	·07
		Sundry claims	....	....	....	....	....	24·70	269·72	1,492·50	1,026·37	....
Kanowna	1572X	Kanowna Red Hill	....	....	148·00	26·70	....	....	....	2,119·25	601·98	....
		Voided leases	....	....	....	....	....	24·94	4,516·76	685,557·10	380,497·36	2,482·24
		Sundry claims	....	....	197·75	41·43	....	125·32	2,163·30	26,823·02	118,74·76	1·50
Mulgarrie	....	Voided leases	....	....	....	....	....	....	1,216·63	6,902·26	4,197·98	....
		Sundry claims	....	....	....	....	....	....	16·78	1,290·00	646·60	....
Six Mile	....	Voided leases	....	....	....	....	....	....	1,603·72	559·00	767·72	....
		Sundry claims	....	....	....	....	....	....	56·51	764·50	231·13	....
		From District generally :—										
		Sundry Parcels treated at :										
		Various Works	....	....	....	....	....	330·42	867·52	1,58935·05	153,205·89	....
		Reported by Banks and Gold Dealers	1·14	....	....	1·69	....	106,017·45	40·42	·50	109·73	....
		Totals	**1·14**	....	**532·75**	**104·39**	....	**106,522·83**	**13,518·52**	**1,005757·51**	**626,120·87**	**3,039·73**
KURNALPI DISTRICT.												
Jubilee	....	Voided leases	....	....	....	....	....	....	145·13	2,122·50	1,465·16	....
		Sundry claims	....	....	....	....	....	25·57	13·52	1,234·00	520·15	....
Kurnalpi	....	Voided leases	....	....	....	....	....	371·18	3,166·80	4,052·51	3,957·71	6·27
		Sundry claims	....	....	....	....	....	324·12	727·39	4,377·61	2,292·28	....
Mulgabbie	....	Voided leases	....	....	....	....	....	....	1,402·66	226·75	7,845·87	4·95
		Sundry claims	....	....	....	....	....	8·06	2,772·71	1,327·45	2,241·18	....

From District generally :—													
Sundry Parcels treated at :													
Various Works	....	....	....	....	....	....	....	....	101·50	388·63	....
Reported by Banks and Gold Dealers	....	....	....	....	....	12,105·52	70·70	....	2·35	1·49
Totals	....	....	....	....	....	**12,834·45**	**8,298·91**	**13,442·32**	**18,713·33**	**12·71**

East Coolgardie Goldfield.

EAST COOLGARDIE DISTRICT.

Binduli	6025E	Belle of Kalgoorlie	....	....	25·50	1·74	....	....	....	825·00	89·66	....
		Voided leases	....	....	....	....	....	....	....	803·10	385·19	....
		Sundry claims	....	....	24·50	3·74	....	....	13·01	5,169·77	1,681·45	....
Boorara	....	Voided leases	....	....	....	....	....	....	459·07	309,467·82	172,861·95	411·37
		Sundry claims	....	....	48·00	9·35	....	·49	145·56	3,535·34	1,524·15	....
Boulder	6145E	Boomerang	....	....	....	....	....	....	....	77·00	8·00	....
	5531E	Cassidy's Hill	....	....	....	....	....	....	....	75·50	7·77	....
	5964E	Croesus Extended	....	....	....	....	....	....	....	192·75	16·57	....
	(6320E)	Edith Joy	....	....	....	....	....	....	....	188·25	23·81	....
	6537E	Golden Key	....	27·47	80·00	82·59	....	....	27·47	80·00	82·59	....
	5692E, etc.	Gold Mines of Kalgoorlie (Aust.), Ltd.	....	....	222,456·00	61,217·29	21,941·69	....	....	2,954,254·30	817,914·31	197,182·47
	5466E	(South Star)	....	....	....	....	....	....	233·46	4,237·43	1,494·78	....
	5466E	Prior to transfer to present holders	....	....	....	....	....	....	5·22	1,835·75	748·78	....
	5159E, etc.	(Lake View South (G.M.K.), Ltd.)	....	....	....	....	....	....	....	62,278·38	21,536·66	....
	5692E, etc.	Prior to transfer to present holders	....	....	....	....	....	....	545·23	527,790·53	568,643·05	4,844·50
	5853E, etc.	Paringa Junction North Leases	....	....	....	....	....	....	7·82	1,686·79	701·11	....
	5853E	(Paringa Junction)	....	....	....	....	....	....	....	123·75	17·77	....
	5854E	(Paringa Junction North)	....	....	....	....	....	....	....	60·50	10·64	....
	5855E	(Paringa Junction South)	....	....	....	....	....	....	....	1,473·25	228·42	....
	5690E	(Boulder Perseverance, Ltd.)	....	....	122,397·00	18,354·23	1,228·44	....	....	3,231,394·37	1,104,705·27	339,695·60
		Prior to transfer to present holders	....	....	....	....	....	....	....	3,306,942·88	1,841,159·00	203,821·43
	5695E, etc.	(South Kalgurli Consolidated, Ltd.)	....	....	70,631·00	15,374·92	1·17	....	....	3,363,857·36	1,190,887·72	26,490·36
		Prior to transfer to present holders	....	....	....	....	....	....	....	1,344,254·70	531,792·77	17,722·97
	(5716E)	(Two B's)	....	....	....	....	....	....	....	464·25	88·66	....
	5345E, etc.	(Kalgoorlie Enterprise Mines, Ltd.)	....	....	66,744·00	12,839·04	368·76	....	....	1,095,387·80	325,990·62	29,133·01
		Prior to transfer to present holders	....	....	....	....	....	....	....	15,320·68	8,957·01	....
	5696E, etc.	Great Boulder Pty. Gold Mines, Ltd.	....	....	428,571·00	122,312·94	56,721·52	....	1·53	11822910·97	5,759,483·61	1,360,639·03
	5845E	Happy Returns	....	....	....	....	....	....	....	7,862·75	1,452·88	....
	5478E, etc.	Lake View & Star, Ltd.	....	....	657,105·00	167,004·12	18,992·53	....	....	13133048·30	3,964,073·26	428,155·07
		Prior to transfer to present holders	....	....	....	....	....	....	8·49	15792500·38	9,149,223·80	1,348,055·28
	6230E	New Look	....	....	....	....	....	....	....	256·75	22·68	....
	5431E, etc.	North Kalgurlie (1912), Ltd.	....	....	351,313·80	66,948·28	5,362·73	....	127·55	4,300,680·24	1,225,192·57	264,876·07
	5405E, etc.	North Kalgurli (1912), Ltd., Croesus Pty. Group	....	....	....	....	....	....	51·20	90,159·00	19,261·22	....
	5891E	(New Croesus)	....	....	....	....	....	....	....	193·00	48·74	....
	5700E	Prior to transfer to present holders	....	....	....	....	....	43·99	....	4,018,436·01	2,815,911·21	97,625·03

Table I.—*Production of Gold and Silver from all sources, etc.*—continued.

Mining Centre.	Number of Lease.	Registered Name of Company or Lease.	Total for 1956.					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 (2,240 lb.).	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240 lb.).	Fine ozs.	Fine ozs.
		EAST COOLGARDIE GOLDFIELD—continued.										
		EAST COOLGARDIE DISTRICT—*continued.*										
	5446E, etc.	North Kalgurli United Mines, Ltd.	....	....	....	....	....	....	....	4,661·51	928·18	232·93
		Prior to transfer to present holders	....	....	....	....	....	....	....	131·74	76·74	....
		Voided leases	....	....	....	....	....	129·24	12,023·37	1,814,183·06	760,424·05	24,046·96
		Sundry claims	....	....	....	....	....	24·58	212·32	11,649·99	4,300·62	....
Cutter's Luck	....	Voided leases	....	....	....	....	....	45·87	133·58	74·50	239·19	....
		Sundry claims	....	....	....	....	....	8·11	501·65	922·90	384·71	....
Feysville	....	Voided leases	....	....	....	....	....	....	110·93	863·30	425·16	....
		Sundry claims	....	....	....	....	....	....	199·00	1,237·10	645·88	....
Hampton Plains	P.P.L. 1, etc.	Consolidated Gold Areas, N.L.	....	....	....	....	....	....	....	142,565·73	37,249·15	5,835·85
	P.P.L. 86	Golden Hope, N.L.	....	....	....	....	....	....	....	5,964·00	2,006·14	....
	P.P.L. 192	Golden Hope North	....	....	....	....	....	....	....	353·00	201·02	....
	P.P.L. 252	Hampton Properties, Ltd.—Mt. Martin	....	....	....	....	....	....	....	14,953·75	5,574·11	....
	P.P.L. 460	Hampton Xmas Gift	....	....	....	....	....	6·72	37·57	107·00	89·44	....
	P.P.L. 12	Junction Extended	....	....	....	....	....	....	....	3,581·75	527·74	....
	P.P.L. 277	Pernatty	....	....	345·75	39·46	....	....	....	6,078·50	715·64	....
	P.P.L. 277	New Hope	....	....	....	....	....	....	17·23	61,468·55	11,175·94	....
	H.P. 23	Scherini & Rowe (Mutooroo)	....	....	590·50	58·28	....	....	....	979·00	83·50	....
	P.P.L. 175	Jubilee	....	....	304·25	23·12	....	....	....	6,581·75	894·36	....
		Cancelled leases	....	....	....	....	....	4,578·52	203·94	126,877·34	39,711·84	69·83
		Sundry claims and leases	....	....	....	....	....	2·68	70·85	46,439·41	8,509·67	....
Kalgoorlie	6048E	Auld Acquaintance	....	....	....	....	....	....	....	7·50	2·36	....
	6562E	Bretvic	....	....	264·50	19·68	....	....	....	264·50	19·68	....
	(4547E), (4548E)	Champagne Syndicate, N.L.	....	....	2,631·75	259·70	·23	....	....	9,783·75	1,048·56	61·41
	4547E, etc.	(Mt. Charlotte (Kalgoorlie) G.M., Ltd.)	....	....	....	....	....	....	....	25,143·25	2,888·32	110·15
		Prior to transfer to present holders	....	....	....	....	....	....	5·72	48,292·60	13,930·79	....
	6503E	Coronation	....	....	....	....	....	....	....	20·50	2·52	....
	5913E	Devon Consuls	....	....	....	....	....	....	93·19	2,298·46	699·66	....
	5915E	Edna Derby	....	....	6·50	2·49	....	....	....	6·50	2·49	....
	5647E	Golden Cross	....	....	....	....	....	....	....	156·25	19·77	....
	5510E	Golden Dream	....	....	....	....	....	....	....	79·00	6·53	....
	5774E	Golden Goose	....	....	....	....	....	....	....	215·50	53·07	....
	5739E	Golden Star	....	....	....	....	....	....	....	918·50	85·96	....
	6502E	Western Mining Corp. (Hannans North)	....	....	40·25	5·86	....	....	....	256·00	65·07	4·28
	6504E	Historic	....	....	....	....	....	....	....	257·00	17·27	....
	5460E	Kalgoorlie Star	....	....	52·00	3·78	....	....	....	290·25	56·54	....

	5878E	Lady May	....	....	....	....	....	....	62·05	4,740·50	1,177·07	....
	6091E	Lesanben	....	1·66	97·25	43·40	....	....	185·86	576·00	341·25	....
	6485E	Maritana Hill	....	....	629·50	67·26	....	....	....	2,516·75	332·50	....
	6535E	Mary A.	....	....	653·00	58·97	....	....	....	1,624·25	144·52	....
	6321E	North End Extended	....	....	783·00	77·06	....	....	69·28	1,749·75	377·54	....
	5852E, 6024E....	Pedestal Leases	....	....	52·25	9·22	....	....	....	1,778·25	485·69	....
	5852E	(Pedestal)	....	....	....	....	....	....	....	1,608·75	444·93	....
	6024E	Trident	....	....	....	....	....	....	....	58·75	36·67	....
	5468E	Phar Lap	....	....	....	....	....	....	....	2,083·25	750·82	2·50
	5415E, 5803E....	Return Leases	....	....	....	....	....	....	5·64	3,831·75	656·15	....
		Voided leases	....	....	....	....	....	242·48	10,572·12	1,457,335·80	578,523·61	45,973·47
		Sundry claims	....	....	689·25	51·49	....	232·41	1,124·61	61,255·63	23,183·81	....
Wombola	6051E	Big Bull	....	....	....	....	....	....	....	595·50	432·86	....
	5688E, (5967E)	Caledonian Leases	....	....	....	....	....	....	....	970·00	659·67	....
	5688E	(Caledonian)	....	....	....	....	....	....	....	4,275·00	3,632·98	....
	(5967E)	(North Caledonian)	....	....	....	....	....	....	1·27	22·25	8·15	....
	5497E, 5500E....	Daisy Leases	....	....	1,873·85	918·07	....	....	....	10,717·50	7,612·17	5·92
	5497E	(Daisy)	....	....	....	....	....	....	....	6,282·25	5,031·93	....
	5500E	(Happy-Go-Lucky)	....	....	....	....	....	....	....	2,075·25	1,675·85	....
	6032E	Dry Mount	....	....	35·75	15·07	....	....	....	1,156·25	1,136·47	....
	6325E	Great Hope	....	....	....	....	....	....	....	150·00	64·66	....
	5689E, etc.	Haoma Gold Mines, N.L.	....	....	3,731·00	2,687·56	33·93	....	....	4,886·00	3,712·33	33·93
	5689E, etc.	(Haoma Leases)	....	....	....	....	....	....	....	27,396·50	25,445·40	79·15
	5689E	(Haoma)	....	....	....	....	....	....	....	2,168·00	1,948·36	....
	5525E	(Xmas Flat)	....	....	....	....	....	....	....	330·25	264·74	....
	5798E	(Maranoa)	....	....	....	....	....	....	32·17	3,183·50	1,633·27	....
	5493E, etc.	(New Milano, N.L.)	....	....	....	....	....	....	·25	17,390·75	11,622·24	479·00
	5493E	(Milano)	....	....	....	....	....	....	....	4,012·75	11,676·72	....
	(5616E)	(Leslie)	....	....	....	....	....	....	....	602·00	939·10	....
	6312E	Inverness	....	....	183·00	47·11	....	....	....	1,840·00	348·73	....
	(6043E)	Launa Doone	....	....	35·50	10·70	....	....	....	1,674·00	696·17	....
	6043E, etc.	(Launa Doone Leases)	....	....	....	....	....	....	....	32·50	42·76	....
	6487E	Leslie	....	....	13·50	10·40	....	....	....	84·50	78·61	....
	6213E	Pauline	....	....	47·00	25·78	....	....	....	242·00	222·17	....
	6533E	Rosemary	....	....	313·25	802·07	....	....	....	629·50	2,719·35	....
		Voided leases	....	....	....	....	....	3·80	2,464·78	27,520·59	40,315·95	....
		Sundry claims	....	....	31·25	3·20	....	....	711·10	23,389·68	14,158·46	....
	From District Generally :											
	Sundry Parcels treated at :											
	Golden Horseshoe (New), Ltd. (T.L.'s. 101, etc.)	....	....	....	*5,002·72	2,507·60	....	....	....	*350,028·15	354,192·20
	State Battery, Kalgoorlie	....	....	....	*11·68	....	....	....	390·70	*32,025·68	46·24
	Sundry Claims	....	....	....	....	....	11,014·57	465·61	5,440·46	2,541·10	....
	Various Works	....	....	....	....	....	384·36	64·70	41,135·02	270,756·33	14,114·46
	Reported by Banks and Gold Dealers	10·19	1·23	·02	105·00	....	16,909·17	9,985·20	359·68	7,201·71	....
	Totals	**10·19**	**30·36**	**1,932,799·67**	**474,507·47**	**107,158·60**	**33,626·99**	**40,979·60**	**69463599·90**	**31824375·98**	**4,763,941·01**
					BULONG DISTRICT.							
Balagundi	....	Voided leases	....	....	....	....	....	....	2,408·98	1,115·93	1,488·91	12·92
		Sundry claims	....	....	....	....	....	3·51	293·52	806·01	505·93	....

Table I.—*Production of Gold and Silver from all sources, etc.*—continued.

Mining Centre.	Number of Lease.	Registered Name of Company or Lease.	Total for 1956.					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 (2,240 lb.).	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240 lb.).	Fine ozs.	Fine ozs.
EAST COOLGARDIE GOLDFIELD—continued.												
BULONG DISTRICT—*continued.*												
Bulong	G.M.L. 1311Y	Blue Quartz	....	....	....	....	....	....	....	1,310·50	559·10	....
		Voided leases	....	....	....	....	....	107·54	8,526·12	108,330·55	85,785·57	....
		Sundry claims	....	....	343·25	41·52	....	1,655·86	1,611·58	16,817·23	17,764·83	....
Majestic	....	Voided leases	....	....	....	....	....	19·45	63·91	1,317·94	647·62	....
		Sundry claims	....	....	....	....	....	42·88	154·58	1,926·55	948·06	....
Morelands	....	Sundry claims	....	....	....	....	....	....	·13	308·75	81·84	....
Mount Monger	....	Voided leases	....	....	....	....	....	....	2,771·39	1,437·85	1,256·10	....
		Sundry claims	....	....	....	....	....	215·60	....	379·05	308·48	....
Randalls	....	Voided leases	....	....	....	....	....	....	60·04	33,180·35	11,100·46	....
		Sundry claims	....	....	....	....	....	20·70	8·11	4,814·31	1,211·05	....
Taurus	....	Voided leases	....	....	....	....	....	2·06	3·70	1,765·10	909·84	....
		Sundry claims	....	....	....	....	....	112·69	51·88	2,656·60	1,049·81	....
Trans Find	P.P.L. 308A, Loc. 41	Dawn of Hope	....	....	....	....	....	....	2·87	1,145·75	330·33	....
		Voided leases	....	....	....	....	....	....	....	1,098·42	876·22	....
		Sundry claims	....	....	....	....	....	....	5·93	808·25	335·33	....
		From District generally :—										
		Sundry Parcels treated at :										
		Various Works	....	....	....	....	....	....	....	6,102·15	6,675·38	....
		Reported by Banks and Gold Dealers	....	....	....	....	....	25,224·93	70·15	·01	28·44	....
		Totals	....	....	**343·25**	**41·52**	....	**27,405·22**	**16,032·89**	**185,321·30**	**131,863·30**	**12·92**

Coolgardie Goldfield.

COOLGARDIE DISTRICT.

Bonnievale	G.M.L. 5622	Lucky Hit	....	....	....	....	....	....	3·28	945·60	491·59	....
	4600	Malva Maie	....	....	83·50	52·31	....	....	....	3,622·40	3,814·49	2·35
		Prior to transfer to present holders	....	....	....	....	....	....	....	614·50	1,099·21	11·63
	5977	Mystery	....	....	122·25	37·26	....	....	....	396·00	169·82	....

	5890	Rayjax	....	....	47·75	99·65	....	....	....	201·50	438·97	....
		Voided leases	....	....	....	....	....	....	212·48	357,741·97	191,281·36	5·88
		Sundry claims	....	....	209·50	89·21	....	....	163·19	8,019·38	5,335·75	·04
Bulla Bulling	(5955)	Greta	....	....	....	....	....	....	....	176·50	51·59	....
		Voided leases	....	....	....	....	....	....	....	776·81	668·19	....
		Sundry claims	....	....	....	....	....	5·21	15·98	1,685·76	666·59	....
Burbanks	5605	Burbanks Deeps	....	....	....	....	....	....	....	103·00	53·46	....
	(5956)	Lord Bobs	....	....	....	....	....	....	....	34·50	11·98	....
		Voided leases	....	....	....	....	....	14·90	376·98	420,454·36	306,380·87	521·06
		Sundry claims	....	7·98	127·50	48·70	....	55·05	497·55	16,050·60	8,962·33	....
Cave Rocks	....	Voided leases	....	....	....	....	....	....	....	8,223·16	1,941·42	....
		Sundry claims	....	....	....	....	....	....	50·00	4,473·65	1,082·79	....
Coolgardie	5679	Ada	....	....	....	....	....	....	....	1,602·70	153·57	....
	5935, etc.	Bailey's South (New Coolgardie G.M.)	....	....	18,435·00	6,143·06	....	....	....	25,648·00	10,760·83	907·43
	5876	(Bailey's West)	....	....	....	....	....	....	....	6·25	2·22	....
	5868	El Dorado	....	....	....	....	....	....	498·20	166·20	1,034·01	....
	(5878)	Ellen Jean	....	....	....	....	....	....	....	358·00	116·88	·69
	5844	Jackpot	....	....	1,027·75	408·68	....	....	....	6,071·75	2,370·37	....
	5643	Lloyd George South	....	....	....	....	....	....	....	....	10·25	....
	5884	Lone Hand	....	....	16·50	2·10	....	....	19·85	475·25	77·30	....
	5881	MacPhersons'	....	....	....	....	....	....	....	953·00	586·05	....
	5743	Moya Jan	....	....	....	....	....	....	....	2,233·25	917·10	....
	5954	Pat Jan	....	....	....	....	....	....	....	32·00	9·08	....
		Voided leases	....	....	....	....	....	1,301·71	4,763·64	1,104,943·29	447,618·41	4,818·90
		Sundry claims	12·34	2·04	499·50	176·31	....	217·83	2,714·34	72,691·94	27,299·09	....
Eundynie	....	Voided leases	....	....	....	....	....	3·70	16·09	31,772·98	16,531·34	1·75
		Sundry claims	....	....	....	....	....	....	82·28	694·12	468·01	....
Gibraltar	5723	Lloyd George	....	....	....	....	....	....	....	763·00	176·78	....
		Voided leases	....	....	....	....	....	....	33·97	38,658·63	20,111·22	....
		Sundry claims	....	....	....	....	....	1·39	50·76	3,270·10	1,390·47	....
Gnarlbine	....	Voided leases	....	....	....	....	....	....	13·95	2,731·75	1,341·60	....
		Sundry claims	....	....	....	....	....	....	4·90	1,186·10	504·18	....
Hampton Plains	P.P.L. 462	Bobby Dazzler	....	....	....	....	....	....	28·55	31·37	301·45	....
	P.P.L. 419	Chatanooka	....	....	....	....	....	....	....	1,267·75	295·73	1·10
	P.P.L. 335	D. & C. P. Clews	....	....	32·50	33·68	....	....	....	111·00	80·31	....
	P.P.L. 338	Dry Hill	....	....	....	....	....	....	....	43·00	58·42	....
	P.P.L. 465	G. Dugan and Party	....	....	....	....	....	....	....	53·75	17·54	....
	P.P.L. 454	Golden Dollar	....	....	....	....	....	....	....	105·50	13·66	....
	P.P.L. 319	Lady May	....	....	....	....	....	....	....	1,742·25	981·39	....
	P.P.L. 316, 330	New Coolgardie G.M., N.L.	....	....	14,125·00	9,966·90	124·80	....	....	250,385·00	125,351·36	29,871·18
	P.P.L. 316	(Surprise G.M.)	....	....	....	....	....	....	....	7,189·00	3,425·59	....
	P.P.L. 330	(Barbara)	....	....	....	....	....	....	....	2,157·75	1,655·63	....
		Voided leases	....	....	....	....	....	....	451·32	13,950·84	11,118·69	....
		Sundry claims	....	....	....	....	....	1·63	132·06	1,948·00	856·51	....

Table I.—*Production of Gold and Silver from all sources, etc.*—continued.

Mining Centre.	Number of Lease.	Registered Name of Company or Lease.	Total for 1956.					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 (2,240 lb.).	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240 lb.).	Fine ozs.	Fine ozs.
COOLGARDIE GOLDFIELD—continued.												
COOLGARDIE DISTRICT—*continued.*												
Higginsville	G.M.L. (5981)	Central Higginsville	....	....	....	4·76	....	....	33·81	44·00	33·29	....
	5877	Sons of Erin	....	....	....	....	....	....	26·40	20·00	8·44	....
	5293, etc.	Two Boys	....	....	....	....	....	....	....	360·00	1,260·43	·01
	5293	(Two Boys)	....	....	....	....	....	....	....	6,888·00	3,193·95	....
		Voided leases	....	....	....	....	....	....	373·93	66,417·35	20,562·31	159·52
		Sundry claims	....	....	....	....	....	....	187·25	3,654·76	1,951·40	....
Larkinville	....	Voided leases	....	....	....	....	....	22·77	54·44	2,335·16	3,256·49	....
		Sundry claims	....	....	....	....	....	....	147·20	448·53	1,029·03	....
Logan's	5324, etc.	Spargo's Reward G.M. (1935), N.L.	....	....	....	....	....	....	....	105,397·50	26,324·42	....
		Voided leases	....	....	....	....	....	....	....	1,263·31	607·26	....
		Sundry claims	....	....	....	....	....	6·88	128·95	1,969·10	907·47	....
Londonderry	....	Voided leases	....	....	....	....	....	....	95·04	34,155·35	22,238·37	·35
		Sundry claims	....	39·77	283·25	102·79	....	16·68	78·49	3,915·67	2,666·35	22·42
Mungari	....	Voided leases	....	....	....	....	....	....	17·71	1,872·50	458·43	....
		Sundry claims	....	....	....	....	....	1·77	153·24	2,787·94	750·54	....
Paris	(5311), 5500	Lister's Gold Mine	....	....	....	....	....	·88	....	5,460·00	3,563·29	75·95
	(5530), 5311, 5500	Lister's Gold Mine	....	....	....	....	....	....	....	8,582·00	4,423·84	....
	5500	(Paris Central)	....	....	....	....	....	....	....	113·00	24·16	....
	5873	Paris West	....	....	....	....	....	....	....	19·00	11·03	....
		Voided leases	....	....	....	....	....	....	4·30	1,342·00	614·08	3·24
		Sundry claims	....	....	....	....	....	....	....	2,104·25	518·98	....
Red Hill	....	Voided leases	....	....	....	....	....	14·87	1,551·81	40,797·40	31,070·65	....
		Sundry claims	....	....	14·00	34·06	....	15·29	90·33	1,417·14	1,034·03	....
Ryan's Find	....	Voided leases	....	....	....	....	....	....	....	54·16	151·69	....
		Sundry claims	....	....	....	....	....	....	·44	116·44	355·83	....
St. Ives	....	Voided leases	....	....	....	....	....	63·34	146·87	39,318·46	16,208·86	....
		Sundry claims	....	....	....	....	....	211·25	950·23	4,177·56	1,459·39	....
Wannaway	....	Voided leases	....	....	....	....	....	....	28·61	1,831·95	1,465·70	....
		Sundry claims	....	....	8·50	6·70	....	....	193·79	1,324·87	1,307·03	....

Widgiemooltha	5663	Bobs	....	....	....	....	....	....	....	16·00	4·94	....
	5834	Harpers	....	....	....	....	....	....	9·54	40·00	93·06	....
	5451	Host Group	....	....	....	....	....	....	12·75	1,604·15	565·02	....
		Voided leases	....	....	....	....	....	17·95	1,252·70	22,727·81	11,965·35	·17
		Sundry claims	....	....	18·20	24·31	....	46·49	470·06	16,186·16	6,863·69	·07
	From District generally :—											
	Sundry Parcels treated at :											
	State Battery, Coolgardie....	....	....	....	*392·95	....	....	....	771·01	*38,349·74	17·00
	Australian Machinery and Investment, Co., Ltd	....	....	....	....	....	....	....	....	*3,044·44	86·31
	T. A. James, (T.A. 201)	....	....	....	....	....	....	....	....	361·00	367·34	....
	Lister's Cyanide Plant	....	....	....	....	....	....	....	....	....	*269·23	....
	Paris Central Cyanide Plant	....	....	....	....	....	....	....	....	....	*77·64	....
	Various Works	....	....	....	....	....	7·75	....	4,014·61	29,433·20	223·06
	Reported by Banks and Gold Dealers	12·84	....	....	....	....	14,941·77	723·86	48·25	123·65	·65
	Totals	**25·18**	**49·79**	**35,050·70**	**17,623·43**	**124·80**	**16,969·11**	**16,861·12**	**2,780,719·60**	**1,436,699·49**	**36,730·76**

KUNANALLING DISTRICT.

Carbine	970S	Carbine	....	....	....	....	....	....	....	13,820·00	7,047·96	....
	970S, etc.	Carbine Leases	....	....	....	....	....	....	687·98	51,991·86	39,862·25	....
		Voided leases	....	....	....	....	....	....	....	20,116·00	5,470·81	....
		Sundry claims	....	....	74·75	24·90	....	136·08	93·96	6,240·63	2,252·83	....
Chadwin	1047S	Resulute	....	....	37·75	39·34	....	....	....	51·75	56·73	....
		Voided leases	....	....	....	....	....	....	....	4,781·55	5,232·25	2·50
		Sundry claims	....	....	....	....	....	14·28	82·36	5,972·55	2,945·14	·25
Dunnsville	....	Voided leases	....	....	....	....	....	....	828·58	17,548·85	8,657·45	....
		Sundry claims	....	....	27·00	7·52	....	21·00	1,034·08	2,916·21	2,070·12	....
Jourdie Hills	....	Voided leases	....	....	....	....	....	....	18·00	28,009·74	19,401·09	28·45
		Sundry claims	....	....	54·25	17·69	....	1·86	49·81	1,881·50	866·97	1·05
Kintore	1036S	Newhaven	....	....	....	....	....	....	....	1,993·50	465·11	....
		Voided leases	....	....	....	....	....	18·70	169·33	54,829·39	39,579·50	677·88
		Sundry claims	....	....	9·50	21·97	....	111·91	102·70	4,534·28	2,525·88	....
Kunanalling	....	Voided leases	....	....	....	....	....	86·13	1,734·92	130,303·61	100,812·73	40·77
		Sundry claims	....	·21	246·50	23·97	....	216·53	815·49	15,001·77	9,644·05	....
Kundana	....	Voided leases	....	....	....	....	....	....	....	465·00	68·12	....
		Sundry claims	....	....	....	....	....	....	....	475·25	60·38	....
	From District generally :—											
	Sundry Parcels treated at :											
	Goldfields Aust. Dev. Cyanide Plant	....	....	....	....	....	....	....	....	*548·07	....
	G. Tite, L.T.T. 1337H	....	....	....	2·22	....	....	....	....	2·22	....
	Various Works	....	....	....	....	....	42·23	....	1,782·26	*5,061·33	....
	Reported by Banks and Gold Dealers	2·38	....	....	....	....	868·40	17·93	....	5·85	·49
	Totals	**2·38**	**·21**	**449·75**	**137·61**	....	**1,517·12**	**5,635·14**	**362,715·70**	**252,636·84**	**751·39**

Table I.—*Production of Gold and Silver from all sources, etc.*—continued.

Mining Centre.	Number of Lease.	Registered Name of Company or Lease.	Total for 1956.					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 (2,240 lb.).	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240 lb.).	Fine ozs.	Fine ozs.
Yilgarn Goldfield.												
Blackbournes	....	Voided leases	....	....	....	....	....	....	....	1,282·50	341·37	....
		Sundry claims	....	....	....	....	....	....	....	392·50	81·15	....
Bullfinch	3350, etc.	Great Western Consolidated, N.L. (Copperfield Group)	....	....	417,813·00	64,081·49	21,406·04	....	....	1,706,187·00	232,743·38	73,631·15
		Prior to transfer to present holders	....	....	....	....	....	....	64·80	78,404·34	24,644·88	....
	4287	Volcano	....	....	25·00	10·14	....	....	....	175·00	166·03	....
		Voided leases	....	....	....	....	....	..	10·14	490,361·07	185,489·03	27,958·41
		Sundry claims	....	....	....	....	....	8·47	37·04	7,484·75	4,068·00	....
Corinthian	3398, etc.	Great Western Consolidated, N.L. (Corinthean Group)	....	....	2,015·00	217·83	....	....	....	2,015·00	217·83	....
		Prior to transfer to present holders	....	....	....	....	....	....	....	14,416·58	6,248·03	....
	4180	Deliverance	....	....	....	....	....	....	....	480·00	167·55	....
		Voided leases	....	....	....	....	....	....	23·46	138,241·40	33,293·21	....
		Sundry claims	....	....	....	....	....	....	2·68	1,088·35	640·61	....
Eenuin	4414	Birthday	....	....	30·00	42·00	....	....	....	30·00	42·00	....
		Voided leases	....	....	....	....	....	....	181·74	10,038·06	10,457·92	·01
		Sundry claims	....	....	89·00	104·41	....	2·50	73·97	2,722·60	1,930·86	....
Evanston	....	Voided leases	....	....	....	....	....	....	79·27	64,533·06	33,191·88	10·14
		Sundry claims	....	....	....	....	....	4·98	....	638·35	159·55	....
Forrestonia	....	Voided leases	....	....	....	....	....	....	....	1,185·00	298·15	....
		Sundry claims	....	....	....	....	....	....	....	378·00	144·01	....
Golden Valley	(4173)	Inspiration	....	....	....	....	....	....	....	254·00	397·74	....
	4369	Inspiration West	....	....	24·00	44·63	....	....	....	36·00	62·27	....
	4247	Lilly of the Valley	....	....	85·00	27·54	....	....	....	709·00	177·73	....
	4220	Manxman South	....	....	....	....	....	....	....	19·00	4·42	....
	2994, etc.	Radio leases	....	....	1,450·00	3,906·08	48·41	....	2·70	30,170·80	53,138·51	720·21
		Voided leases	....	....	....	....	....	....	36·34	36,545·92	28,509·40	10·99
		Sundry claims	....	....	....	....	....	4·58	237·85	6,641·27	4,922·56	1·02
Greenmount	....	Voided leases	....	....	....	....	....	45·99	21·62	125,127·64	31,585·45	944·50
		Sundry claims	....	....	27·00	2·69	....	·46	4·27	3,099·58	816·65	....

Holleton	37PP	(Reward) Brittania	....	....	250·00	82·57	....	....	....	2,150·00	1,711·48	....
		Voided leases	....	....	....	....	....	....	9·33	45,003·25	13,147·88	36·69
		Sundry claims	....	....	....	....	....	....	3·75	3,464·05	923·78	·20
Hope's Hill	3414	Pilot	....	....	....	....	....	....	....	19,446·12	2,948·68	....
		Voided leases	....	....	....	....	....	....	74·78	132,660·55	36,462·02	1·00
		Sundry claims	....	....	....	....	....	18·67	44·35	4,600·52	1,417·83	....
Kennyville	3875	Victoria	....	....	....	....	....	....	....	5,244·00	1,148·94	·63
		Voided leases	....	....	....	....	....	....	18·76	55,876·63	21,625·66	·59
		Sundry claims	....	....	33·00	6·99	....	....	5·06	8,700·50	2,337·49	....
Koolyanobbing	....	Voided leases	....	....	....	....	....	....	·99	1,768·05	972·77	....
		Sundry claims	....	....	....	....	....	·26	17·33	656·10	329·20	....
Marvel Loch	4243	Christmas Gift	....	....	....	....	....	....	32·56	75·60	52·95	....
	13PP	Cricket	....	....	....	....	....	....	....	1,671·00	932·04	....
	4039	Cromwell	....	....	....	....	....	....	....	633·00	98·46	....
	3942, etc.	Edward's Reward Leases	....	....	1,926·00	392·38	....	....	....	64,780·50	28,472·56	....
	3942	(Edward's Reward)	....	....	....	....	....	....	....	2,080·00	2,016·32	....
	3943	(Sunshine)	....	....	....	....	....	....	....	3,866·00	2,384·79	....
	4034	Firelight	....	....	....	....	....	....	2·68	6,653·75	940·03	....
	3724	Frances Furness	....	....	469·00	295·58	....	....	....	13,751·75	6,673·89	....
	4375	Great Western Consolidated, N.L.	....	....	297·00	51·21	....	....	....	297·00	51·21	....
	3718	Kurrajong	....	....	....	....	....	....	....	9,221·00	3,271·73	....
	3914	May	....	....	....	....	....	....	....	145·00	45·86	....
	4230	May Queen	....	....	....	....	....	....	....	286·00	43·42	....
	3970	Mountain Queen	....	....	....	....	....	....	....	1,231·00	455·65	....
	4384	Newry	....	....	108·00	27·39	....	....	....	108·00	27·39	....
	4362	North Star	....	....	....	....	....	....	....	104·00	18·60	....
	4035	Undaunted	....	....	....	....	....	....	....	865·00	113·59	....
	4251	Union Jack	....	....	....	....	....	....	....	2,175·00	182·17	....
		Voided leases	....	....	....	....	....	....	1,504·26	857,859·48	206,677·52	2,474·95
		Sundry claims	....	....	61·00	10·01	....	11·35	809·31	35,878·61	13,372·83	·04
Mount Jackson	....	Voided leases	....	....	....	....	....	....	180·85	55,166·78	39,927·52	2,313·77
		Sundry claims	....	....	....	....	....	6·44	52·87	10,935·95	4,879·54	70·74
Mount Palmer	4250	Palmerston	....	....	20·00	11·14	....	2·03	....	43·00	28·98	....
	4345	Speedie	....	....	90·00	38·03	....	....	....	90·00	38·03	....
	M.L. 4	Yellowdine Gold Dev. Pty., Ltd. (in Liq.)	....	....	....	....	....	....	....	93·00	136·46	....
		Voided leases	....	....	....	....	....	....	....	306,408·40	158,486·81	....
		Sundry claims	....	....	....	....	....	1,643·48	18·19	450·25	387·14	....
Mount Rankin	81PP	Golden View	....	....	....	....	....	....	....	45·00	77·43	....
	89PP	Lynette	....	....	258·00	88·99	....	....	....	612·00	196·49	....
	76PP	Marjorie Glen Reward	....	48·43	408·00	510·46	....	....	191·46	1,862·00	2,727·09	....
	3555	No Trumps	....	....	....	....	....	....	....	5,562·37	853·06	....
		Voided leases	....	....	....	....	....	3·84	5·20	496·00	122·17	....
		Sundry claims	....	....	....	....	....	....	1·85	749·00	952·01	....

Table I.—*Production of Gold and Silver from all sources, etc.*—continued.

Mining Centre.	Number of Lease.	Registered Name of Company or Lease.	Total for 1956.					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 (2,240 lb.).	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240 lb.).	Fine ozs.	Fine ozs.
YILGARN GOLDFIELD—continued.												
Parker's Range	4381	Centipede	....	....	320·00	150·29	....	....	....	444·00	181·85	....
	(4359)	Leonard's Find	....	·28	44·00	6·91	....	....	·28	294·75	46·14	....
	4370	Margaret Rose	....	....	....	....	....	....	....	23·00	3·99	....
		Voided leases	....	....	....	....	....		·42	270·48	62,880·35	32,479·50	26·46
		Sundry claims	....	....	154·00	43·86	....	6·59	303·93	12,391·30	5,409·71	·98
Southern Cross	4082	Day Dawn	....	....	....	....	....	....	....	86·00	9·16	....
	4002, etc.	Great Western Consolidated, N.L. (Frasers)	....	....	24,060·00	9,356·29	2,566·72	....	....	27,213·00	10,279·41	2,813·35
		Prior to transfer to present holders	....	....	....	....	....	....	....	13,634·50	1,866·84	1·26
	3444	(Three Boys)	....	....	....	....	....	....	....	4,180·00	727·75	....
	3934	(Three Boys North)	....	....	....	....	....	....	....	106·00	14·66	....
	3981	(Three Kings)	....	....	....	....	....	....	....	104·00	10·01	....
	3444, etc.	(Yellowdine Options, N.L.)	....	....	....	....	....	....	....	8,074·25	2,000·29	....
		Voided leases	....	....	....	....	....	4·89	261·35	454,906·68	215,351·50	364·41
		Sundry claims	....	....	....	....	....	95·90	648·49	8,183·66	2,626·86	....
Westonia	4326	Consols	....	....	70·00	33·84	....	....	....	788·00	487·31	....
	(4374)	Les Trios	....	....	....	....	....	....	....	94·00	42·22	....
		Voided leases	....	....	....	....	....	....	4·06	596,024·64	380,874·45	5,104·07
		Sundry claims	....	....	....	....	....	9·51	64·96	4,310·76	2,823·33	·72
	From Goldfield generally :—											
	Sundry Parcels treated at :											
	State Battery, Marvel Loch		....	....	....	*335·39	....	....	....	29·00	*871·72	....
	Great Western Consolidated (Copperhead)		....	....	....	*2,124·66	....	....	....	....	*2,332·54	....
	Great Western Consolidated (N.G.M. Dump)		....	....	....	*276·58	....	....	....	....	*276·58	....
	C. V. Davies (L.T.T. 1344H)		....	....	....	*15·19	....	....	....	....	*15·19	....
	Mount Palmer Cyanide Plant (L.T.T. 1278H)		....	....	....	*50·87	....	....	....	....	*50·87	....
	Great Western Consolidated (Fraser's)		....	....	....	*171·32	....	....	....	....	*171·32	....
	Kurrajong Battery		....	....	....	....	....	....	....	....	*409·57	....
	Pilot Cyanide Plant		....	....	....	....	....	....	....	30·00	*3,753·59	....
	R. R. Robinson (L.T.T. 1315H)		....	....	....	*1,377·51	....	....	....	....	*1,408·40	....
	Three Boys Cyanide Plant		....	....	....	*126·12	....	....	....	7·00	*3,833·87	....
	Westonia Cyanide Plant (L.T.T. 1279)		....	....	....	*21·30	....	....	....	....	*63·16	....
	Various Works		....	....	....	....	....	....	....	341·48	99,050·20	107·98
	Reported by Banks and Gold Dealers		....	....	....	....	....	323·20	71·73	·60	120·60	....
	Totals		....	**48·71**	**450,126·00**	**84,041·69**	**24,021·17**	**2,193·56**	**5,374·74**	**5,580,568·95**	**1,979,202·23**	**116,594·27**

Dundas Goldfield.

Buldania	....	Voided leases	....	....	....	....	....	....	3·02	846·05	708·99	....
		Sundry claims	....	....	....	....	....	....	39·25	1,324·27	861·36	·72
Dundas	1860	Coronation	....	....	15·00	2·58	....	....	....	121·50	14·13	....
		Voided leases	....	....	....	....	....	1·88	28·02	6,103·48	2,545·38	155·02
		Sundry claims	....	....	....	....	....	·76	413·85	2,130·75	1,102·82	18·32
Norseman	1288, etc.	Central Norseman Gold Corp., N.L.	....	....	160,961·00	89,038·83	45,765·15	....	....	2324,786·20	944,511·14	721,253·93
		Prior to transfer to present holders	....	....	....	....	....	....	1,663·32	69,819·83	47,892·08	16,508·85
	1859	Mt. Barker	....	....	....	....	....	....	....	30·50	4·51	·19
	1315, etc.	Norseman Gold Mines, N.L.	....	....	....	....	....	....	....	964,099·00	240,900·95	353,206·54
		Prior to transfer to present holders	....	....	....	....	....	....	....	20,657·00	3,909·60	4,981·00
	(1596)	(Late) Abbots Hall	....	....	27·00	5·17	....	....	....	27·00	5·17	....
		Voided leases	....	....	....	....	....	14·27	10,601·15	915,732·17	601,756·74	39,001·04
		Sundry claims	....	....	128·00	19·47	....	1,052·09	3,402·99	47,459·20	22,245·61	200·64
Peninsula	....	Voided leases	....	....	....	....	....	....	24·29	9,603·39	6,102·61	12·20
		Sundry claims	....	....	....	....	....	....	....	217·25	119·32	·97
	From Goldfield generally :—											
	Sundry Parcels treated at :											
	State Battery, Norseman	....	....	....	....	....	....	....	....	417·89	*25,351·51	1,051·13
	Various Works	....	....	....	....	....	....	....	54·52	760·64	*15,104·14	2,588·35
	Reported by Banks and Gold Dealers	....	....	....	2·75	....	1,181·77	49·59	47·50	21·37	·70
	Totals	....	....	**161,131·00**	**89,068·80**	**45,765·15**	**2,250·77**	**16,280·00**	**4364,183·62**	**1913,157·43**	**1138,979·60**

Phillips River Goldfield.

Hatters Hill	....	Voided leases	....	....	....	....	....	....	4·38	1,599·55	1,222·72	....
		Sundry claims	....	....	....	....	....	74·91	24·26	5,225·60	2,720·90	26·09
Kundip	263	Hillsborough	....	....	....	....	....	....	....	258·00	65·75	19·33
		Voided leases	....	....	....	....	....	113·28	556·17	84,866·58	60,584·54	4,008·81
		Sundry claims	....	....	....	....	....	90·27	73·02	6,434·68	1,951·87	54·65
Mt. Desmond	....	Voided leases	....	....	....	....	....	....	1·40	9·00	3,905·46	6,891·59
		Sundry claims	....	....	....	....	....	....	....	80·00	41·96	51·01
Ravensthorpe	M.L. 411	Wehr Bros.	....	....	....	....	....	....	....	....	‡1·99	....
	M.L. 421	Belli and Dawes	....	....	6·46	‡·52	32·76	....	....	6·46	‡·52	32·76
		Voided leases	....	....	....	....	....	....	141·80	24,723·55	26,070·94	4,384·07
		Sundry claims	....	....	....	....	....	163·96	7·68	7,261·57	3,195·67	41·12
West River	....	Voided leases	....	....	....	....	....	....	....	....	10·34	31·06
		Sundry claims	....	....	....	....	....	....	....	....	6·60	3·44

Table I.—*Production of Gold and Silver from all sources, etc.*—continued.

Mining Centre.	Number of Lease.	Registered Name of Company or Lease.	Total for 1956.					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. (2,240 lb.).	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons. (2,240 lb.).	Fine ozs.	Fine ozs.
PHILLIPS RIVER GOLDFIELD—continued.												
		From Goldfield generally :—										
		Sundry Parcels treated at :										
		Cordingup Copper Smelter (L.T.T. 1079H)	....	....	....	....	....	....	....	....	‡46·08	8·89
		Daw, F. C. (T.A. 11)	....	....	....	....	....	....	....	....	*128·45	....
		Ravensthorpe Sands Pty., Ltd. (L.T.T. 1235H, 1237H)	....	....	....	....	....	....	....	....	*608·05	5·72
		Various Works	....	....	....	.. .	....	....	....	27·00	*3,464·60	500·82
		Reported by Banks and Gold Dealers	....	....	....	....	....	164·69	12·31	....	4·76	....
		Totals	....	....	**6·46**	**·52**	**32·76**	**607·11**	**821·02**	**130,491·99**	**104,031·20**	**16,059·36**
Outside Proclaimed Goldfield.												
Burracoppin	....	Voided leases	....	....	....	....	....	....	....	710·85	706·38	....
		Sundry claims	....	....	....	....	....	....	·98	372·75	213·97	....
Donnybrook	....	Voided leases	....	....	....	....	....	23·24	....	1,613·30	816·23	....
		Sundry claims	....	....	....	....	....	44·01	43·03	119·50	15·71	15·18
Jimperding	1PP Avon	Hillsdale	....	....	....	....	....	....	....	1,261·75	308·00	....
Northampton	....	Sundry Lead Claims	....	....	....	....	†899·77	....	....	....	....	†2,602·51
Ongerup	103H	Hornblende	....	....	....	....	....	....	....	24·50	2·85	....
		Sundry claims	....	....	....	....	....	....	1·58	·33	1·74	....
		From State generally :—										
		Miscellaneous leases and sundry claims	....	....	....	....	....	245·83	3·07	210·35	45·19	....
		Sundry specimens	....	....	....	....	....	4·24	56·85	....	....	....
		Various Works	....	....	....	....	....	....	....	27·00	‡9,009·75	31,521·73
		Reported by Banks and Gold Dealers	11·50	....	....	....	....	1,120·13	932·10	....	456·32	404·26
		Totals	**11·50**	....	....	....	**899·77**	**1,437·45**	**1,037·61**	**4,340·33**	**11,576·14**	**34,543·68**

TABLE II

Production of Gold and Silver from all Sources, showing in fine ounces the output, as reported to the Mines Department during the year 1956

Goldfield.	District.	District.						Goldfield.					
		Alluvial.	Dollied and Specimens.	Ore Treated.	Gold Therefrom.	Total Gold.	Silver.	Alluvial.	Dollied and Specimens.	Ore Treated.	Gold Therefrom.	Total Gold.	Silver.
		Fine ozs.	Fine ozs.	Tons. (2,240 lb.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons. (2,240 lb.)	Fine ozs.	Fine ozs.	Fine ozs.
Kimberley	....	....	....	....	....	....	....	8·08	135·09	60·00	35·12	179·10	....
West Kimberley	....	....	....	....	....	....	....	....	....	....	....	....	....
Pilbara	Marble Bar	15·00	2·12	1,208·50	605·26	622·38	5,708·91	67·91	97·31	1,762·00	1,908·99	2,074·21	5,712·81
	Nullagine	52·91	95·19	553·50	1,303·73	1,451·83	3·90						
West Pilbara	....	....	....	....	....	....	....	0·69	....	....	....	0·69	....
Ashburton	....	....	....	....	....	....	....	1·16	....	....	....	1·16	388·06
Gascoyne	....	....	....	....	....	....	....	....	....	....	....	....	....
Peak Hill	....	....	....	....	....	....	....	....	....	44·00	15·83	15·83	....
East Murchison	Lawlers	....	....	153·00	47·57	47·57	....	....	....	476·75	272·13	272·13	....
	Wiluna	....	....	....	107·30	107·30	....						
	Black Range	....	....	323·75	117·53	117·53	....						
Murchison	Cue	·94	....	1,252·70	1,122·91	1,123·85	101·81	81·28	·11	110,531·00	85,832·61	85,914·00	2,395·18
	Meekatharra	78·27	....	987·30	626·13	704·40	....						
	Day Dawn	1·26	....	242·50	54·90	56·16	2·23						
	Mt. Magnet	·81	·11	108,048·50	84,028·67	84,029·59	2,291·14						
Yalgoo	....	....	....	....	....	....	....	....	....	....	....	....	....
Mt. Margaret	Mt. Morgans	....	8·66	405·50	159·36	168·02	....	4·91	300·81	120,368·13	29,572·69	29,878·41	2,274·26
	Mt. Malcolm	4·91	292·15	113,674·63	27,487·15	27,784·21	2,263·42						
	Mt. Margaret	....	....	6,288·00	1,926·18	1,926·18	10·84						
North Coolgardie	Menzies	15·83	4·56	32,482·75	17,612·83	17,633·22	....	17·52	4·56	47,622·25	27,623·79	27,645·87	453·98
	Ularring	....	....	10,889·00	6,814·10	6,814·10	....						
	Niagara	1·69	....	1,218·00	457·13	458·82	0·44						
	Yerrilla	....	....	3,032·50	2,739·73	2,739·73	453·54						
Broad Arrow	....	....	....	....	....	....	....	·26	28·54	6,969·75	1,928·58	1,957·38	....
N.E. Coolgardie	Kanowna	1·14	....	532·75	104·39	105·53	....	1·14	....	532·75	104·39	105·53	....
	Kurnalpi	....	....	....	....	....	....						
East Coolgardie	East Coolgardie	10·19	30·36	1,932,799·67	474,507·47	474,548·02	107,158·60	10·19	30·36	1,933,142·92	474,548·99	474,589·54	107,158·60
	Bulong	....	....	343·25	41·52	41·52	....						
Coolgardie	Coolgardie	25·18	49·79	35,050·70	17,623·43	17,698·40	124·80	27·56	50·00	35,500·45	17,761·04	17,838·60	124·80
	Kunanalling	2·38	·21	449·75	137·61	140·20	....						
Yilgarn	....	....	....	....	....	....	....	....	48·71	450,126·00	84,041·69	84,090·40	24,021·17
Dundas	....	....	....	....	....	....	....	....	....	161,131·00	89,068·80	89,068·80	45,765·15
Phillips River	....	....	....	....	....	....	....	....	....	6·46	·52	·52	32·76
Outside Proclaimed Goldfields		....	....	....	....	....	....	11·50	....	....	....	11·50	899·77
	Total	....	....	....	....	....	....	232·20	696·30	2,870,275·96	812,588·86	813,517·36	189,226·54

TABLE III.

Return showing total production reported to the Mines Department, and respective Districts and Goldfields from whence derived, to 31st December, 1956

Goldfield	District.	District.						Goldfield.					
		Alluvial.	Dollied and Specimens.	Ore Treated.	Gold Therefrom.	Total Gold.	Silver.	Alluvial.	Dollied and Specimens.	Ore Treated.	Gold Therefrom.	Total Gold.	Silver.
		Fine ozs.	Fine ozs.	Tons. (2,240 lb.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons. (2,240 lb.)	Fine ozs.	Fine ozs.	Fine ozs.
Kimberley	....	....	....	....	....	....	....	8,975·20	2,779·51	22,721·90	17,226·52	28,981·23	128·76
West Kimberley	....	....	....	....	....	....	....	1·30	24·68	1·00	2·49	28·47	13,575·29
Pilbara	Marble Bar	15,249·56	4,564·40	329,752·42	324,569·77	344,383·73	29,410·71	25,591·02	7,398·18	464,870·62	452,446·93	485,436·13	29,943·03
	Nullagine	10,341·46	2,833·78	135,118·20	127,877·16	140,952·40	532·32						
West Pilbara	....	....	....	....	....	....	....	6,334·78	374·74	24,680·96	24,220·15	30,929·67	1,881·19
Ashburton	....	....	....	....	....	....	....	9,266·13	482·46	6,807·10	2,913·43	12,662·02	39,631·42
Gascoyne	....	....	....	....	....	....	....	693·44	62·97	387·00	517·29	1,273·70	....
Peak Hill	....	....	....	....	....	....	....	3,376·86	5,300·33	761,563·43	320,181·32	328,858·51	3,768·47
East Murchison	Lawlers	6,904·30	2,343·19	2,011,351·92	822,700·55	831,948·04	26,290·77	8,796·56	22,119·10	12,614,088·08	3,648,109·29	3,679,024·95	59,068·71
	Wiluna	224·85	1,254·11	8,873,554·94	1,871,953·88	1,873,432·84	10,282·38						
	Black Range	1,667·41	18,521·80	1,729,181·22	953,454·86	973,644·07	22,495·56						
Murchison	Cue	5,088·35	9,096·19	6,806,934·79	1,399,620·08	1,413,804·62	273,986·45	25,488·54	59,035·72	13,229,884·43	5,104,611·17	5,189,135·43	460,563·96
	Meekatharra	14,595·95	18,164·04	2,286,039·71	1,304,359·05	1,343,119·04	5,119·88						
	Day Dawn	3,237·47	11,341·63	2,035,024·88	1,375,340·24	1,389,919·34	169,434·20						
	Mt. Magnet	2,566·77	20,433·86	2,102,085·05	1,025,291·80	1,048,292·43	12,023·43						
Yalgoo	....	....	....	....	....	....	....	1,787·26	3,223·19	441,403·83	263,534·74	268,545·19	1,502·56
Mt. Margaret	Mt. Morgans	3,486·54	9,380·81	1,214,393·21	716,894·85	729,762·20	5,812·32	11,478·59	35,384·84	10,504,259·67	4,735,915·98	4,782,779·41	242,522·39
	Mt. Malcolm	3,921·35	16,649·68	6,766,154·82	2,846,008·44	2,866,579·47	170,692·31						
	Mt. Margaret	4,070·70	9,354·35	2,523,711·64	1,173,012·69	1,186,437·74	66,017·76						
North Coolgardie	Menzies	1,675·22	6,946·04	1,639,362·30	1,282,081·69	1,290,702·75	31,272·59	4,835·01	19,343·01	3,372,584·45	2,404,395·09	2,428,573·11	61,955·51
	Ularring	129·52	6,758·08	523,816·10	434,871·33	441,758·93	21,928·23						
	Niagara	1,718·36	1,821·77	933,469·02	524,453·73	527,993·86	5,686·69						
	Yerrilla	1,311·91	3,817·12	275,937·03	162,988·34	168,117·37	3,068·00						
Broad Arrow	....	....	....	....	....	....	....	21,966·37	27,463·18	1,337,610·84	731,216·99	780,646·54	5,296·65
N.E. Coolgardie	Kanowna	106,522·83	13,518·52	1,005,757·51	626,120·87	746,162·22	3,039·73	119,357·28	21,817·43	1,019,199·83	644,834·20	786,008·91	3,052·44
	Kurnalpi	12,834·45	8,298·91	13,442·32	18,713·33	39,846·69	12·71						
East Coolgardie	East Coolgardie	33,626·99	40,979·60	69,463,599·90	31,824,375·98	31,898,982·57	4,763,941·01	61,032·21	57,012·49	69,648,921·20	31,956,239·28	32,074,283·98	4,763,953·93
	Bulong	27,405·22	16,032·89	185,321·30	131,863·30	175,301·41	12·92						
Coolgardie	Coolgardie	16,969·11	16,861·12	2,980,719·60	1,436,699·49	1,470,529·72	36,730·76	18,486·23	22,496·26	3,143,435·30	1,689,336·33	1,730,318·82	37,482·15
	Kunanalling	1,517·12	5,635·14	362,715·70	252,636·84	259,789·10	751·39						
Yilgarn	....	....	....	....	....	....	....	2,193·56	5,374·74	5,580,568·95	1,979,202·23	1,986,770·53	116,594·27
Dundas	....	....	....	....	....	....	....	2,250·77	16,280·00	4,364,183·62	1,913,157·43	1,931,688·20	1,138,979·60
Phillips River	....	....	....	....	....	....	....	607·11	821·02	130,491·99	104,031·20	105,459·33	16,059·36
Outside Proclaimed Goldfields		....	....	....	....	....	....	1,437·45	1,037·61	4,340·33	11,576·14	14,051·20	34,543·68
	Total	....	....	....	....	....	....	333,955·67	307,831·46	126,674,204·53	56,003,541·89	56,645,329·02	7,030,503·37

TABLE IV.

Total output of Gold (Bullion and Concentrates entered for Export and Gold received at the Royal Mint, Perth), from 1st January, 1886, to 31st December, 1956; showing in Fine Ounces the quantity credited to the respective Goldfields.

Year.	Export.	Mint.	Total.	Export.	Mint.	Total.
	Kimberley.			**Pilbara.**		
	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.
Prior to 1953	22,422·06	16,416·51	38,838·57	166,786·91	378,634·96	545,421·87
1953	....	186·46	186·46	4,105·56	4,694·22	8,799·78
1954	....	71·98	71·98	1,562·98	1,831·48	3,394·46
1955	....	178·81	178·81	2,335·70	1,937·80	4,273·50
1956	....	172·97	172·97	673·60	913·63	1,587·23
Total	22,422·06	17,026·73	39,448·79	175,464·75	388,012·09	563,476·84
	(*a*) West Pilbara.			**Ashburton.**		
Prior to 1953	4,351·11	26,896·41	31,247·52	4,104·96	6,253·46	10,358·42
1953	....	....	....	....	68·85	68·85
1954	....	9·73	9·73	....	29·31	29·31
1955	....	2·29	2·29	....	13·60	13·60
1956	....	7·59	7·59	....	1·01	1·01
Total	4,351·11	26,916·02	31,267·13	4,104·96	6,366·23	10,471·19
	(*b*) Gascoyne.			**(*c*) Peak Hill.**		
Prior to 1953	304·55	1,068·17	1,372·72	41,102·76	212,447·00	253,549·76
1953	....	....	....	....	8,465·73	8,465·73
1954	....	21·40	21·40	....	8,104·51	8,104·51
1955	....	....	....	..	103·50	103·50
1956	....	....	....	....	22·03	22·03
Total	304·55	1,089·57	1,394·12	41,102·76	229,142·77	270,245·53
	East Murchison.			**Murchison.**		
Prior to 1953	259,275·33	3,023,172·46	3,282,447·79	1,576,903·72	3,483,595·44	5,060,504·16
1953	83·33	1,162·39	1,245·72	304·86	98,202·21	98,507·07
1954	33·70	200·54	234·24	36·59	121,085·74	121,122·33
1955	63·89	46·68	110·57	93·85	81,903·93	81,997·78
1956	270·74	69·32	340·06	174·62	81,083·19	81,257·81
Total	259,726·99	3,024,651·39	3,284,378·38	1,577,518·64	3,865,870·51	5,443,389·15
	(*d*) Yalgoo.			**(*e*) Mt. Margaret.**		
Prior to 1953	13,650·56	196,941·99	210,592·55	694,644·87	3,815,425·87	4,510,070·74
1953	....	283·12	283·12	....	25,725·48	25,725·48
1954	....	8·72	8·72	197·66	24,169·56	24,367·22
1955	....	1·68	1·68	112·70	26,285·21	26,397·91
1956	....	·48	·48	64·85	25,986·30	26,051·15
Total	13,650·56	197,235·99	210,886·55	695,020·08	3,917,592·42	4,612,612·50
	(*f*) North Coolgardie.			**(*g*) Broad Arrow.**		
Prior to 1953	263,480·50	2,042,317·67	2,305,807·17	122,793·11	440,014·72	562,807·83
1953	22·27	18,816·46	18,838·73	6·43	1,734·52	1,740·95
1954	23·84	19,767·03	19,790·87	40·96	2,343·13	2,384·09
1955	117·56	19,410·57	19,528·13	75·50	1,559·24	1,634·74
1956	14·67	21,752·28	21,766·95	3·72	1,802·30	1,806·02
Total	263,667·84	2,122,064·01	2,385,731·85	122,919·72	447,453·91	570,373·63
	(*f*) North-East Coolgardie.			**(*f*) East Coolgardie.**		
Prior to 1953	235,893·69	459,346·84	695,240·53	7,031,771·06	24,701,522·73	31,733,293·79
1953	....	120·57	120·57	777·13	493,055·30	493,832·43
1954	....	146·35	146·35	1,108·51	494,893·95	496,002·46
1955	....	108·96	108·96	1,248·39	512,527·52	513,775·91
1956	....	128·27	128·27	946·39	491,466·14	492,412·53
Total	235,893·69	459,850·99	695,744·68	7,035,851·48	26,693,465·64	33,729,317·12
	(*h*) Coolgardie.			**Yilgarn.**		
Prior to 1953	663,477·45	1,305,609·96	1,969,087·41	220,404·82	1,552,883·53	1,773,288·35
1953	49·20	40,262·26	40,311·46	47·52	57,387·44	57,434·96
1954	16·70	35,769·72	35,786·42	68·14	59,334·09	59,402·23
1955	17·11	35,091·85	35,108·96	26·81	70,003·36	70,030·17
1956	22·72	10,828·17	10,850·89	70·98	86,353·75	86,424·73
Total	663,583·18	1,427,561·96	2,091,145·14	220,618·27	1,825,962·17	2,046,580·44
	(*i*) Dundas.			**(*j*) Phillips River.**		
Prior to 1953	170,787·39	1,497,250·66	1,668,038·05	40,650·82	63,033·87	103,684·69
1953	....	66,780·03	66,780·03	....	898·98	898·98
1954	....	78,668·52	78,668·52	....	437·74	437·74
1955	....	88,031·33	88,031·33	....	3·06	3·06
1956	....	88,670·54	88,670·54	·52	....	·52
Total	170,787·39	1,819,401·08	1,990,188·47	40,651·34	64,373·65	105,024·99
	¶ Donnybrook.			**Outside Proclaimed Goldfields.**		
Prior to 1953	282·21	557·53	839·74	22,769·12	40,935·68	63,704·80
1953	....	....	....	....	671·63	671·63
1954	....	....	....	....	557·59	557·59
1955	....	....	....	....	704·33	704·33
1956	....	....	....	88·29	790·71	879·00
Total	282·21	557·53	839·74	22,857·41	43,659·94	66,517·35

(*a*) Prior to 1st May, 1898, included with Pilbara, and from 12th July, 1929, to 16th September, 1949, included in Outside Proclaimed Goldfields.
(*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 Outside Proclaimed Goldfields. ¶ Abolished 4th March, 1908.

TABLE V.

Total Output of Gold Bullion, Concentrates, etc., entered for Export and Received at the Perth Branch of the Royal Mint from 1st January, 1886.

Year.	Export.	Mint.	Total.	Estimated Value.
	Fine ozs.	Fine ozs.	Fine ozs.	£A.
1886	270·17	....	270·17	1,147
1887	4,359·37	....	4,359·37	18,518
1888	3,124·82	....	3,124·82	13,273
1889	13,859·52	....	13,859·52	58,871
1890	20,402·42	....	20,402·42	86,664
1891	27,116·14	....	27,116·14	115,182
1892	53,271·65	....	53,271·65	226,284
1893	99,202·50	....	99,202·50	421,385
1894	185,298·73	....	185,298·73	787,099
1895	207,110·20	....	207,110·20	879,749
1896	251,618·69	....	251,618·69	1,068,808
1897	603,846·44	....	603,846·44	2,564,977
1898	939,489·49	....	939,489·49	3,990,697
1899	1,283,360·25	187,244·41	1,470,604·66	6,246,732
1900	894,387·27	519,923·59	1,414,310·86	6,007,610
1901	923,698·96	779,729·56	1,703,416·52	7,235,654
1902	707,039·75	1,163,997·60	1,871,037·35	7,947,661
1903	833,685·78	1,231,115·62	2,064,801·40	8,770,719
1904	810,616·04	1,172,614·03	1,983,230·07	8,424,226
1905	655,089·88	1,300,226·00	1,955,315·88	8,305,654
1906	562,250·59	1,232,296·01	1,794,546·60	7,622,749
1907	431,803·14	1,265,750·45	1,697,553·59	7,210,750
1908	356,353·96	1,291,557·17	1,647,911·13	6,999,881
1909	386,370·58	1,208,898·83	1,595,269·41	6,776,274
1910	233,970·34	1,236,661·68	1,470,632·02	6,246,848
1911	160,422·28	1,210,445·24	1,370,867·52	5,823,075
1912	83,577·12	1,199,080·87	1,282,657·99	5,448,385
1913	86,255·13	1,227,788·15	1,314,043·28	5,581,701
1914	51,454·65	1,181,522·17	1,232,976·82	5,237,352
1915	17,340·47	1,192,771·23	1,210,111·70	5,140,228
1916	26,742·17	1,034,655·87	1,061,398·04	4,508,532
1917	9,022·49	961,294·67	970,317·16	4,121,646
1918	15,644·12	860,867·03	876,511·15	3,723,183
1919	6,445·89	727,619·90	734,065·79	3,618,509
1920	5,261·13	612,581·00	617,842·13	3,598,931
1921	7,170·74	546,559·92	553,730·66	2,942,526
1922	5,320·16	532,926·12	538,246·28	2,525,812
1923	5,933·82	498,577·59	504,511·41	2,232,186
1924	2,585·20	482,449·78	485,034·98	2,255,927
1925	3,910·59	437,341·56	441,252·15	1,874,920
1926	3,188·22	434,154·98	437,343·20	1,857,715
1927	3,359·10	404,993·41	408,352·51	1,734,572
1928	3,339·30	390,069·19	393,408·49	1,671,093
1929	3,037·12	374,138·96	377,176·08	1,602,142
1930	1,753·09	415,765·00	417,518·09	1,864,442
1931	1,726·66	508,845·36	510,572·02	2,998,137
1932	3,887·07	601,674·33	605,561·40	4,403,642
1933	2,446·97	634,760·40	637,207·37	4,886,254
1934	3,520·40	647,817·95	661,338·35	5,558,873
1935	9,868·71	639,180·38	649,049·09	5,702,149
1936	55,024·58	791,183·21	846,207·79	7,373,539
1937	71,646·91	928,999·84	1,000,646·75	8,743,755
1938	113,620·06	1,054,171·13	1,167,791·19	10,363,023
1939	98,739·88	1,115,497·76	1,214,237·64	11,842,964
1940	71,680·47	1,119,801·08	1,191,481·55	12,696,503
1941	65,925·94	1,043,391·96	1,109,317·90	11,851,445
1942	15,676·48	832,503·97	848,180·45	8,865,495
1943	6,408·34	540,057·08	546,475·42	5,710,669
1944	1,824·99	464,439·76	466,264·75	4,899,997
1945	5,029·38	463,521·34	468,550·72	5,010,541
1946	6,090·14	610,873·52	616,963·66	6,640,069
1947	5,220·09	698,666·29	703,886·38	7,575,574
1948	4,653·72	660,332·07	664,985·79	7,156,909
1949	4,173·14	644,252·48	648,425·62	7,962,808
1950	4,161·53	606,171·88	610,333·41	9,466,270
1951	5,589·45	622,189·64	627,779·09	9,725,343
1952	9,608·62	720,366·44	729,975·06	11,847,917
1953	5,396·30	818,515·65	823,911·95	13,299,092
1954	3,089·08	847,451·09	850,540·17	13,313,618
1955	4,091·55	837,913·72	842,005·23	13,175,559
1956	2,331·10	810,048·68	812,379·78	12,705,581
Total	11,570,778·99	46,578,254·60	58,149,033·59	389,165,415

	1955. £A.	1956. £A.
Estimated total par value of above production	243,550,338	247,001,104
Overseas Gold Sales Premium distributed by Gold Producers Association, 1920-1924	2,589,602	2,589,602
Overseas Gold Sales Premium distributed by Gold Producers Association from 1952	1,157,757	1,169,911
Exchange Premium paid by Mint above par value, 1930-1955 (approximate)	129,162,137	138,404,798
Estimated Total	£A376,459,834	£A389,165,415
Bonus paid by Commonwealth Government under Commonwealth Bounty Act, 1930	161,448	161,448
Subsidy paid by Commonwealth Government under Gold Mining Industry Assistance Act, 1954	199,130	484,357
Gross estimated value of gold won	£A376,820,412	£A389,811,220

TABLE VI.—MINERALS OTHER THAN GOLD

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 1956, and previous years.

Period.	Abrasive Silica Stone.		Alunite (Crude Potash).		Arsenic.*		Antimony.†		
	Murchison Goldfield. (Mt. Magnet District.)		Yilgarn Goldfield.		East Murchison Goldfield. (Wiluna District.)		East Murchison Goldfield.		
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Conc.	Metal.	Value.
	tons.	£	tons.	£	tons.	£	tons.	tons.	£
Prior to 1953	1·50	9	9,073·05	215,865	‡38,674·08	747,205	7,883·66	3,870·93	157,298
1953	....	....	....	....	....	....	....	....	....
1954	....	....	....	....	....	....	....	....	....
1955	....	....	....	....	....	....	....	....	....
1956	....	....	....	....	....	....	....	....	....
Total	**1·50**	**9**	**9,073·05**	**215,865**	**38,674·08**	**747,205**	**7,883·66**	**3,870·93**	**157,298**

* By-product by Wiluna G.Ms., Ltd. † By-product of Gold Mining. ‡ Includes 1·13 tons Arsenic valued at £24 from Yilgarn Goldfield.

Period	Antimony.*						Asbestos.	
	Pilbara Goldfield.			Total.			Ashburton Goldfield.	
	Conc.	Metal.	Value.	Conc.	Metal.	Value.	Quantity.	Value.
	tons.	tons.	£	tons.	tons.	£	tons.	£
Prior to 1953	1,233·61	526·05	71,904	†9,143·50	4,410·54	229,802	10·10	959
1953	358·43	164·23	10,313	358·43	164·23	10,313	....	....
1954	45·44	23·49	1,410	45·44	23·49	1,410	....	....
1955	203·88	59·11	230	203·88	59·11	230	....	....
1956	78·44	23·26	742	78·44	23·26	742	....	....
Total	**1,919·80**	**796·14**	**84,599**	**9,819·69**	**4,680·63**	**242,497**	**10·10**	**959**

* By-product of Gold Mining. † Includes 26·23 tons Conc. containing 13·56 tons metal valued at £600 from West Pilbara.

Period.	Asbestos—*continued.*							
	Pilbara Goldfield.		West Pilbara Goldfield.		Outside Proclaimed Goldfield.		Total.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	tons.	£	tons.	£	tons.	£	tons.	£
Prior to 1953	1,529·63	60,958	13,295·79	1,299,590	501·10	6,732	15,344·82	1,368,281
1953	341·69	7,087	4,059·29	700,277	....	....	4,400·98	707,364
1954	124·79	2,620	3,972·53	553,056	....	....	4,097·32	555,676
1955	16·45	346	4,602·55	501,683	....	....	4,619·00	502,028
1956	267·25	5,612	7,779·82	820,464	....	....	8,047·07	826,076
Total	**2,279·81**	**76,623**	**75,109·93**	**3,875,075**	**501·10**	**6,732**	**36,509·19**	**3,959,435**

Period.	Barytes.							
	Murchison Goldfield.		North-East Coolgardie Goldfield.		Outside Proclaimed Goldfield.		Total.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	tons.	£	tons.	£	tons.	£	tons.	£
Prior to 1953	9·00	50	10·00	50	21·00	74	40·00	174
1953	....	....	42·22	380	169·65	1,410	211·87	1,790
1954	111·74	615	....	....	932·00	7,016	1,043·74	7,631
1955	....	....	....	....	10·00	70	10·00	70
1956	426·10	2,031	....	....	501·00	3,156	927·10	5,187
Total	**546·84**	**2,696**	**52·22**	**430**	**1,633·65**	**11,726**	**2,232·71**	**14,852**

Period.	Bentonite		Beryl Ore.					
	Outside Proclaimed Goldfield.		Pilbara Goldfield.		Ashburton Goldfield.		Gascoyne Goldfield.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	tons.	£	tons.	£	tons.	£	tons.	£
Prior to 1953	2,421·13	7,124	988·08	56,081	....	....	116·53	5,836
1953	217·70	741	104·49	18,649	....	....	2·07	402
1954	1,121·60	4,111	105·60	18,070	0·14	25	11·78	2,092
1955	696·94	2,591	173·14	29,712	....	....	11·08	1,995
1956	1,403·54	5,658	239·27	43,753	....	....	50·11	9,603
Total	**5,860·91**	**20,225**	**1,610·58**	**156,265**	**0·14**	**25**	**191·57**	**19,928**

Table VI.—*Minerals other than Gold*—continued.

Period.	Beryl Ore—*continued.*						Bismuth.	
	Yalgoo Goldfield.		Coolgardie Goldfield.		Total.		Outside Proclaimed Goldfield.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	tons.	£	tons.	£	tons.	£	lb.	£
Prior to 1953	....	....	111·64	7,772	1,254·28	61,006	5,634·31	1,884
1953	8·00	1,390	10·06	1,782	124·62	22,223	....	....
1954	3·48	547	11·15	1,873	132·15	22,607	....	....
1955	2·33	439	11·47	2,185	198·63	34,430	....	....
1956	....	....	20·81	3,757	310·19	57,113	....	....
Total	**13·81**	**2,376**	**165·13**	**17,369**	**2,019·87**	**197,379**	**5,634·31**	**1,884**

* Includes 3·50 tons valued at £297 from West Kimberley Goldfield, 25·14 tons valued at £1,027 from Murchison Goldfield and 10·00 tons valued at £92 from Outside Proclaimed Goldfield.

Period.	Calcite.		Chromite.		Clays (Cement, Fire and White Clays).			
	Mt. Margaret Goldfield.		Peak Hill Goldfield.		Murchison Goldfield.		Outside Proclaimed Goldfield.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	tons	£	tons.	£	tons.	£	tons.	£
Prior to 1953	5·00	25	773·00	11,100	41·75	207	116,790·33	76,987
1953	....	....	1,968·00	29,717	....	....	22,915·85	15,881
1954	....	....	4,269·55	48,957	....	....	22,659·00	28,681
1955	....	....	....	....	....	....	41,912·32	32,693
1956	....	....	6,096·20	97,526	....	....	29,841·00	33,507
Total	**5·00**	**25**	**13,096·75**	**186,300**	**41·75**	**207**	**224,118·50**	**187,849**

Period.	Clays (Cement, etc.)—*continued.*		Coal.		Copper Ore.			
	Total.		Collie Coalfield.		Pilbara Goldfield.		West Pilbara Goldfield.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	tons.	£	tons.	£	tons.	£	tons.	£
Prior to 1953	*117,882·38	78,032	23094847·96	21,251,178	75·68	2,037	82,745·45	748,482
1953	22,915·85	15,881	886,182·20	3,073,073	32·93	2,424	13·32	674
1954	22,659·00	28,681	1,018,342·53	3,588,818	....	....	....	....
1955	41,912·32	32,693	903,792·22	3,132,074	0·53	134	....	....
1956	29,841·00	33,507	830,006·65	2,797,506	22·71	1,058	....	....
Total	**235,211·05**	**188,794**	**26733171·56**	**33,842,649**	**131·85**	**5,653**	**82,758·77**	**749,156**

* Includes 1,050·80 tons valued at £738 from Collie Mineral Field.

Period.	Copper Ore—*continued.*							
	Ashburton Goldfield.		Mt. Margaret Goldfield.		Phillips River Goldfield.		Outside Proclaimed Goldfield.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	tons.	£	tons.	£	tons.	£	tons.	£
Prior to 1953	378·07	6,937	47,861·82	231,003	95,924·47	589,467	176·66	1,945
1953	....	....	....	....	....	....	4·04	101
1954	....	....	....	....	....	....	....	....
1955	....	....	....	....	....	....	....	....
1956	....	....	....	....	6·46	770	....	....
Total	**378·07**	**6,937**	**47,861·82**	**231,003**	**95,930·93**	**590,237**	**180·70**	**2,046**

* Value of Copper separated from 1·31 tons Copper precipitates.

Period.	Copper Ore—*continued.*		Corundum.		Cupreous Ore (Fertiliser).			
	Total.		East Murchison Goldfield.		West Pilbara Goldfield.		Pilbara Goldfield.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	tons.	£	tons.	£	tons.	£	tons.	£
Prior to 1953	253,659·38	1,749,978	54·00	380	2,855·49	26,046	....	....
1953	50·29	3,199	....	....	672·22	6,851	....	....
1954	....	....	....	....	3,080·16	17,228	310·58	9,200
1955	12·12	1,001	9·15	275	3,327·36	23,981	857·17	23,868
1956	*212·23	12,742	....	....	2,331·23	18,418	1,853·17	42,971
Total	†253,934·02	**1,766,910**	**63·15**	**655**	**12,265·46**	**92,524**	**3,020·87**	**76,039**

* Including 79·08 tons valued at £8,444 from Peak Hill Goldfield ; 100·59 tons valued at £2,131 from East Murchison Goldfield ; 3·39 tons valued at £339 from State generally. † Including 109·52 tons valued at £1,709 from West Kimberley Goldfield ; 384·90 tons valued at £7,183 from East Murchison Goldfield ; 82·35 tons valued at £811 from Yalgoo Goldfield ; 6·12 tons valued at £51 from North Coolgardie Goldfield ; 50·67 tons valued at £379 from East Coolgardie Goldfield ; 16·00 tons valued at £77 from Yilgarn Goldfield ; 1,130·62 tons valued at £41,574 from Peak Hill Goldfield ; 24,026·25 tons valued at £119,497 from Northampton Mineral Field and 1,053·61 tons valued at £12,157 from Murchison Goldfield, and 3·39 tons valued at £339 from State generally.

Table VI.—*Minerals other than Gold*—continued.

Period.	Cupreous Ore (Fertiliser)—*continued.*							
	Ashburton Goldfield.		Peak Hill Goldfield.		East Murchison Goldfield.		Murchison Goldfield.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	tons.	£	tons.	£	tons.	£	tons.	£
Prior to 1953	41·41	525	1,633·59	19,248	608·98	8,575	....	....
1953	9·79	114	163·30	1,140	892·10	10,043	25·54	461
1954	0·75	7	328·57	5,915	553·04	12,671	286·15	2,653
1955	13·95	141	1,797·85	30,059	695·58	14,084	796·39	7,372
1956	2·00	53	2,443·12	37,839	411·43	7,261	524·93	4,589
Total	**67·90**	**840**	**6,366·43**	**94,201**	**3,161·13**	**51,334**	**1,633·01**	**20,075**

Period.	Cupreous Ore (Fertiliser)—*continued.*							
	Yalgoo Goldfield.		Mt. Margaret Goldfield.		Broad Arrow Goldfield.		East Coolgardie Goldfield.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	tons.	£	tons.	£	tons.	£	tons.	£
Prior to 1953	47·00	288	28·61	284	....	....	....	....
1953	....	....	9·50	73	22·00	368	29·0	100
1954	....	....	72·86	660	....	....	....	....
1955	10·29	102	133·00	599	7·05	....	....	....
1956	....	....	81·67	807	5·54	11	....	....
Total	**57·29**	**390**	**324·64**	**2,423**	**34·59**	**379**	**29·00**	**100**

Period.	Cupreous Ore (Fertiliser)—*continued.*							
	Dundas Goldfield.		Phillips River Goldfield.		Outside Proclaimed Goldfield.		Total.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	tons.	£	tons.	£	tons.	£	tons.	£
Prior to 1953	....	....	126·67	2,563	....	....	5,380·12	57,662
1953	12·69	117	72·00	1,406	39·94	331	1,948·08	21,004
1954	....	....	116·00	2,047	....	....	4,748·11	50,381
1955	....	....	52·50	1,146	17·85	193	7,730·78	101,731
1956	....	....	32·48	1,259	1·19	22	7,713·31	113,442
Total	**12·69**	**117**	**899·65**	**8,421**	**58·98**	**546**	***27,520·40**	**344,222**

* Includes 64·97 tons valued at £345 from Yilgarn Goldfield; and 21·79 tons valued at £186 from Northampton Mineral Field.

Period.	Diamonds.		Diatomaceous Earth.		Dolomite.		Emerald.	
	Pilbara Goldfield.		Outside Proclaimed Goldfield.		Murchison Goldfield.		Murchison Goldfield.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Carats.	£	tons.	£	tons.	£	Carats (cut and rough).	£
Prior to 1953	....	24	828·00	4,510	1,574·90	7,155	18,373·00	1,609
1953	....	....	....	....	....	....	....	....
1954	....	....	150·00	1 579	....	....	....	....
1955	....	....	....	....	81·00	324	....	....
1956	....	....	....	....	171·00	690	....	....
Total	**....**	**24**	**978·00**	**6,089**	**1,826·90**	**8,160**	**18,373·00**	**1,609**

Period.	Emerald—*continued.*				Emery.		Felspar.	
	Pilbara Goldfield.		Total.		West Kimberley Goldfield.		Coolgardie Goldfield.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Carats (cut and rough).	£	Carats (cut and rough).	£	tons.	£	tons.	£
Prior to 1953	....	....	18,373·00	1,609	13·00	130	44,315·30	122,304
1953	....	....	....	....	....	....	2,079·50	8,682
1954	8·68	313	8·68	313	....	....	3,173·00	14,293
1955	....	....	....	....	8·15	245	3,565·00	16,660
1956	....	....	....	....	....	....	3,773·00	17,686
Total	**8·68**	**313**	**18,381·68**	**1,922**	**21·15**	**375**	**56,905·80**	**179,625**

Table VI.—*Minerals other than Gold*—continued.

Period.	Felspar—*continued.*				Fergusonite.		Fuller's Earth.	
	Outside Proclaimed Goldfield.		Total.		Pilbara Goldfield.		Outside Proclaimed Goldfield.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	tons.	£	tons.	£	tons.	£	tons.	£
Prior to 1953	528·00	1,050	44,843·30	123,354	0·17	165	55·00	211
1953	47·50	178	2,127·00	8,860	....	....	15·75	79
1954	52·91	198	3,225·91	14,491	....	....	....	....
1955	....	....	3,565·00	16,660	0·13	226	10·76	54
1956	8·00	32	3,781·00	17,718	....	....	40·13	201
Total	**636·41**	**1,458**	**57,542·21**	**181,083**	**0·30**	**391**	**91·64**	**545**

* Including 30 tons valued at £86 from Board Arrow Goldfield.

Period.	Gadolinite.		Glass Sand.		Glauconite.		Graphite.	
	Pilbara Goldfield.		Outside Proclaimed Goldfield.		Outside Proclaimed Goldfield.		Outside Proclaimed Goldfield.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	tons.	£	tons.	£	tons.	£	tons.	£
Prior to 1953	1·00	112	21,857·46	16,900	5,128·50	96,980	18·10	97
1953	....	....	6,905·74	4,690	319·50	11,182	20·00	180
1954	....	....	7,803·01	5,541	257·50	9,012	....	....
1955	....	....	6,758·98	4,801	196·50	7,407	110·00	990
1956	....	....	7,343·17	5,153	114·00	4,520	5·10	37
Total	**1·00**	**112**	**50,668·36**	**37,085**	**5,916·00**	**129,101**	**153·20**	**1,304**

Period.	Gypsum.							
	Yilgarn Goldfield.		Dundas Goldfield.		Outside Proclaimed Goldfield.		Total.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	tons.	£	tons.	£	tons.	£	tons.	£
Prior to 1953	174,487·50	138,683	2,027·00	1,310	197,276·41	214,212	373,790·91	354,205
1953	25,216·00	19,041	12·00	6	15,019·11	11,131	40,247·11	30,178
1954	24,347·00	18,290	30·00	15	16,765·00	13,315	41,142·00	31,620
1955	38,807·00	29,411	9·00	4	1,130·00	920	39,946·00	30,335
1956	21,389·00	16,163	....	....	5,732·00	4,764	27,121·00	20,928
Total	**264,246·50**	**221,588**	**2,078·00**	**1,335**	**235,922·52**	**244,342**	**522,247·02**	**467,266**

Period.	Ilmenite Concentrates.		* Iron Ore (for Pig Iron).					
	Outside Proclaimed Goldfield.		Yilgarn Goldfield.		Outside Proclaimed Goldfield.		Total.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantiy.	Value.
	tons.	£	tons.	£	tons.	£	tons.	£
Prior to 1953	155·95	776	29,693·96	338,541	41,773·32	244,581	71,467·28	583,123
1953	....	....	13,175·88	185,670	3,675·89	35,336	16,851·77	221,006
1954	....	....	16,664·99	195,997	1,633·30	13,030	18,298·29	209,027
1955	....	....	16,876·82	216,772	426·06	3,786	17,302·88	220,558
1956	3,293·40	15,150	19,853·60	278,846	....	....	19,853·60	278,846
Total	**3,449·35**	**15,926**	**96,265·25**	**1,215,826**	**47,508·57**	**296,733**	**143,773·82**	**1,512,560**

* Excludes Iron Ore used as Flux :—Yilgarn Goldfield, 84·35 tons valued at £128 ; West Pilbara Goldfield, 100·00 tons valued at £300 ; East Coolgardie Goldfield, 450·00 tons valued at £247 ; West Kimberley Goldfield, 10·50 tons valued at £12 ; Greenbushes Mineral Field, 7,481·00 tons valued at £4,629 ; and Outside Proclaimed Goldfields, 49,938·50 tons valued at £31,732.

Period.	Iron Ore (exported.)		Jarosite.		Kyanite.		Lead Ore and Concentrates.	
	West Kimberley Goldfield.		Phillips River Goldfield.		Outside Proclaimed Goldfield.		Northampton Mineral Field.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	tons.	£	tons.	£	tons.	£	tons.	£
Prior to 1953	215,329·00	213,535	9·54	37	4,215·69	21,781	429,443·73	2,473,735
1953	687,895·00	682,162	....	....	....	....	4,776·11	284,524
1954	634,514·00	629,325	....	....	....	....	1,338·94	70,370
1955	496,882·00	492,741	....	....	....	....	1,069·04	68,529
1956	327,815·00	323,923	....	....	....	....	4,955·43	552,322
Total	**2,362,435·00**	**2,341,686**	**9·54**	**37**	**4,215·69**	**21,781**	**441,583·25**	**3,449,480**

Table VI.—*Minerals other than Gold*—continued.

Period.	Magnesite.							
	East Coolgardie Goldfield.		Coolgardie Goldfield.		Outside Proclaimed Goldfield.		Total.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	tons.	£	tons.	£	tons.	£	tons.	£
Prior to 1953	1,052·96	2,413	2,218·32	5,978	4,269·82	9,718	7,941·10	18,109
1953	....	....	19·60	73	....	....	19·60	73
1954	....	....	91·75	258	....	....	91·75	258
1955	....	....	....	....	....	....	....	....
1956	358·35	810	445·20	1,168	....	....	803·55	1,978
Total	**1,811·31**	**3,223**	**2,774·87**	**7,477**	**4,269·82**	**9,718**	**8,856·00**	**19,418**

Period.	Manganese. (Metallurgical Grade).						Mica.	
	Pilbara Goldfield.		Peak Hill Goldfield.		Total.		Outside Proclaimed Goldfield.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	tons.	£	tons.	£	tons.	£	lb.	£
Prior to 1953	....	....	33,360·01	201,757	*33,403·86	202,049	†32,930·00	3,984
1953	....	....	16,324·00	150,991	16,324·00	150,991	....	....
1954	8,982·00	163,473	31,599·00	444,742	40,581·00	608,215	....	....
1955	7,594·00	95,146	29,896·66	328,684	37,490·66	423,330	....	....
1956	7,525·25	102,159	49,596·00	542,706	‡57,323·14	648,956	....	....
Total	**24,101·25**	**360,774**	**160,773·67**	**1,668,880**	**135,123·66**	**2,034,041**	**32,930·00**	**3,984**

* Includes 20 tons, valued at £180 from Mt. Margaret Goldfield and 24·85 tons, valued at £112 from Outside Proclaimed Goldfield. † Includes 7,868 lb. crude Mica. Also includes 31·25 lb. Mica valued at £5 from West Kimberley Goldfield. ‡ Includes 201·89 tons of Battery Grade Manganese, valued at £4,091 from Peak Hill Goldfield.

Period.	Ochre.							
	Kimberley Goldfield.		West Pilbara Goldfield.		Murchison Goldfield.		East Coolgardie. Goldfield.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	tons.	£	tons.	£	tons.	£	tons.	£
Prior to 1953	....	....	3,758·85	47,014	2,996·82	30,320	45·35	163
1953	20·61	330	....	....	266·06	2,412	20·50	145
1954	....	....	....	....	429·45	4,109	....	....
1955	....	....	41·60	917	303·59	2,996	....	....
1956	....	....	....	....	444·38	4,349	....	....
Total	**20·61**	**330**	**3,790·45**	**47,931**	**4,440·30**	**44,186**	**65·85**	**308**

Period.	Ochre—*continued.*		Petalite.		Phosphatic Guano.		Pyrites.	
	Total.		Coolgardie Goldfield.		Outside Proclaimed Goldfield.		Dundas Goldfield.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quatity.	Value.
	tons.	£	tons.	£	tons.	£	tons.	£
Prior to 1953	*6,850·52	77,769	5·19	52	10,799·73	59,174	†428,537·56	1,703,036
1953	307·17	2,887	....	....	....	....	59,248·00	489,985
1954	429·45	4,109	15·00	69	....	....	56,150·00	441,466
1955	345·19	3,913	....	....	....	....	49,485·00	397,269
1956	444·38	4,349	....	....	....	....	‡60,968·98	420,052
Total	**8,386·71**	**93,027**	**20·19**	**121**	**10,799·73**	**59,174**	**654,389·54**	**3,451,808**

* Includes 2·10 tons valued at £15 ton from Pilbara Goldfield, 11 tons valued at £66 from Yalgoo Goldfield, 10·40 tons valued at £83 from North-East Coolgardie Goldfield and 36 tons valued at £108 from Outside Proclaimed Goldfield. † Includes 74,047·56 tons valued at £45,496 from Mt. Margaret Goldfield. ‡ Includes 12,542·98 tons Concentrates valued at £57,103 from East Coolgardie Goldfield.

Period.	Sillimanite.		Silver Lead Ore and Concentrates.					
	Outside Proclaimed Goldfield.		Kimberley Goldfield.		Pilbara Goldfield.		West Pilbara Goldfield.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	tons.	£	tons.	£	tons.	£	tons.	£
Pror to 1953	2·00	13	9·26	648	1,614·21	99,765	175·13	7,584
1953	....	....	....	....	393·77	20,975	3·29	28
1954	....	....	....	....	155·27	7,679	....	....
1955	....	....	....	....	330·60	24,887	....	....
1956	....	....	....	....	1,117·94	78,549	....	....
Total	**2·00**	**13**	**9·26**	**648**	**3,611·97**	**231,755**	**178·42**	**7,612**

Table VI.—*Minerals other than Gold*—continued.

Period.	Silver Lead Ore and Concentrates.				Silver Lead Zinc Ore and Concentrates.			
	Ashburton Goldfield.		Total.		West Kimberley Goldfield.		Pilbara Goldfield.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	tons.	£	tons.	£	tons.	£	tons.	£
Prior to 1953	5,793·44	261,079	7,597·54	368,361	1,120·27	32,570	....	....
1953	713·28	40,195	1,110·34	61,198	444·61	7,118	94·42	5,488
1954	393·50	20,533	548·77	28,212	279·26	2,601	....	....
1955	16·32	992	346·92	25,878	....	....	....	....
1956	156·60	11,751	1,282·14	90,931	....	....	....	....
Total	**7,073·14**	**334,550**	**10,885·71**	**575,580**	**1,844·14**	**42,289**	**94·42**	**5,488**

Period.	Silver Lead Zinc Ore and Concentrates.				Soapstone.			
	Northampton Mineral Field.		Total.		Greenbushes Mineral Field.		Total.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	tons.	£	tons.	£	tons.	£	tons.	£
Prior to 1953	105·36	3,983	1,225·63	36,553	517·00	1,778	*565·40	1,928
1953	....	....	539·03	12.606	....	....	....	....
1954	....	....	279·26	2.601	....	....	....	....
1955	....	....	....	....	....	....	....	....
1956	....	....	....	....	....	....	....	....
Total	**105·36**	**3,983**	**2,043·92**	**51,760**	**517·00**	**1,778**	**565·40**	**1,928**

* Including 48·40 tons valued at £150 from Outside Proclaimed Goldfields.

Period.	Spodumene.		Talc.					
	Phillips River Goldfield.		East Coolgardie Goldfield.		Outside Proclaimed Goldfield.		Total.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	tons.	£	tons.	£	tons.	£	tons.	£
Prior to 1953	....	....	963·91	3,986	2,133·83	26,706	3,096·71	30,692
1953	....	....	108·70	487	2,119·37	30,445	2,228·07	30,932
1954	....	....	37·00	166	2,883·03	45,685	2,920·03	45,851
1955	3·89	57	26·83	120	2,559·98	37,647	2,586·81	37,767
1956	....	....	77·12	388	4,378·45	54,050	4,455·57	54,438
Total	**3·89**	**57**	**1,213·56**	**5,147**	**14,063·66**	**194,533**	**15,287·22**	**199,680**

Period.	Tantalite.						Tantalo Columbite Ore and Concentrates.	
	Pilbara Goldfield.		Greenbushes Mineral Field.		Total.		Greenbushes Mineral Field.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	tons.	£	tons.	£	tons.	£	tons.	£
Prior to 1953	265·07	130,672	15·29	10,052	*283·17	143,233	11·26	10,801
1953	....	....	....	....	....	....	3·09	7,252
1954	....	....	....	....	....	....	4·84	5,941
1955	....	....	....	....	....	....	2·06	2,747
1956	....	....	....	....	....	....	30·20	33,667
Total	**265·07**	**130,672**	**15·29**	**10,052**	**283·17**	**143,233**	**51·45**	**60,008**

* Includes 2·81 tons valued at £2,509 from Coolgardie Goldfield.

Period.	Tantalo Columbite Ore and Concentrates—*continued.*							
	Pilbara Goldfield.		Gascoyne Goldfield.		Coolgardie Goldfield.		Phillips River Goldfield	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	tons.	£	tons.	£	tons.	£	tons.	£
Prior to 1953	4·19	2,470	....	....	2·02	2,399	....	....
1953	2·89	8,560	0·80	1,038	1·09	2,960	*0·22	390
1954	46·72	68,997	....	....	0·55	1,507	....	....
1955	10·54	21,208	....	....	0·10	251	0·28	1,556
1956	39·25	88,134	....	....	1·47	4,390	0·35	1,473
Total	**103·59**	**189,369**	**0·80**	**1,038**	**5·23**	**11,507**	**0·85**	**3,419**

* Microlite.

Table VI.—*Minerals other than Gold*—continued.

Period.	Tantalo Columbite Ore and Concentrates—*continued.*		Tin.					
	Total.		Greenbushes Mineral Field.		Kimberley Goldfield.		West Kimberley Goldfield.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	tons.	£	tons.	£	tons.	£	tons.	£
Prior to 1953	17·47	15,670	11,471·57	1,067,572	0·83	302	0·30	235
1953	8·09	20,200	41·41	23,311	....	....	....	....
1954	52·11	76,445	42·85	22,885	....	....	....	....
1955	12·98	25,762	119·57	61,577	....	....	0·13	79
1956	71·27	127,664	131·17	71,273	....	....	....	....
Total	**161·92**	**265,741**	**11,796·57**	**1,246,618**	**0·83**	**302**	**0·43**	**314**

Period.	Tin—*continued.*							
	Pilbara Goldfield.		West Pilbara Goldfield.		East Murchison Goldfield.		Total.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	tons.	£	tons.	£	tons.	£	tons.	£
Prior to 1953	6,153·56	658,493	1·89	1,295	0·39	103	*17,634·01	1,728,431
1953	70·97	39,386	0·59	310	0·30	122	113·27	63,129
1954	78·47	40,092	....	....	....	....	121·32	62,977
1955	60·02	33,256	....	....	....	....	179·72	94,913
1956	227·12	136,965	....	....	....	....	358·35	208,273
Total	**6,590·14**	**908,192**	**2·48**	**1,615**	**0·69**	**225**	***18,406·67**	**2,157,723**

* Includes 4·78 tons valued at £395, 0·15 tons valued at £15, and 0·60 tons valued at £46 from Murchison, Coolgardie and Yilgarn Goldfields, respectively.

Period.	Tungsten (Scheelite).							
	Pilbara Goldfield.		East Murchison Goldfield.		Yalgoo Goldfield.		Mt. Margaret Goldfield.	
	Conc.	Value.	Conc.	Value.	Conc.	Value.	Conc.	Value.
	tons.	£	tons.	£	tons.	£	tons.	£
Prior to 1953	....	....	0·06	52	2·99	1,050	1·29	2,255
1953	....	....	....	....	0·03	43	0·78	842
1954	1·69	1,867	....	....	....	....	....	....
1955	....	....	....	....	....	....	0·83	582
1956	....	....	....	....	....	....	....	....
Total	**1·69**	**1,867**	**0·06**	**52**	**3·02**	**1,093**	**2·94**	**3,730**

Period.	Tungsten (Scheelite)—*continued.*							
	North Coolgardie Goldfield.		Coolgardie Goldfield.		Yilgarn Goldfield.		Total.	
	Conc.	Value.	Conc.	Value.	Conc.	Value.	Conc.	Value.
	tons.	£	tons.	£	tons.	£	tons.	£
Prior to 1953	6·45	1,030	22·36	6,776	106·74	39,087	*141·17	50,564
1953	1·31	1,571	0·74	867	0·05	38	2·91	3,361
1954	2·01	1,494	....	....	....	....	3·70	3,361
1955	5·71	6,009	1·21	826	....	....	7·75	7,417
1956	....	....	....	....	....	....	....	....
Total	**15·48**	**10,104**	**24·31**	**8,479**	**106·79**	**39,125**	**155·53**	**64,703**

* Includes 0·16 tons valued at £59 from Murchison Goldfield, 1·01 tons valued at £175 from Broad Arrow Goldfield and 0·08 tons valued at £19 from Dundas Goldfield.

Period.	Tungsten (Wolfram).							
	Pilbara Goldfield.		Murchison Goldfield.		Yalgoo Goldfield.		Total.	
	Ore and Conc.	Value.	Ore and Conc.	Value.	Ore and Conc.	Value.	Ore and Conc.	Value.
	tons.	£	tons.	£	tons.	£	tons.	£
Prior to 1953	24·61	45,078	245·82	10,879	1·29	910	*300·48	57,286
1953	....	....	3·00	3,861	0·45	612	3·45	4,473
1954	....	....	....	....	....	....	....	....
1955	....	....	....	....	....	....	....	....
1956	....	....	....	....	....	....	....	....
Total	**24·61**	**45,078**	**248·82**	**14,740**	**1·74**	**1,522**	**303·93**	**61,759**

* Includes 28·48 tons valued at £331 from West Kimberley Goldfield and 0·28 tons valued at £88 from Broad Arrow Goldfield.

Table VI.—*Minerals other than Gold*—continued.

Period.	Vermiculite.		Zinc Ore (Fertiliser).		Zinc.†					
	Outside Proclaimed Goldfield.		Pilbara Goldfield.		West Kimberley Goldfield.		Pilbara Goldfield.		Total.	
	Quantity.	Value.	Quantity.	Value.	Metallic Content.	Value.	Metallic Content.	Value.	Metallic Content.	Value.
	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£
Prior to 1953	1,802·92	11,474	10·00	50	46·01	365	....	....	46·01	365
1953	29·00	348	10·00	50	63·77	1,011	‡4·38	*Nil*	68·15	1,011
1954	....	....	....	....	‡73·85	*Nil*	....	....	73·85	*Nil*
1955	....	....	....	....	....	....	....	....	....	....
1956	....	....	....	....	....	....	....	....	....	....
Total	***1,832·92**	**11,831**	**20·00**	**100**	**183·63**	**1,376**	**4·38**	**Nil**	**188·01**	**1,376**

* Includes 127·16 tons valued at £881 from East Coolgardie Goldfield and 20 tons valued at £60 from Yilgarn Goldfield.

† By-product from Silver-Lead-Zinc Mining. ‡ Unpayable assayed zinc content of Silver-Lead-Zinc Ore and Concentrate.

TABLE VII.

Quantity and Value of Minerals, other than Gold, reported during year 1956.

Number of Lease, Claim, Or Area.	Goldfield or Mineral Field.	Registered Name of Producer.	Quantity.	Metallic Content.	Value.
		ANTIMONY (*f*) (*g*) (*j*).			
			tons.	tons.	£A.
G.M.Ls. 231L, etc.	Pilbara	Blue Spec Mining Co., N.L.	78·44	(*b*) 23·26	742·00
		ASBESTOS (Chrysotile).			
L.T.T. 1226H, ...	Pilbara	Hancock, L. G.	267·25	....	5,612·25
M.C. 48, etc.	West Pilbara	Hancock, L. G.	493·85	....	19,753·75
			761·10	....	(*b*) 25,366·00
		ASBESTOS (Crocidolite).			
M.C. 54, etc.	West Pilbara	Australian Blue Asbestos, Ltd.	7,285·97	....	(*b*) 800,710·48
		BARYTES.			
M.C. 11N	Murchison	Rumble, P. R.	426·10	....	2,031·00
M.C. 511H	O.P.G. (Cranbrook)	Ferrari, A.	501·00	....	3,156·00
			927·10	....	(*a*) 5,187·00
		BENTONITE.			
M.C. 537H	O.P.G. (Marchagee)	Collins, A. C.	65·84	....	251·10
M.Ls. 437H, etc.	O.P.G. (Marchagee)	Noonan, E. J.	1,157·00	....	4,729·50
M.Cs. 282H, etc.	O.P.G. (Marchagee)	Fennell, W. G.	180·70	....	677·63
			1,403·54	....	(*a*) 5,658·23
		BERYL (*f*) (*g*).		BeO Units.	
Crown Lands	Gascoyne	Poland, W. C.	3·62	45·25	678·85
Crown Lands	Gascoyne	Sundry persons	46·49	565·79	8,924·50
	Coolgardie	Pegmatite Minerals Synd.	14·93	178·08	2,589·85
M.C. 14	Coolgardie	E. P. Rowe & Pty.	0·54	6·92	113·65
M.C. 9	Coolgardie	D. J. Evans & Pty.	5·34	64·08	1,053·35
Crown Lands	Pilbara	Sundry persons	9·49	115·90	1,844·15
M.C. 350	Pilbara	Johnston, J. A.	1·62	17·85	251·20
P.A. 2534	Pilbara	O'Donnell, P.	2·03	25·26	390·20
M.C. 304	Pilbara	White, A. L.	6·18	71·77	1,011·90
M.C. 297, etc.	Pilbara	Miller & Trembath	0·65	9·43	126·40
M.C. 313, etc.	Pilbara	Richardson Bros.	116·75	1,415·94	22,884·80
Crown Lands	Pilbara	Sundry persons	1·97	24·02	371·05
M.C. 354	Pilbara	McGregor, D. M.	4·21	45·01	634·60
M.C. 116	Pilbara	Tabba Tabba Synd.	16·09	180·90	2,828·65
P.A. 2531	Pilbara	Haselby, H. M.	0·30	3·89	60·10
M.C. 352	Pilbara	Marshall, W.	4·27	48·28	680·75
P.A. 2523	Pilbara	Fullbrook & Pty.	0·65	7·80	120·60
Crown Lands	Pilbara	Sundry persons	75·06	852·05	12,548·05
			310·19	3,678·22	(*b*) 57,113·15
		CLAYS (Cement Clays).			
M.C. 492H, etc.	O.P.G. (Gosnells)	Cockburn Cement Pty., Ltd.	6,014·00	....	8,269·50
Freehold Land	O.P.G. (Maida Vale)	D. Rhodes Pty., Ltd.	12,300·00	....	6,938·30
			18,314·00	....	(*c*) 15,207·80

Table VII.—*Minerals other than Gold*—continued.

Quantity and Value of Minerals, other than Gold, reported during year 1956.

Number of Lease, Claim, or Area.	Goldfield or Mineral Field.	Registered Name of Producer.	Quantity.	Metallic Content.	Value.
		CLAYS (Fireclays).	tons.	tons.	£A.
M.C. 304H, etc.	O.P.G. (Clackline)	Clackline Refractories, Ltd.	7,108·00	....	7,108·00
Loc. 84	O.P.G. (Glen Forrest)	Darling Range Firebrick Co.	979·00	....	929·75
M.C. 522H, etc.	O.P.G. (Byford)	Bridge, J. S.	1,350·00	....	1,901·25
			9,437·00	....	(*c*) 9,939·00
		CLAYS (Ball Clay-Ceramic).			
M.C. 109H	O.P.G. (Goomalling)	Brisbane & Wunderlich, Ltd.	2,090·00	....	(*c*) 8,360·0
		COAL.			
M.L. 250, etc.	Collie	Amalgamated Collieries of W.A., Ltd.	475,614·20	....	1,588,166·11
M.L. 314, etc.	Collie	Griffin Coal Mining Coy.	214,938·15	....	732,467·80
M.L. 418, etc.	Collie	Western Collieries, Ltd.	139,454·30	....	476,871·80
			830,006·65	....	2,797,505·71 (*e*)
		COPPER ORE AND CONCENTRATES (*f*) (*g*).			
				Copper Units	
Crown Lands	State generally	Sundry persons	3·39	103·00	339·50
M.C. 43P	Peak Hill	Parkinson, T. L.	43·55	2,242·00	7,529·82
M.C. 65P	Peak Hill	Bettineschi & Ricci	35·53	430·27	914·00
M.C. 2B	East Murchison	Rinaldi, Motter & Motter	24·54	280·12	550·00
M.C. 13	East Murchison	Delich, T.	76·05	822·29	1,581·10
M.C. 112L	Pilbara	Baker, J. C. & G. M.	22·71	406·82	1,058·35
M.L. 421	Phillips River....	Belli & Dawes	6·46	294·84	769·50
			212·23	4,579·34	12,742·27
		CUPREOUS ORE AND CONCENTRATES (Fertiliser) (*f*).			
				Av. Assay Cu. %.	
M.L. 260	West Pilbara	Whundo Copper Synd.	53·28	9·26	753·00
M.L. 259	West Pilbara	Lee, T.	234·21	11·58	3,939·97
Loc. 71	West Pilbara	Walters, I.	2,028·16	4·18	13,538·00
M.C. 88	West Pilbara	Carlow Castle Copper Mine	15·58	8·27	186·92
M.C. 117L	Pilbara	Stream & Kelly	37·26	20·20	1,735·60
G.M.L. 314L	Pilbara	Stubbs, S. H.	1,619·62	12·35	36,783·54
P.A. 2508	Pilbara	Drew & Pty.	1·20	5·90	10·13
P.A. 2506	Pilbara	Doughty, J. J.	1·57	17·40	55·91
M.C. 209	Pilbara	Breens Copper Synd.	94·39	10·42	1,623·14
M.C. 439	Pilbara	Native Welfare Dept.	10·64	7·50	97·75
M.C. 112L, etc.	Pilbara	Baker, J. C. & G. M.	39·00	16·55	1,335·23
M.C. 103L, etc.	Pilbara	Baker, J. C. & G. M.	49·08	14·04	1,330·45
M.C. 2B	East Murchison	Rinaldi & Motter	177·37	10·64	3,270·87
M.C. 11	East Murchison	Alac, M.	68·18	6·43	550·96
P.A. 1472	East Murchison	Glucina, D.	63·66	11·12	1,262·31
P.A. 1475	East Murchison	Howarth, C. A.	30·62	10·85	575·68
M.C. 13	East Murchison	Delich, T.	71·60	12·03	1,601·25
M.L. 68P	Peak Hill	Walsh, E.	2,067·35	8·33	25,220·97
M.C. 65P	Peak Hill	Bettineschi & Ricci	184·40	8·20	2,276·54
M.C. 43P	Peak Hill	Parkinson, T. L.	118·23	24·17	8,714·73
P.A. 854P	Peak Hill	Edwards, M.	37·66	11·32	830·55
M.C. 64P	Peak Hill	North-End G.M. Synd.	21·80	9·50	296·00
P.A. 856P	Peak Hill	Cooper & Tester	10·53	20·70	475·00
P.A. 852P	Peak Hill	Collis, D. J.	3·15	6·55	25·00
L.T.T. 1289H	Murchison	Motter, G.	129·83	4·50	761·43
M.C. 10N	Murchison	Rinaldi, D.	215·13	6·96	2,032·83
M.C. 9N	Murchison	Rinaldi, L. V.	55·81	5·21	279·08
M.L. 20N	Murchison	Motter, Z.	89·74	6·99	887·90
P.A. 1064P	Murchison	Gorman & Lee	28·03	10·86	532·10
P.A. 3385N	Murchison	Jeffreys, E. G. & K. E.	6·39	9·30	96·00
P.A. 1649F	Mt. Margaret	Fanetti, Cox & Bernadi	6·75	5·30	30·38
M.L. 24F	Mt. Margaret	Le Feuvre, G.	12·00	5·30	54·00
P.A. 1650F	Mt. Margaret	Grey, A.	42·08	8·93	591·65
M.C. 5F	Mt. Margaret	Grgich, G.	20·84	5·87	130·85
Crown Lands	Broad Arrow	Sundry persons	5·54	3·90	10·80
P.A. 6791	Yilgarn	Copperbrook Mining Synd.	26·60	6·05	212·39
M.C. 38	Phillips River....	Westralian Mining Pty., Ltd.	17·45	12·52	410·45
M.L. 421	Phillips River....	Belli & Dawes	15·03	24·00	848·50
M.L. 159	Ashburton	Kempton Bros.	2·00	13·86	52·66
M.C. 534H	O.P.G. (Jerramungup)	Ilich & Barnam	1·19	10·95	22·00
			7,713·31	8·60	113,442·52 (*a*) (*b*)

Table VII.—*Minerals other than Gold*—continued.

Quantity and Value of Minerals, other than Gold, reported during year 1956.

Number of Lease, Claim, or Area.	Goldfield or Mineral Field.	Registered Name of Producer.	Quantity.	Metallic Content.	Value.
		CHROMITE (*f*) (*g*).	tons.	Av. Assay Cr. %.	£A.
M.C. 44P, etc.	Peak Hill	B.H.P., Ltd.	6,096·20	43·04	(*b*) 97,526·00
		DOLOMITE.			
M.L. 9M, etc.	Murchison	Westralian Ores Pty., Ltd.	171·00	....	(*a*) 690·00
		FULLERS EARTH.			
M.C. 452H	O.P.G. (Marchagee)	Read, C. J. and T. J.	40·13	....	(*a*) 200·65
		FELSPAR.			
M.L. 80, etc.	Coolgardie	Aust. Glass Mfrs. Pty., Ltd.	3,773·00	....	17,686·50
M.C. 111H	O.P.G. (Balingup)	V. C. Oma	8·00	....	32·00
			3,781·00	....	(*a*) 17·718·50
		GLASS SAND.			
M.C. 417H, etc.	O.P.G. (Lake Gnangara)	Aust. Glass Mfrs. Pty., Ltd.	6,913·17	....	4,493·54
M.C. 365H	....	Leach, R. J.	370·00	....	555·00
M.C. 161H, etc.	....	Leach, W. M.	60·00	....	105·00
			7,343·17	....	5,153·54
		GLAUCONITE.	Greensand Treated.	Glauconite Recovered.	
Private Property	O.P.G. (Gingin)	Brook, G. E.	515·00	85·00	(*b*)(*d*)3,360·00
		GRAPHITE.		Assay Carbon %	
M.C. 499H	O.P.G. (Munglinup)	Halbert, G. D.	5·10	24·68	(*a*) 37·20

Note.—Ore reduced to 1·20 tons conc. at School of Mines assaying 85·97% carbon.

		GYPSUM.			
M.C. 30, etc.	Yilgarn	Ajax Plaster Co. Pty., Ltd.	5,266·00	....	4,342·50
M.C. 9, etc.	Yilgarn	Perth Modelling Works Pty.	10,852·00	....	7,867·54
M.C. 51, etc.	O.P.G. (Lake Brown)	H. P. Brady & Co., Ltd.	7,504·00	....	5,628·25
M.C. 126H, etc.	O.P.G. (Baandee)	Perth Modelling Works Pty.	1,124·00	....	1,011·60
M.C. 402H, etc.	O.P.G. (Hines Hill)	Kay, C. J.	2,375·00	....	2,078·10
			27,121·00	....	(*c*) 20,927·99

Plaster of Paris reported as manufactured during the year being 17,541 tons from 24,779 tons of Gypsum.

		IRON ORE (for Pig).		Pig Iron Recovered.	
Temp. Res. 1258H	Yilgarn	Charcoal Iron & Steel Ind.	19,853·60	13,413·13	278,845·62 (*c*) (*d*)

Average Assay or Ore used—61·78% Fe.

		IRON ORE (Export).		Av. Assay % Fe.	
M.L. 10, etc.	West Kimberley	Aust. Iron & Steel, Ltd.	327,815·00	62·64	(*b*) 323,923·00

Table VII.—*Minerals other than Gold*—continued.

Quantity and Value of Minerals, other than Gold, reported during year 1956.

No. of Lease, Claim or Area.	Goldfield or Mineral Field.	Registered Name of Producer.	Ore and Conc.	Lead.		Silver.	
				Tons.	£A.	Fine oz.	£A.
LEAD ORE AND CONCENTRATES (*f*) (*g*).							
M.C. 28	Northampton	Camp & Party	4·00	2·60	289·60	2·12	0·87
T/L. 1/55	Northampton	Camp, S. G.	2·69	1·75	185·65	1·43	0·65
M.L. 205, etc.	Northampton	" Suprise " Lead Mine	126·40	91·61	10,662·64	94·80	8·60
M.L. 222	Northampton	" Geraldine North " L/M.	3·01	2·24	262·79	....	....
M.L. 256, etc.	Northampton	" Gurkha " L/Mine	1,367·98	1,089·72	125,344·21	591·85	208·55
Imp. Gr. Loc. 833	Northampton	Anglo-Westralian Mng. Pty.	4,449·61	3,490·31	386,339·80	272·80	....
M.L. 311	Northampton	" Oakagee " L/M.	17·68	13·07	1,524·47	....	....
P.A. 251	Northampton	Reynolds & Beadle	0·77	0·48	41·40	....	....
Vic. Loc. 334	Northampton	" Wheal Fortune " L/M.	22·25	13·82	982·22	....	....
	Northampton	" Isseka " L/M.	51·36	39·68	4,136·48	8·69	....
Loc. 1146	Northampton	" Corderoy " Mines, Ltd.	5·31	3·32	342·16	....	....
M.L. 234	Northampton	" Mary S. Pring "	49·77	35·93	3,688·50	17·26	6·80
Vic. Loc. 1472	Northampton	Northampton Mining Dev.	4·93	3·44	370·20	....	....
Vic. Loc. 436	Northampton	" Paringa Wheal Fortune "	15·72	12·05	1,165·50	....	....
M.L. 55 P.P.	Northampton	" Wheal Ina "	43·57	28·33	3,043·00	....	....
M.L. 59 P.P.	Northampton	McGuires L/M.	146·79	113·53	12,794·70	36·23	13·95
	Northampton	" Maybelle " L/M.	11·84	8·19	881·25	5·94	2·40
M.L. 58 P.P.	Northampton	Johnston & Karnikoski	7·07	5·36	267·30	....	....
			6,330·75	4,955·43	552,321·87 (*b*)	1,031·12	241·82
Silver—quantity and value transferred to Silver item.							
SILVER LEAD ORE AND CONCENTRATES (*f*) (*g*).							
M.L. 118	Ashburton	Bilrose L/M.	29·06	21·02	2,110·10	297·87	108·25
M.L. 122	Ashburton	Gift L/M.	92·78	70·63	7,088·37	637·87	229·88
M.L. 143	Ashburton	Dingo L/M.	11·35	7·97	875·25	111·63	45·25
M.C. 17	Ashburton	Carlton & Porter	3·32	1·74	265·30	....	....
P.A. 303	Ashburton	Hill, A. M.	19·28	14·98	1,361·83	189·29	77·88
P.A. 315	Ashburton	Roebuck L/M.	0·81	0·58	49·69	8·58	3·35
M.C. 4	Gascoyne	Bohan & McDonald	7·60	5·69	631·10	67·62	27·35
P.A. 2511	Pilbara	Engstrom, O.	16·67	12·76	1,414·95	90·42	29·20
M.C. 189	Pilbara	Ragged Hills L/M.	1,101·27	737·84	77,134·40	6,952·32	1,787·40
			1,282·14	873·21	90,930·99	8,355·60	2,308·56
Silver—quantity and value transferred to Silver item.							

Number of Lease, Claim, or Area.	Goldfield or Mineral Field.	Registered Name of Producer.	Quantity.	Metallic Content.	Value.
MINERAL BEACH SAND—ILMENITE (*f*).					
			Tons.	Assay T_1O_2 %.	£A.
D.C. 32H	O.P.G. (Bunbury)	Perron Bros. Pty., Ltd.	3,293·40	54·03	(*b*) 15,149·65
MAGNESITE.					
P.A. 1409Y	East Coolgardie	Frank, C. B.	96·00	....	192·00
M.C. 17E	East Coolgardie	Jones, R. L. C.	262·35	....	617·95
M.C. 22	Coolgardie	Scahill, E.	445·20	....	1,168·30
			803·55	....	(*a*) 1,978·25

Table VII.—*Minerals other than Gold*—continued.

Quantity and Value of Minerals, other than Gold, reported during year 1956.

Number of Lease, Claim, Or Area.	Goldfield or Mineral Field.	Registered Name of Producer.	Quantity.	Metallic. Content.	Value.
		MANGANESE (*f*) (*q*).			
			Tons.	Av. Assay Mn. %.	£A.
M.C. 268/9, etc.	Pilbara	Northern Minerals Synd.	7,525·25	50·34	102,159·00
M.C. 24P, etc.	Peak Hill	Westralian Ores Pty., Ltd.	49,596·00	43·57	542,706·00
	Peak Hill	Westralian Ores Pty., Ltd.	201·89	*	4,091·00
			57,323·14	....	(*b*) 648,956·00
		* Used for Manganese Dioxide powder—Assay 88·75% Mn.Oz.			
		OCHRE (Red).			
M.C. 26	Murchison	Zadow, J. C.	368·93	....	(*a*) 3,594·50
		OCHRE (Yellow).			
M.C. 30	Murchison	Zadow & Ball	75·45	....	(*a*) 754·75
		PYRITES ORE AND CONC.			
				Sulphur Recovered. tons.	
G.M.L. 5345E, etc.	East Coolgardie	G.M. of Kalg. (Aust.), Ltd.	(*i*) 12,542·98	4,568·24	57,103·00
G.M.L. 1460, etc.	Dundas	Norseman G.M., N.L.	12,629·00	4,443·88	56,909·00
			(*i*) 35,797·00	17,291·63	306,040·00
			60,968·98	26,303·75	(*a*) 420,052·00
		Note.—G.M.K. production accumulated figures for 1955-56 and is a by-product of Gold Mining.			
		SILVER.			
			Fine ozs.		
	By product from	Gold Mining	207,478·41	....	88,274·00
	By product from	Lead Mining	1,031·12	....	241·82
	By product from	Silver/Lead Mining	8,355·60	....	2,308·56
	By product from	Copper Mining	381·88	....	148·95
			217,247·01	....	90,973·33
		TALC.	Tons.		
M.C. 15E	East Coolgardie	Bean, H.	77·12	....	(*a*) 387·60
Loc. M839	O.P.G. (Three Springs)	Universal Milling Coy.	4,378·45	....	(*c*) 54,050·16
			4,455·57	....	54,437·76
		TANTO COLUMBITE ORE AND CONC. (*f*) (*g*).			
			lb.	Combined $TaNb_2O$. lb.	
M.C. 373, etc.	Pilbara	Graydon & Pty.	1,272·00	805·00	1,418·00
P.A. 2454, etc.	Pilbara	McPherson & Pty.	835·00	528·00	931·00
D.C. 126, etc.	Pilbara	Northern Minerals Synd.	6,749·00	4,206·00	7,030·00
M.C. 382	Pilbara	Wilson, G.	12,446·00	9,133·00	13,461·30
M.C. 291, etc.	Pilbara	Northern Territory Pros. & Dev.	18,826·00	8,418·00	19,665·00
M.C. 291	Pilbara	Perron Bros.	1,440·00	667·00	1,569·70
M.C. 381	Pilbara	Brennan, L. M.	12,512·00	5,605·00	14,748·05
M.C. 174	Pilbara	Griffiths, W. E.	21,980·00	13,391·00	24,086·40
	Pilbara	Pilbara Natives Society	3,156·00	861·00	1,643·00
M.C. 106, etc.	Pilbara	North-West Tantalum, N.L.	1,341·00	675·00	1,275·25
M.C. 140, etc.	Pilbara	Tantalite, Ltd.	2,455·00	1,266·00	985·25
Crown Lands	Pilbara	Sundry persons	112·00	71·00	33·20
	Pilbara	Ball, J.	93·00	19·00	26·70
M.C. 340	Pilbara	Sherlock & Parker	158·00	101·00	46·90
M.C. 69L, etc.	Pilbara	Dorrington & Party	4,435·00	2,819·00	1,179·50
Crown Lands	Pilbara	Sundry persons	115·00	23·59	34·88
M.C. 9	Coolgardie	D. J. Evans and Pty.	2,961·00	2,331·59	4,293·00
M.C. 14	Coolgardie	Rowe, E. P.	345·00	219·00	96·70
M.C. 70, etc.	Greenbushes	Tin & Strategic Mins., Ltd.	62,628·00	31,055·00	30,685·00
D.C. 111	Greenbushes	Tin & Strategic Mins. Synd.	5,024·00	2,980·00	2,982·00
M.C. 23	Phillips River....	Pantall, D. H.	772·00	516·00	1,472·75
			159,655·00	85,690·18	(*b*) 127,663·58

Table VII.—*Minerals other than Gold*—continued.

Quantity and Value of Minerals, other than Gold, reported during year 1956.

Number of Lease, Claim, or Area.	Goldfield or Mineralfield.	Registered Name of Producer.	Quantity.	Metallic Content.	Value.
		TIN (*f*) (*g*).	Tons.	Met. Cont. tons.	£A.
M.C. 56, etc.	Greenbushes	Tin & Strategic Mins., Ltd.	125·06	80·25	68,214·95
M.C. 56, etc.	Greenbushes	Western Queen (1936), N.L.	6·03	3·42	3,005·25
Crown Lands	Greenbushes	Sundry Claims	0·08	0·06	52·75
D.C. 58, etc.	Pilbara	Northern Mines Synd.	142·45	99·07	85,744·06
D.C. 26, etc.	Pilbara	E. Newnham Pty., Ltd.	11·37	7·85	6,973·63
Crown Lands	Pilbara	Sundry persons	4·33	3·02	2,648·83
D.C. 196	Pilbara	Johnston & Sons	22·49	15·47	13,595·09
M.C. 448	Pilbara	Johnston, R.	0·69	0·43	382·40
D.C. 26, etc.	Pilbara	Shaw River Alluv., N.L.	33·50	22·42	20,351·72
Crown Lands	Pilbara	Sundry persons	3·70	2·63	2,338·35
M.C. 174	Pilbara	Griffiths, W. E.	1·45	0·90	735·21
M.C. 381, etc.	Pilbara	Perron Bros.	0·82	0·61	406·47
M.C. 291	Pilbara	Northern Territory Dev. & Pros. Co.	5·51	3·71	3,332·55
M.L. 313, etc.	Pilbara	Crawford Bros.	0·81	0·53	457·15
	Murchison	Ryan, L. F.	0·06	0·05	34·70
			358·35	240·42	(*b*) 208,273·11
		VERMICULITE.			
	East Coolgardie	Jones, R. L.	1·04	....	8·60

References :—O.P.G. denotes Outside Proclaimed Goldfield or Mineral field. (*a*) Value F.O.R. (*b*) Value F.O.B. (*c*) Value at Works. (*d*) Value of mineral recovered. (*e*) Value at Pit Head. (*f*) Only results from shipments finalised during period under review. (*g*) Metallic content calculated on assay basis. (*h*) Value subject to revision. (*i*) Concentrates. (*j*) By-product from Gold Mining.

TABLE VIII.—SHOWING AVERAGE NUMBER OF MEN EMPLOYED ABOVE AND UNDER GROUND IN THE LARGER GOLDMINING COMPANIES OPERATING IN WESTERN AUSTRALIA DURING THE YEARS FROM 1947 to 1956 INCLUSIVE.

COMPANY.	1947.			1948.			1949.			1950.			1951.			1952.			1953.			1954.			1955.			1956.		
	Above.	Under.	Total.	Above.	Under.	Total.	Above.	Under.	Total.	Above.	Under.	Total.	Above.	Under.	Total.	Above.	Under.	Total.	Above.	Under.	Total.	Above.	Under.	Total.	Above.	Under.	Total.	Above.	Under.	Total.
Anglo-Westralian Mng. Pty.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	47	4	51	37	5	42	28	6	34	....	....	....	....	....	....
Boulder Perseverance, Ltd.	195	159	354	185	148	333	171	135	306	173	138	311	115	119	274	151	115	266	155	112	267	152	114	266	171	114	285	181	113	294
Broken Hill Pty. Co., Ltd.	38	95	133	38	84	122	36	73	109	34	68	102	13	12	25	6	....	6	4	....	4	2	....	2	....	....	....	....	....	....
Blue Spec Gold Mines, Ltd.	36	24	60	17	12	29	1	....	1	20	6	26	33	21	54	36	21	57	33	15	48	30	15	45	17	9	26	....	....	....
Big Bell Mines, Ltd.	186	198	384	188	193	381	197	210	407	219	246	465	230	240	470	203	205	408	200	215	415	179	167	346	44	16	60	....	....	....
Burbidge Gold Mines, N.L.	15	4	19	14	4	18	18	4	22	16	4	20	2	....	2	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....
Consolidated Gold Area, N.L.	2	....	2	2	....	2	1	....	1	1	....	1	3	1	4	1	....	1	1	1	2	1	2	3	....	....	....	....	....	....
Comet Gold Mines, Ltd	17	7	24	7	10	17	9	13	22	11	12	23	13	11	24	10	8	18	10	6	16	4	2	6	3	....	3	....	....	....
Central Norseman Gold Corporation, N.L.	111	251	362	117	268	385	133	246	379	163	236	399	148	226	374	151	212	363	155	228	383	158	227	385	166	225	391	159	209	368
Dundas Gold Mines, N.L.	9	22	31	7	17	24	11	15	26	3	9	12	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Emu Gold Mines, Ltd.	36	35	71	9	6	15	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Edna May Amalgamated, N.L.	28	33	61	11	9	20	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Evanston Gold, N.L.	37	26	63	2	....	2	2	....	2	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
First Hit Gold Mine	4	5	9	2	1	3	1	1	2	1	1	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Golden Horseshoe (New), Ltd.	46	....	46	45	....	45	43	....	43	41	....	41	39	....	39	38	....	38	42	....	42	42	....	42	39	....	39	35	....	35
Gold Mines of Kalgoorlie, Ltd.	169	158	327	166	173	339	175	179	354	187	180	367	181	191	372	185	182	367	184	182	366	199	186	385	257	192	449	228	223	451
Great Boulder Pty., Ltd.	325	496	821	316	418	734	312	392	704	327	404	731	311	354	665	344	339	683	349	359	708	342	372	714	350	379	729	349	380	729
†Great Western Consolidated	....	....	....	....	....	....	....	....	....	....	....	....	125	72	197	148	60	208	186	113	299	191	150	341	224	271	441	232	270	502
Hill 50 Gold Mine, N.L.	49	55	104	55	67	122	68	78	146	74	66	140	62	41	103	59	48	107	68	63	131	73	63	136	82	73	155	98	85	183
Kalgoorlie Enterprise, Ltd.	....	118	118	1	105	106	7	103	110	7	95	102	8	85	93	8	93	101	8	98	106	8	89	97	7	101	108	8	100	108
Kalgurli Ore Treatment Co., Ltd.	69	....	69	69	....	69	74	....	74	74	....	74	77	....	77	81	....	81	77	....	77	78	....	78	65	....	65	40	....	40
Lake View and Star, Ltd.	366	468	834	414	465	879	454	441	895	471	476	947	492	517	1,009	486	529	1,015	494	519	1,013	488	498	986	482	487	969	471	523	994
Moonlight Wiluna Gold Mines, Ltd. (Timoni)	18	20	38	13	20	33	18	18	36	33	32	65	42	42	84	42	41	83	39	37	76	42	34	76	39	33	72	37	32	69
Mountain View Gold, N.L.	7	9	16	11	8	19	10	14	24	11	11	22	13	7	20	5	3	8	4	6	10	3	6	9	3	1	4	....	....	....
Mt. Charlotte (Kalgoorlie) Gold Mines, N.L.	2	1	3	18	18	36	24	28	52	10	8	18	2	....	2	2	3	5	3	6	9	3	2	5	....	....	....	....	....	....
North Kalgurli (1912), Ltd.	66	213	279	76	265	341	79	304	383	90	316	406	133	348	481	112	293	405	76	207	283	83	193	276	95	236	331	156	239	395
New Milano, N.L.	2	2	4	2	1	3	1	....	1	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
*Norseman Gold Mines, N.L.	12	19	31	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
New Coolgardie Gold Mines, N.L. (Barbara Leases)	....	....	....	12	9	21	78	64	142	73	125	198	73	120	193	65	109	174	68	108	176	77	95	172	79	95	174	3	24	27
‡New Coolgardie Gold Mines, N.L. (Callion Leases)	....	....	....	....	....	....	....	....	....	....	....	....	6	21	27	6	29	35	7	34	41	9	42	51	8	35	43	37	60	97
Ora Banda Amalgamated, Ltd.	23	44	67	5	4	9	3	1	4	2	....	2	1	....	1	1	....	1	3	2	5	1	2	3	....	2	2	....	....	....
Paringa Mining and Exploration Co., Ltd.	83	117	200	87	134	221	79	134	213	92	138	230	47	46	93	10	6	16	2	2	4	....	....	....	....	....	....	....	....	....
Phoenix Gold Mines, Ltd.	50	30	80	33	22	55	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Porphyry (1939) Gold Mines, Ltd.	2	1	3	18	18	36	24	28	52	10	8	18	6	1	7	1	....	1	3	3	6	2	2	4	....	....	....	....	....	....
Radio Gold Mines	....	....	....	....	....	....	....	....	....	....	....	....	5	3	8	4	4	8	5	5	10	5	5	10	6	6	12	6	6	12
South Kalgurli Consolidated	103	105	208	107	111	218	110	105	215	120	107	227	124	110	234	67	102	169	67	107	174	64	106	170	53	99	152	13	84	97
Sons of Gwalia, Ltd.	108	128	236	98	109	207	92	143	235	104	151	255	121	129	250	121	118	239	102	157	259	102	138	240	102	146	248	105	156	261
Sunshine Reward Amalgamated Leases	8	9	17	9	10	19	9	14	23	10	9	19	10	7	17	9	7	16	8	7	15	8	7	15	7	4	11	8	7	15
Triton Gold Mine	83	178	261	64	95	159	7	....	7	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Wiluna Gold Mines, Ltd.	117	5	122	69	....	69	49	....	49	29	....	29	20	....	20	13	....	13	2	1	3	1	1	2	....	....	....	....	....	....
Yellowdine Gold Development, Ltd.	2	....	2	2	....	2	2	....	2	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
All other Operators	1,175	993	2,168	1,128	972	2,100	966	825	1791	986	837	1,823	883	664	1,547	851	598	1,449	846	523	1,369	734	495	1,229	634	388	1,022	544	407	951
State Average (incl. Diggers)	3,612	4,037	7,649	3,416	3,762	7,178	3,260	3,540	6,800	3,404	3,676	7,080	3,378	3,388	6,766	3,265	3,129	6,394	3,238	3,121	6,359	3,109	3,019	6,128	2,933	2,912	5,845	2,710	2,918	5,628
*Also additional men engaged exclusively on Pyrites Production	78	56	134	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....

* Converted solely to Pyrites production after 1947.

† Including both Copperhead and Frasers Groups for 1955, and also Navoria and Corinthian Groups for 1956.

‡ Includes Bayleys Group for 1956.

By Authority :

ALEX. B. DAVIES
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