THE ALBERTON GOLDFIELD

Ever since 1883 when gold was first produced at Alberton, it has been confidently expected that this field would develop into Tasmania's foremost gold producer, but although many small rich shoots in a number of vein systems have been worked, this promise has never been fulfilled. However, this is probably due to the weak policy of development undertaken by the operating companies and in a field such as this, a strong developmental policy should be more important than the immediate stoping of rich shoots.

In 1883, Thureau wrote his first report on the field and since then, at intervals of ten years or so, it has been visited by many geologists. It is many years now since much active mining has been carried on, and, in the meantime adits have fallen in, workings collapsed and filled with water, outcrops and dumps have been concealed by heavy growths of blackberries and bracken and men's minds have become hazy and over-optimistic in estimation of gold values. In this report, therefore, I do not propose to give a detailed account of individual workings. This has been done before when they were far more accessible. Rather would I attempt to advance some theories of the origin of the mineralization and the possible location of future payable deposits.

It may be worth while, at this stage to place on record a list of previous reports on the field.

Mt. Victoria Goldfield	-	G. Thureau,	1883.
Mt. Victoria....Goldfield	-	do.	1884.
North Mt. Victoria Goldfield	-	W.H. Twelvetrees,	1900.
Mt. Victoria Goldfield	-	do.	1904.
Mt. Victoria Goldfield	-	L. Hills	1923.

Typewritten Reports by various authors on individual mines (Ringarooma, Mercury, Forest King etc.) from 1923 to 1933.

In 1933, Messrs. Nye and Blake, made a careful survey of all the main lodes and workings and prepared a series of maps showing these. This has saved a great deal of time in actual survey and the small amount of development work since then, mainly at the Long Struggle, Mt. Victoria and New River Mines has been added to these plans. No report however, was prepared in connection with their examination.

The host rocks of the quartz veins are a Lower Palaeozoic Series of quartzites, slates, shales and possible tuffs, several thousand feet in thickness referable to the Mathinna Series. It is often difficult to denote a rock type name to individual beds; there are beds of definite hard blue quartzites and there are beds of very fissile dark blue to black slates, but the majority of the beds are composed of rocks somewhere between these two types and they may be called arenaceous slates or argillaceous quartzites depending on the competency of the original facies. No fossils have been located on these rocks and individual beds are often but a few feet in thickness so that the series cannot be sub-divided nor can marker beds be determined. Ofter cleavage and jointing mask the original bedding planes.

2.

The structure of these rocks is not simple. They form the Western Limb of an anticline striking at 340°. However, this has subsequently been subjected to cross folding due to some force from the south-east, giving the effect of a variably plunging anticline. Excellent sections of this can be seen in cuttings along the new Pyengana Road and in the lower adit of the Mercury Mine, where in a couple of hundred feet, the strike of the bedding alters by 90°. The cleavage, on the other hand is remarkably constant over the entire area, striking at about 340° and although usually vertical, occasionally dipping to the West at high angles. The axis of the anticline is parallel to this cleavage. Minor folding, on the limbs of the major anticline, is common and, in the Wilson Adit, may be seen good examples of bedding, between slates and quartzites, dipping both ways in a distance of only 50 feet. Jointing and minor faulting is very prevalent but most of the faulting is pre-mineral and will be discussed in relation to the vein systems.

It is possible to see but little of the original productive lodes. Nothing, of course, can be seen below water level and in most cases where stoping has taken place, it is either filled or fallen in. Nevertheless, from old reports and the limited inspection available, a picture of these lodes may be pieced together.

These veins then, consist mainly of quartz, sometimes very massive, sometimes showing well-developed crystals. Although occasionally white, the quartz is often coloured blue by the presence of fine-grained metallic sulphides, principally arsenopyrite. Sometimes these sulphides are sufficiently coarse to be identified in hand specimens. These lodes are often contained between well defined walls but frequently it can be seen that one wall, usually the hanging wall, is much better developed than the other. They (the veins) vary in width from an inch to several feet and the wider ones often contain inclusions of country rock, principally black slate, showing that the original openings have been widened by the force of crystallization of the quartz. This quartz, although generally confined to fissures, sometimes is found penetrating the country rock beyond the defined walls in the form of stringers and bunches and, often, as in the Long Struggle Lower Adit, between the Long Struggle and Caxton Reefs, much of the country rock (hard blue quartzite) has been replaced by white quartz; this however, is not usual. The quartz in the fissures is often accompanied by a few inches of fault gouge. The lode sometimes ends by the feathering out into a mass of tiny veins, sometimes it pinches to a single thread.

The quartz reefs occur in a narrow zone of some 50 chains in width which extends southward (on a bearing of 160°) from the alluvium bounding the New River to join with the neighbouring field of Dan Rivulet. This does not mean that no gold bearing formations extend outside this zone (Heathorn's Mine for example, is well outside it) but only here is there any concentration of reefs. In other words the structure is such that the maximum number of openings, faults etc., occurred in this zone of weakness. It is a shear zone located on the Western Limb of a large

anticline of similar strike. The force necessary to form such openings operated from a cardinal direction so that the openings so formed and hence the majority of reefs are either in a north-easterly or north-westerly direction and they have steep dips either way. The greatest concentrations of these openings are located at places where the cross-folding is most intense. Tensional openings are rare but do occur, as at the Esk, where an East-West Reef of very dense white quartz has been driven on.

The source of the gold is the granite magma lying beneath and intruding the host rocks. Portion of this magma may be seen outcropping to the south-east towards Pyengana. It is a granodiorite described in my report on the Dan Rivulet Goldfield and should not be confused with the more normal granite which is the source of tin and which outcrops not far to the North-east of this field. To the West, in the Trenah District are large outcrops of a third type of granite. This is a coarse grained rock consisting essentially of quartz, microperthite, microcline and biotite with subsidiary crystals of albite and muscovite. Visible chalcopyrite occurs in aggregates, and in section may be seen in veins along crystal boundaries and penetrating cleavage cracks. These veins are associated with Kaolinisation and sericitisation of the felspars and are, therefore, of hydrothermal origin.

In the location of ore shoots in this series of reefs, the actual size of the quartz lode does not seem to be the fundamental factor. Thus at changes of dip or strike or at the intersection of two veins the width of the quartz may be greater but just as much gold may be obtained per vertical foot from a vein a few inches wide as from one several feet. In the Rich Youth, for instance, an inch width of quartz yielded for a depth of 5 feet gold to the amount of 1½ oz. per pound. However, the wider the vein, the more likely it is to be persistent and the easier to follow in developmental work. In the past, ore shoots have been reckoned, not on the width of the reef or the amount of sulphide minerals present or even on the gold assay, but on the amount of free gold present and this because only the free gold was recovered, although in places the sulphides contain quite an amount of gold. This gold is of two generations; that accompanying and included in the sulphides which was contemporaneous with the quartz and a later influx of free gold from solutions which found their way up pre-existing fracture zones by means of some later re-opening of these. The source of the gold seems to be at depth and to the south, and the ore-shoots normally dip to the south. It should be noted that the lodes have been injected into fault fissures and sometimes much of the original fault gouge remains. Thus when two of these fissures intersect, the gouge may act as an impounding structure and prevent the migration of the gold solutions into the second channel way. So vein intersections are not always favourable locations for rich shoots. Sometimes the two directions of opening (i.e. North-east and North-west) lead one into the other. At first sight it may appear that it is one direction of reef displaced by a fault at right angles,

4.

but both of these directions of movement are contemporaneous and both are mineralised. This gives the effect of a zig-zag reef, as the Rosalind. No post-mineral faulting of any magnitude has been observed and the veins are rarely displaced more than a few feet.

It has frequently been considered that most of the gold obtained in this and other Tasmanian fields is the result of secondary enrichment. That is, the solution of the original gold content of the reefs by descending waters and its re-precipitation and concentration at the permanent water table with the help of metallic sulphides. However, there is no evidence of this and chemically it seems a most unlikely occurrence. Certainly most of the rich pockets of ore have been found near the surface and deteriorate in value at depth but this is only to be expected where the majority of gold shoots are short and no serious investigations at depth have been attempted. The only "secondary enrichment" is that formed by the oxidation of the sulphide minerals so that they have broken down and yielded their contained gold. This is not a major process and the original sulphide minerals may be seen quite close to the surface.

Alluvial Gold.

From the base of the Permian below Mt. Victoria to the alluvial flats bordering New and Dorset Rivers is a difference of height of over a thousand feet and much of the original rock between these two levels has been eroded away. This rock must have contained many reefs carrying rich gold values and this gold must have been concentrated in the alluvium round these two rivers as well as along minor cracks. Boring has revealed a Tertiary Deep Lead near New River and in the past fairly shallow workings in Recent alluvium are stated to have yielded good gold returns.

A summary of points made in this report shows:-

1. The area occupied by the majority of reefs is about fifty chains in width and extends south from the New River Alluvium through to Mathinna. This is a shear zone striking at 160° and located on the Western limb of a major anticline and roughly parallel to its axis.

2. The quartz reefs are mainly of the fault fissure type and strike either North-west or North-east. Sometimes the same reef will continue through openings in both these directions giving a zig-zag course.

3. The greatest intensity of the quartz reefs is where the cross folding is most pronounced, i.e. in the vicinity of the Forest King - Ringarooma, the Mercury - Long Struggle - Mt. Victoria, and the Central - New River systems of Reefs.

4. Post-mineral faulting is of no great magnitude.

5. The reefs are mainly quartz carrying fine gold and gold contained in sulphide minerals.

6. This gold is of two generations, that in the

5.

sulphides and a later intrusion of free gold.

7. The character of the country rock does not seem to have influenced the precipitation of the gold as shoots are found in hard quartzite and fissile slate.

8. Surface enrichment has not taken place but sometimes due to the weathering of the sulphide minerals near the surface and their break down, the gold contained in these is liberated and the amount of easily obtainable free gold is increased.

9. The ore shoots are not as a rule large and often the bottom of a shoot is located near the present surface; but they are very numerous.

10. The ore shoots normally dip to the south.

11. The value of the shoots is not governed by the width of quartz but they can be better located in well defined lodes.

12. In any mining operations, a vigorous policy of driving and cross-cutting should keep well ahead of stoping so that neighbouring shoots may be defined.

13. The ultimate depth of the gold bearing quartz should be at least a couple of thousand feet as the granite should underlie this area at a great depth. Mining operations to date have rarely been carried to three hundred feet below the outcrop.

14. Any policy of development should aim at -
(a) The limiting of ore-shoots already known, such as the one on the Rosalind Lode cut by the shaft from the lower Ringarooma Mine Adit and the one on the Mercury Lode cut by the lower winze; both of these workings are stated to be in payable gold,

(b) The location of new shoots in existing reefs by drilling south of the workings on the Long Struggle, Mercury, Ringarooma, Forest King or Victoria systems of reefs and at a greater depth than these workings. The sites of any possible drills should be carefully chosen and surveyed.

15. Large areas of alluvial ground, both Tertiary Leads and more shallow Recent deposits should contain alluvial gold in payable amounts and would be worth investigating.

(Sgd.) Terence D. Hughes

GEOLOGIST

Department of Mines,
HOBART.
24.6.52.