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

on this level. At the No. 3 level at the western end of the mine a rather large granitic dyke has disturbed the lode and, according to the mine sampling, regular gold values do not commence on the level until a point 126 feet east of the shaft is reached. From that point for a distance of 168 feet the estimated values are 66s. over a width of 60 inches. In the east face of the No. 3 level (340 feet east of the main shaft) the size of the vein is small (3-4 inches only) and the gold values low.

There seems little doubt that the Royal Flush reef continues into the lease lying immediately to the east and continues for a considerable distance in that direction, though I was unable to obtain details as to size, etc., owing to the workings being inaccessible.

What has happened to the reef in the western end of the mine is not so clear. At the No. 2 level the values and apparently the lode have practically cut out near the shaft, and, as already pointed out, the values at the No. 3 level do not become payable until a distance of 126 feet is reached east of the shaft. Faulting in the Westonia field is not uncommon and has usually been associated with the occurrence of granite dykes, *e.g.*, the thrust fault along one of these dykes at the 225 level of the Edna May and Edna May Central mines. In the western end of the Royal Flush Mine I would suggest the possibility of thrusting being induced by the large granite arm lying to the south-east of the main shaft and a movement of the southern end of the lode to the north-west, presumably along the rather extensive granite dyke which crossed the No. 3 level at a point 82 feet east of the main shaft.

The sheared nature of the wall rock at the end of the north-west crosscut, 55 feet east of the main shaft, is further evidence that the main shear zone lies in this direction.

In searching for a continuance of the reef in the west end I would therefore suggest lengthening the crosscut referred to, or the north-west crosscut 65 feet west of the shaft, until at least the sheared zone has been passed through.

Possibilities as regards the permanency of the lode.—When considering this question the main points to observe are the nature of the country and the length and size and value of the lode. As far as can be seen the country rock is definitely foliated and therefore there is every reason for believing that the sheared zone in which the quartz reef occurs, and therefore the quartz also, might continue to a considerable depth. There is little doubt that the lode continues for a considerable length east of the shaft, and there appears to me to be a reasonable chance of eventually finding it extending west.

The occurrence of the granite dykes, as already explained, need not be feared except in that when present they will increase mining costs by diminishing ore reserves.

The intrinsic value of the lode is a more difficult problem. So far 2,305 tons of ore have been reported crushed for a return of 1,027 ozs., valued at £4 1s. 6d. per ounce, with two and a half to three dwts. in the tailings. This is an average of 49s. per ton, which is considerably below the estimate from sampling. In addition to this the tailings dump appears to contain much more than 2,300 tons, which would bring the average still lower. On the other hand the average grade of the stone sent to the battery by the prospectors from the upper levels was very much higher than 49s. Judging from the stopes left open the stone broken by the prospectors was quartz only, whereas the company has taken too much from the walls.

As the discrepancy between estimates and returns is being at present thoroughly investigated by the mine officials no further comment on my part is necessary.

7.—REPORT ON THE WONGAMINE GOLD FIND.

Lands and Surveys Department Lithos 27/80, 27A/40.)

(F. R. Feldtmann.)

Introduction.

Two visits were paid to the Wongamine gold find during the second half of October. At this find 24 prospecting areas had been pegged within an area of about 14 square miles. The main group comprised 14 prospecting areas, including the area applied for as Reward G.M.L. 8PP. The other areas were situated at various distances, up to nearly three miles, from the main group. Owing to the limited time available my examination was confined to the main group of prospecting areas and the immediately surrounding country.

As the exact location of the prospecting areas was uncertain the positions of a number of the stakes were fixed approximately by traverse, and a fairly detailed examination was made of rock outcrops and of the localities from which samples assayed were said to have shown gold. Several samples of likely-looking material were taken for assay.

Location.

The Wongamine gold find is situated about 80 miles from Perth by rail.

The main group of prospecting areas is about 9½ miles north-east of Toodyay and about 14 miles north-west of Northam, as the crow flies. From Northam it is about 16½ miles by road. The road through Northam is said to be better than the shorter road through Toodyay. The Northam-Bolgart road passes about half a mile east of the main group.

The main group of prospecting areas is situated on the Midland Railway Company's subdivisional lots M498, M499, M513, and M39. Other prospecting areas have been taken up on lots M513, M514, M502, and M491.

Topography.

In general, the surface of the district is fairly strongly undulating, markedly so in the neighbourhood of the main group of prospecting areas, where much of the ground is very rough. The hills are not high, but are dissected by steep narrow gullies.

The highest point in the locality appears to be south of the middle of Lot M513, and from it there is a general fall east and south-east, interrupted by the small ridges on which the main group of prospecting areas is situated. The area is drained by two main creeks which run through Lot M499 in an easterly direction.