Material: *Samples of Lime Sands from Quininup Sand Hill*:—

Lab. No.	1854/31 (1)*	1855/31 (2)*	1856/31 (3)†	1857/31 (4)*	1858/31 (5)†	1859/31 (6)*
Calcium oxide, CaO	39·60	47·67	48·90	47·52	25·44	48·09
equivalent to calcium carbonate, $CaCO_3$	70·66	85·06	87·25	84·79	45·37	85·81
Magnesium oxide, MgO	3·61	3·12	3·27	2·93	1·49	2·88
equivalent to magnesium carbonate, $MgCO_3$	7·56	6·52	6·83	6·14	3·12	6·03
Total carbonate	78·22	91·58	94·08	90·93	48·49	91·84
Phosphoric oxide, P_2O_5	·128	·087	·124	·809	·111	·165

NOTE.—* (1), (2), (4) and (6) from surface to 3 feet.
(6) is an average of 11 samples from surface to 3 feet.
† (3) and (5) from 3 to 6 feet.

Material: *Samples of Lime sands from Busselton.**

Lab. No. ...	3059/31 (1)	3060/31 (2)	3061/31 (3)	3062/31 (4)	3063/31 (5)	3064/31 (6)	3065/31 (7)	3066/31 (8)	1983/31 (9)	1984/31 (10)
Calcium oxide ...	36·30	35·94	37·68	36·74	35·10	35·07	38·70	38·25	37·65	38·91
equivalent to calcium carbonate ...	64·78	64·14	67·24	65·56	62·64	62·58	69·06	68·26	67·20	69·42
Magnesium oxide ...	2·74	2·78	2·70	2·96	2·84	2·77	2·80	2·83	3·204	2·910
equivalent to magnesium carbonate	5·73	5·82	5·65	6·20	5·93	5·79	5·86	5·92	6·70	6·09
Total effective carbonates	70·51	69·96	72·89	71·76	68·57	68·37	74·92	74·18	...	...
Insoluble in acid ...	28·34	28·87	26·45	26·49	29·22	29·71	23·56	23·22	73·90	75·51

*Locations.—(1) to (5) Depth 1 to 4 feet
(6) and (7) Depth 4 to 8 feet } Near Esplanade Hotel ... P_2O_5 trace trace
(8) Beach sand
(9) Opposite Esplanade Hotel.
(10) Near North-West corner of Cemetery.

Material: *Lime Sands from Sand heap near Bunbury Jetty*:—

Lab. No.	1985/31
Calcium oxide	14·82%
equivalent to calcium carbonate	26·45
Magnesium oxide	1·044
equivalent to magnesium carbonate	2·18
Total carbonate	28·63
Phosphoric oxide	trace

Material: *Lime Sands from near Robbs Jetty, Fremantle** :—

Lab. No.	3122/31 (1)	3123/31 (2)	3124/31 (3)
Calcium oxide	23·16	21·51	36·84
equivalent to calcium carbonate	41·33	38·38	65·73
Magnesium oxide	1·35	1·24	2·31
equivalent to magnesium carbonate	2·82	2·59	4·84
Total effective carbonates	44·15	40·97	70·57
Insoluble in acid	54·24	57·13	27·94

*Locations: No. 1.—Opposite Robbs Jetty.
No. 2.—From where sand was taken for making sand bricks.
No. 3.—Three miles south from Robbs Jetty, near bathing shed opposite delicensed hotel.

(Sgd.) EDWARD S. SIMPSON,
Government Mineralogist and Analyst.

5. REPORT ON DISCOVERY OF TIN NINE MILES SOUTH-WEST OF GREENBUSHES.

(T. Blatchford, B.A.)

Geology.

Although the underlying rocks are almost completely covered with a mantle of laterite there are sufficient outcrops and shallow workings to show that the country rock consists of either a granite or a gneiss, through which have intruded typical tin-bearing pegmatite dykes. It would therefore appear that this area is a continuation of the Greenbushes mineral belt. In all cases the rocks were too weathered to examine in detail.

The Occurrence of the Tin.

Apparently tin (*i.e.*, black tin or tin oxide) was found in small pieces, lying at the surface, by J. Donovan, who informed me he was really prospecting for gold, not tin, in the hilly country lying between Nannup and Greenbushes.

The present discovery is in a narrow watercourse running in an east-south-easterly direction.

The prospectors have recovered quite an appreciable amount—224 pounds—from a trench in this watercourse and quite good prospects can still be obtained from shallow shafts sunk deeper in the bottom of this trench.

Following up the tin on the northern bank of the creek by a series of workings in the form of shallow costeens and shafts from 12 to 15 feet deep, the tin has been located for a distance of over 100 yards. I attach a sketch plan* showing the relative positions of the more important of these workings. There were only traces of tin in shaft marked A, but samples taken from B and C yielded 0.76 and 0.05 per cent. of tin oxide respectively.

In shaft C there is a distinct footwall to the tin-bearing material, which dips to the east. This footwall rock is without doubt a gneissic form of granite.

*Plan not published.

The material which carries the tin consists of a very much weathered pegmatite, the width of which has not yet been determined in the northern workings, but appears in the trench in the creek to be at least several feet. The pegmatite is very much weathered but the presence of irregular patches of clear quartz and books of partially weathered muscovite mica must be considered as positive evidence of its nature.

Future Prospects.

At the present time the market for tin stands at about £105 per ton, making the value of tin oxide about ninepence per pound.

Taking the average of the two samples from B and C shafts and the estimate of five pounds per yard recovered from the treated material from the trench, the best return which could be expected would not exceed about 8 shillings per ton.

By puddling and sluicing the weathered product a small profit over working expenses might be made, but when the unoxidised zone is reached and deeper mining becomes necessary there is little doubt that the deposit could not be profitably worked unless the market for tin rose again to an abnormal price.

Mr. Donavan informed me that he could find practically no tin above the trench in the creek and very little immediately below, but at intervals lower down small quantities occur which suggest that there are other tin-bearing pegmatites crossing the watercourse. About 400 yards south of the camp a second party is working on a very narrow vein showing a good prospect of tin but too small to be worked with profit.

Tin has also been "specked" at the surface in several other spots, which indicates that other tin-bearing pegmatites occur which are not exposed at the surface.

Conclusions.

The conclusions to be arrived at from the evidence at present available are that—

1. Tin-bearing pegmatites occur, which are most unlikely to be payable under existing mining conditions and the present price of tin.
2. That there is a probability of the Greenbushes Mineral Belt extending much further south than the present recognised boundaries.

6.—GEOLOGICAL REPORT ON THE ROYAL FLUSH GOLD MINE.

(T. Blatchford, B.A.)

Locality.

The Royal Flush Gold Mine is situated in the Westonia mining area in the Yilgarn Goldfield and lies 70 chains due south of Weston's Reward Gold Mine.

Geology.

The country rocks of the Westonia area comprise the following groups in relative chronological order, commencing with the oldest:—

1. Sedimentary metamorphics (non-auriferous).
2. Massive basic rocks (greenstones), plutonic, auriferous.
3. Gneiss—Edna May Gneiss (intrusive), auriferous.
4. Granite, massive, plutonic, non-auriferous.
5. Ultra acid pegmatites—probably apophyses of the gneiss—lodes—highly auriferous.
6. Basic greenstone dykes, non-auriferous.
7. Quartz reefs, auriferous.
8. Granite intrusive pegmatites, felsites, etc., apophyses of the massive granites of Group 4, non-auriferous.
9. Recent sediments, rarely auriferous.

The rocks of the Royal Flush area consist essentially of the massive basic greenstones, massive granites, quartz reefs (auriferous), apophyses of the massive granites and two minor examples of prototypes of the gneiss, occurring at the Battler and Hill Mines, and possibly unrevealed basic dykes.

The Greenstones (massive).—A careful investigation of the various types of the massive greenstones has reduced the various facies to two main groups:—

(a) Foliated felspar hornblende rocks.

(b) Non felspathic hornblendic rocks.

In the Royal Flush Mine the wall rocks of the lode are composed of the second group and may be classified as hornblende schists. These schists, however, may be found merging into less foliated rock which at times approaches the stage of an epidiorite. The second facies is, however, found in the lease lying to the north of the Royal Flush and closer to the granite where granular felspar quartz amphibolites have been recognised.

Granites (massive and non-auriferous).—This rock type is important in that it has been instrumental in causing both a physical and chemical change in the greenstones—physical in causing foliation, and chemical in probably affecting a mineral alteration of the greenstones, particularly near the contacts with the main mass.

Granite apophyses.—These consist of dykes varying very much both in size and form. Sometimes they occur as very narrow veins less than an inch in thickness, at others they have a thickness of several feet. In composition they vary from fine-grained felsites to coarse-grained pegmatites. These dykes are no doubt off-shoots from the granite and intruded the greenstones, after the lodes were formed. They have no bearing whatever on the gold contents of the lode. When occurring in any appreciable size they may materially diminish the quantity of ore in the stopes, the amount being dependent on the thickness and angle at which they cut through the ore channel.

In the Royal Flush Mine some of the dykes are more or less horizontal, though there is a decided tendency for them to dip to the north-east, *i.e.*, towards the granite. This is what might be expected, also that more dykes of this nature will be found if the mine is developed vertically.

The Lode.—The ore body consists of a lenticular quartz vein which varies from a few inches to several feet in thickness. The vein is continuous at the No. 2 level from near the main shaft for a distance of 232 feet east, but is very small in the eastern face