

THE WATERHOUSE (OR LYNDBURST) GOLDFIELD.By F. BlakeContents.

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THE WATERHOUSE (OR LYDHURST) GOLDFIELD
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I. INTRODUCTION.

The examination of the Waterhouse Goldfield was undertaken in March, 1934. Surveys of the reefs and workings where they could be traced on the surface, were carried out with chain and compass, and connections made to the corners of mineral sections.

A great disadvantage to the field work was the fact that, the mines having been abandoned for many years, the workings were either waterlogged or had subsided and were inaccessible for inspection. In addition, no underground plans of the mines were available and only scraps of information could be gleaned from previous reports.

The following plans, as compiled from the surveys, are appended :-

Waterhouse Goldfield,	Lyndhurst Area	(North)
"	"	"
"	"	(South)
	Southern Cross Area	

II. PREVIOUS LITERATURE.

The following list includes all Departmental publications relating to mining activities within the area :-

- (1) Charles Gould: Geological Surveyor's Report on part of County of Dorset. 18th July, 1864. (House of Assembly Paper No. 46. Legislative Council Paper No. 39).
- (2) Charles Gould: Gold at Waterhouse. 26th July, 1869. (House of Assembly and Legislative Council Papers No. 20).
- (3) G. Thureau: Report on Gladstone, Mussel Roe and Waterhouse. October, 1881. (House of Assembly Paper No. 127. Legislative Council Paper No. 105).

III. HISTORY.

This field was one of the earliest discovered in the State, being found in the early sixties, worked in the late sixties and first abandoned by 1873, all machinery including batteries being removed. Revivals of mining were attempted in 1877, 1881, 1887 and 1891 but only a small amount of development took place. It is doubtful if any extensive work has since been undertaken, although sections covering different parts of the field were acquired in the years 1894, 1899, 1906-08 and again in 1911.

The principal reefs including Pioneer, Railway, Alliance, Southern Cross and North Southern Cross were all discovered in the earliest period, but they were only tested to shallow depths, the deepest recorded shaft (the Pioneer) being little over 100 feet in depth.

The lack of sufficient capital to provide adequate pumping machinery for deep shaft sinking, in a low

lying area saturated with large quantities of water, appears to have assisted in the early desertion of the field. It was probably the unpayable nature of the quartz that was the main factor but a contributing influence is stated to have been the absence of suitable plant for the recovery of gold from the large percentage of sulphides - iron and arsenical pyrite - which developed at shallow depths. The gold was worth approximately £3 per ounce.

IV. LOCATION AND ACCESS

This goldfield is situated in the north-eastern part of the State near the north coast 8 miles south-west of Waterhouse Point and $3\frac{1}{2}$ miles east of the north-eastern shore of Anderson Bay; in the vicinity of the abandoned town reserve of Lyndhurst.

Access is gained by way of the Scottsdale-Forester road north-easterly for a distance of 8 miles, thence northerly along the Waterhouse road for another 14 miles to Lyndhurst, the last 5 miles being little more than a cart track. Scottsdale is connected to the remainder of the State by motor roads and also by the Government railway system.

V. TOPOGRAPHY

The topography of the area is one of low relief, being represented by an undulating coastal plain, varying in height at the goldfield from 75 to 200 feet above sea level. The plain extends 2 miles further east where the foot hills of White Rock Tier commence to rise. Sand dunes fringe the shore line of Anderson Bay, to the west, and in places attain a height of over 100 feet. Northerly, in the direction of Waterhouse Point, isolated hills rise above the plain, the highest being 375 feet at Waterhouse Trig. Station.

The district is drained by Sheepwash Creek, the only permanent stream, which rises at Little Mt. Horror and flows north-westerly to form a large fresh water lagoon behind the sand dunes, 2 miles north of Lyndhurst.

VI. GEOLOGY

Silurian. The oldest rocks within the district are the quartzites and slates of the Silurian system. Quartzites occur to a much greater extent than the slates, which are only occasionally visible. They form the bedrock of the district west of White Rock Tier except where small extensions of granite occur. Owing to coverings of upper Tertiary to recent sediments, however, they do not occupy a large proportion of the surface. The rocks have a general north-east and south-west strike but owing to the paucity of exposures, the structure was not determined throughout the field. In the Southern Cross

region, south of Lyndhurst, strike and dip observations suggest that the rocks are closely folded in a series of anticlines and synclines with north-easterly axes. There is no direct evidence of the age of these rocks but from general structural and lithological considerations, they are correlated with the Mathinna series in north-eastern Tasmania and regarded as being of Silurian age.

Devonian Granite. Granite occupies only a small proportion of the area in the immediate vicinity of the goldfield, but it has considerable extent to the east (White Rock Tier) and south (Great Forester River to Mt. Maurice), forming the western portion of the batholith of north-eastern Tasmania. An isolated outcrop occurs $\frac{1}{4}$ of a mile to the south-east of Lyndhurst but this is probably joined to the White Rock Tier mass, with which it is certainly joined at depth.

The granite is a coarse grained type with porphyritic feldspars consisting essentially of plagioclase with subordinate orthoclase, quartz and biotite.

In common with other granites in Tasmania, this granite is regarded as belonging to the Devonian igneous intrusions.

Tertiary Basalt. At least two small areas of basalt occur to the north of Lyndhurst. One is vesicular and situated at Croppies Point, the north-eastern extremity of Anderson Bay. The other occurs two miles south-west of Waterhouse Point and extends north-westerly to the coast. Both appear to be surface flows and are similar to other Tertiary basalts in Tasmania.

Upper Tertiary or Pleistocene Sediments. The surface of the coastal plain extending easterly from Anderson Bay to White Rock Tier is largely composed of sands and gravels. These sediments are almost certainly of marine origin and were probably laid down during the Pleistocene age.

Recent. Sand deposits in the form of coastal dunes extend along the shore of Anderson Bay up to one mile in width and attain a height of over 100 feet. Peat deposits covering several marshy areas scattered throughout the district are of recent origin.

VII. ECONOMIC GEOLOGY

The mineral deposits of the Waterhouse area consist of auriferous veins of reef quartz traversing the quartzites and slates. The typical quartz below the surface is a fine grained and dense, semi-vitreous type of blue-grey colour. Banding is sometimes visible and is probably due to the relative distribution of sulphides. At the surface it is often milky white in appearance. Arsenopyrite and pyrite, in that order of abundance, are the most common of the sulphides and occur in quantity below shallow depths in most of the veins. Galena and sphalerite are also present in small amounts.

Evidence of the excessively high sulphide content of at least one of the veins is shown from a report concerning the Alliance reef, viz., 53 $\frac{1}{2}$ tons of crude ore yielded 35% of pyritic concentrates.

That a large proportion of the gold is associated

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with the sulphides is proved by the treatment of these concentrates which yielded over $1\frac{1}{2}$ oz. per ton.

Evidence regarding the proportion of gold and silver in the reefs is meagre, but it is reported that a parcel of ore from the Pioneer reef, weighing $3\frac{1}{2}$ cwts., yielded at the rate of $3\frac{1}{2}$ oz. gold and 12 oz. silver per ton.

The quartz reefs are of the high temperature type as is evident from their arsenopyrite content and their position in relation to the granite.

The gold bearing veins are found in two narrow north-east trending belts to the south-west (Lyndhurst Area) and south (Southern Cross Area) of Lyndhurst respectively. This may be due to the fact that it is in these belts that the Silurian rocks outcrop, being covered by sands and gravels in adjacent areas. However, other areas four miles to the south are occupied by quartzites and slates in which quartz reefs are unknown, so it would appear that the above belts were favourable for the formation of gold bearing veins. This would probably be due to the trend of the granite on the eastern side of the belts or to the configuration of the underlying granite.

The quartz veins throughout the field vary in width from a few inches up to six feet and in length from 20 feet to 1,200 feet. However, one non-auriferous vein on the eastern side of the field probably exceeds 7,000 feet in length.

The principal reefs, including Railway, Alliance Pioneer, Southern Cross and North Southern Cross, strike in a general north-easterly direction in conformity with the trend of the country rocks. The last named reef varies slightly from the others in that it is only a few degrees east of north. A few short and unimportant veins in both belts strike to the north and also north-west, and the large and persistent non-auriferous vein on the eastern side of the area trends north-westerly.

The dips of the veins show a slight variation but conform in general to the dip of the enclosing quartzites, etc. In the Lyndhurst Area they dip to the north-west at angles varying from 45° to 80° . Along the Southern Cross Area the Southern Cross veins dip to the south-east at 50° to 65° and those at the North Southern Cross from 35° to 80° towards the north-west.

In the Southern Cross Area, where a series of anticlines and synclines is suggested by the strike and dip of the strata, the gold bearing veins appear to have been formed along and generally parallel to the axes of the anticlines.

VIII. THE MINES.

(1) Lyndhurst Area

This area includes several old workings and extends from the Railway in the south-west through the Alliance and Pioneer to the Martial Call in the north-east, near the west boundary of Lyndhurst town reserve.

The following plans illustrating the surface workings refer to this area:-

Lyndhurst Area (North).
" " (South).

Railway Mine. The old workings known as the Railway are situated on abandoned mineral sections 795/G, 794/G, 677/G and 1037/G. The reefs on this property were discovered in 1870 and the first prospecting lease taken up by John Cornish and others and this was shortly afterwards controlled by the Alliance Gold Mining Company. Prospecting was carried out on several reefs and one - the Railway - was mined to shallow depths. Prospecting became active again in 1881, and in 1888 a limited amount of mining was done by the Waterhouse Quartz and Pyrites Prospecting Association. In 1908 the property was held by the New Alliance Gold Mining Company when it is probable some further work was undertaken.

The Railway reef is located in the south-west of section 795/G. The workings consist of a line of shallow prospecting trenches and shaft, together with surface stopes, bearing in a north-easterly direction over a length of 160 feet. The reef is poorly exposed in the northerly stope and trench where it varies in width from one to six feet and dips to the north-west at 67° . At this point it makes an acute angle with the enclosing country rock. Twenty five feet west of the stopes a vertical timbered shaft was sunk with the evident intention of cutting the reef at approximately 60 feet on the underlay. Water now fills the shaft to within 17 feet of the surface. Sandstone, with a total absence of quartz, occurs on the dump at the collar of this shaft and there is no evidence to show that the reef was reached.

In 1881 the Waterhouse Quartz and Pyrites Prospecting Association forwarded 10 cwts. of quartz from the Railway reef to Victoria for treatment, where it yielded gold at the rate of 1 oz. 16 gr. per ton.

Seven chains north-east of the Railway workings in the southern part of section 794/G, a quartz reef, striking north-north-easterly and dipping at 45° to the north west, has been cut in a line of trenches and a prospecting shaft. The reef varies in width from 3 to 24 inches and in places shows a little arsenopyrite, pyrite and galena in blue-grey, semi-vitreous quartz.

In the western part of section 677/G, at a distance of 6 chains west of the Railway shaft, two trenches and a shallow pit reveal the top of a quartz reef. The latter approximates 2 feet in width and at the southern end dips to the north-west at 45° .

Four and a half chains further to the north-west, outside section 677/G, a parallel vein, up to 12 inches wide, is exposed in two prospecting trenches. A vertical shaft west of the northernmost trench, suggests that the vein dips to the west and that an attempt has been made to cut the vein on the underlay. This shaft is waterlogged to within 6 feet of the surface.

New Monarch Prospect. These workings are situated in section 655/G. They consist of trenches and prospecting shafts sunk on two short reefs by the New Monarch Prospecting Association about 1870. The eastern reef occurs near the south boundary of section 656/G and trends north-north-westerly over a length of 50 feet. It varies in width from four inches up to four feet and dips to the west at 35° . The other reef is eight chains to the

north-west and quartz on the dumps of a shallow trench and shaft suggests a reef striking due north over a length of fifty feet. Some of the quartz shows a little arsenopyrite.

Hope Prospect. Numerous trenches about the south boundary of section 965/G are the results of work done by Hope Prospecting Association in the early period of the field. Nothing of importance appears to have been exposed, but the presence of three to four erratic veins is indicated by broken quartz in some of the excavations.

Alliance Mine. This mine is located in the south-east part of section 512/G. The Alliance reef was found and prospected about 1870 by the discoverers of the Railway reef and the work was later extended by the Alliance Gold Mining Company. In 1887 the Waterhouse Quartz and Pyrites Prospecting Association carried out mining development and acquired the crushing machinery formerly owned by the Royal Sovereign Gold Mining Company in the Southern Cross Area. In the following year the mine manager reported that -

"In the old underlay shaft a level had been driven at a depth of 25 feet, the stone being cut at both ends, a distance of nearly 60 feet, and had been stoped nearly to the surface. Driving north and south the reef was in view about 11 feet deep, and of an average thickness of nine inches, very heavily charged with mineral. At a depth of 39 feet in the old whim shaft a cross-cut had been driven east 30 feet, cutting through the reef eight feet from the shaft, and extending 22 feet into the foot-wall. The reef was one foot thick where cut, and nearly two thirds of it mineral. In driving between the shafts it was found the stone had pinched to two or three inches, with walls hard, but stone still full of pyrites. After getting a few feet north of the underlay shaft the stone opened out to nine inches, and in parts was nearly all pyrites."

About this period (1888), a parcel of ore, sent away for treatment by various processes, returned the following yields:-

	<u>oz.</u>	<u>dwt.</u>	<u>gr.</u>
53 $\frac{1}{2}$ tons ore by battery (quicksilvered copper plates).	10	15	16
18 tons 11 cwts. pyritic concentrates from above ore (principally chlorine and amalgamation).	30	17	0
	<hr/>		
	Total 41.	12.	16.
	<hr/> <hr/>		

The above result proved that the ore from this reef could not be treated by the usual battery and quick-silvered plates in vogue at the time, since the bulk of the gold escaped with the pyrites, etc., in the tailings. In 1889, the original capital,

comprising 12,000 shares at 5/- per share, was increased with the object of installing a chlorination plant to deal with the ore. For some unknown reason this intention was not carried out and operations were suspended in 1890.

In 1909, the area covering the Alliance reef was held by the New Alliance Gold Mining Company but it is doubtful if any extensive development took place.

The Alliance reef is situated in the south-east part of section 512/G. It is indicated at the northern end by a line of surface workings trending in a north-easterly direction over a length of 50 feet. The reef is nowhere visible owing to caving of the workings. Two vertical shafts of unknown depth are located to the south-west at 15 feet and 100 feet respectively west of the general line of the reef. The latter was evidently the main shaft and, from its position with relation to the surface workings, it is apparent that the reef dipped to the west. Several tons of grey semi-vitreous quartz, highly mineralised with arsenopyrite and pyrite are stacked near the main shaft and suggest that the reef was cut in these workings. An assay of a general bulk sample from this dump returned 9 dwts. gold and 14 dwts. 6 grs. silver per ton.

Six chains to the north of Alliance workings, about the south boundary of section 966/G, numerous prospecting trenches have been excavated. These have failed to locate any possible northern extension of Alliance reef, but quartz on some of the dumps suggests the presence of at least two minor veins.

Pioneer Mine. The Pioneer was the first gold bearing reef found in the Waterhouse district. Prospecting operations were commenced in 1869 when a prospecting claim was acquired in the names of T.G. Williams, R.J. Richardson, H. Struss and H. Fencker. The United Victorian and Tasmanian Quartz Mining Company was then formed and mining operations commenced, in conjunction with the erection of a crushing plant. However, by June 1873, mining had ceased and the machinery had been removed. Although the claim was taken up in 1877 by the United Lyndhurst Gold Mining Company, and again in 1881 by individuals, it is doubtful if much further progress was achieved. The area was last held under lease in 1907 by John Wren.

After an inspection of the area in 1869, Charles Gould reported that -

"The Pioneer reef has not yet been struck in either of the shafts north and south of the Prospectors claim. In the latter the reef has been cut at one point: the cap on the surface measures about twelve feet in breadth, the thickness of the reef at thirty feet along the underlay is three feet, the underlay is west; the quartz is ruboly on the surface and for some distance downwards but appears to be getting solid in depth.

The gold is most abundant in ferruginous veins extending through the body of the reef and along the casing of the hanging walls, it is associated with galena, iron pyrites and arsenical pyrites, and seems to be especially abundant in black chert like, honey comby stone, which has been followed with good gold in it to the lowest point reached in the underlay shaft. The sample lately crushed consisted, as I am informed by the prospectors, of nearly sixteen hundred weight of picked stone, and four hundred weight of stone taken by chance from the heap: yielded nearly thirty ounces, valued by the assayer of the Bank of Australasia at two pounds nineteen shillings and nine pence per ounce. The stone extracted, amounting to one hundred and twenty tons, appears to contain a fair proportion of gold, and is variously estimated to hold from three to five ounces of gold per ton; a small parcel of non-selected stone, amounting to $3\frac{1}{2}$ cwts. previously transmitted to Melbourne having yielded at the rate of $3\frac{1}{2}$ oz. of gold per ton, valued at £3.2s. per oz. in addition to 12 oz. of silver per ton. "

In 1881, when G. Thureau visited the field, the Pioneer shaft was over 100 feet in depth.

The workings on Pioneer reef are located in the western half of section 959/G. At the surface they consist of open cuts or collapsed stopes and shafts, etc., along a curved north-east trending line over a distance of 300 feet. West of this line several vertical shafts have been sunk, indicating that the reef dips to the west. What appears to be the main Pioneer shaft is located about the centre of the line of workings and 35 feet to the west. In all probability this is the shaft referred to by Thureau as being over 100 feet in depth. The reef was evidently reached at this point as indicated by a large quartz dump at the collar. The quartz varies from dense milky white to grey and vitreous, with a little included arsenopyrite. A representative bulk sample from the dump when assayed showed an absence of gold and silver. In the vicinity of the old battery site, at a distance of three chains west of main shaft, an adit has been driven in an easterly direction. Water from the approach channel leads to a dam and it seems likely that the adit was used for drainage purposes and to obtain water for the battery.

Over a distance of 45 chains north-easterly from the Pioneer workings, much prospecting in the form of trenches and shallow shafts is evidence of the search for either an extension of Pioneer reef or other possible gold bearing veins, but with little apparent success.

Martial Call Workings. These are situated in the eastern half of section 959/G and consist of numerous trenches and caved shafts at intervals over a distance of 10 chains in a general north-east trending zone. This work, undertaken during the early years of the field did not get past the

prospecting stage. No well defined reef is now showing although erratic veinlets and bunches of quartz are visible in places and in others quartz is showing on the spoil dumps. The evidence suggests the presence of three separate north-east coursing reefs as indicated on the plan. A composite sample of quartz from the various dumps along these workings yielded on assay, a result of 19 gr. of gold and 6 gr. of silver per ton. Thus the quartz is gold bearing but little can be said of the general value, width, length, etc., of the reefs.

(2) Southern Cross Area.

This area is located two miles south-east of the Lyndhurst Area and $1\frac{1}{2}$ miles south of Lyndhurst town reserve.

From south to north the principal workings comprise the Southern Cross and the North Southern Cross. These together with the disposition of the reefs are shown on the appropriate plan - Waterhouse Goldfield, Southern Cross Area.

No underground details, production figures, etc., are available for the reefs in this area.

Southern Cross Mine. The original Southern Cross prospecting claim was taken up in 1870 by George Westwood and it is assumed that he discovered and prospected the reefs in this vicinity. It was not until 1878 when the Southern Cross Gold Mining Company was formed that any serious attempt was made to mine the ore. In the following year the company found it necessary to increase its capital, but difficulties arose and it was wound up in February 1880. In August 1881, the Royal Sovereign Gold Mining Company, with a paid up capital of £10,000, was registered with the object of working the reefs at the Southern Cross in conjunction with those on the adjoining claim to the north, known as North Southern Cross. A battery of eight heads was erected and arrangements made to resume mining. However, success was not attained and by 1883 all work had ceased. The battery was taken over in 1887 by the Waterhouse Quartz and Pyrites Prospecting Association which was then interested in the Alliance Mine. The Southern Cross claims have since been leased to individuals at different periods, namely 1891, 1894, 1906 and 1911, but with little further development.

The greater part of Southern Cross workings are located on section 1028/G but they also extend north-east into 1027/G and south-west into 512/G. The principal reefs consist of two parallel veins trending north-easterly. The western reef, located in the south-west of section 1028/G has been mined to the greater extent. It is indicated at surface by a line of stopes, underlay shafts and trenches over a distance of 650 feet. The stopes are confined to the central portion of the reef where they extend for a length of 270 feet. The reef is said to have been stoped out from the 100 feet level to surface, but no confirmation of this statement is available. The lode is now only visible for a few feet near the surface in one of the stopes, where quartz, 7 inches in width, dips at 58° to the south-east. Two vertical shafts, 25 feet and 100 feet respectively intersect the reef at depths of approximately 50 feet and 200 feet.

The eastern reef is 3 chains distant to the east and, although surface openings are located along a line 1,200 feet in length, the continuity is broken and the reef has not been proved to exist throughout that distance. At the southern end the reef has been stoped from surface down to shallow depths in two places over short distances, but for the remainder of its length the workings are little more than of a prospecting nature. The northern extension of the vein is exposed in the north-east of section 1028/G in trenches, open cuts and underlay shafts. It varies in width from 8 inches to 30 inches and dips to the south-east at angles varying from 47° to 65° . A vertical shaft is sited 50 feet east of the reef and a quartz dump near the collar suggests that the lode was here intersected.

In the south of sections 352/G and 1027/G intensive prospecting, as indicated on the plan, has failed to reveal anything of economic consequence although attempts have been made to mine several short and erratic veins which carry a little gold in places.

North Southern Cross. These workings, known as the North Southern Cross, are situated on section 55/G and in the northern half of 1027/G, immediately north of the Southern Cross Mine. The quartz reefs were probably discovered shortly after those on the Southern Cross in 1870 on the No. 1 North prospecting lease of 22 acres held by R. Dunne and J. Parker. Prospecting became active again in 1878 when the North Southern Cross Gold Mining Company was formed. Further work was carried out in 1881 by the Royal Sovereign Gold Mining Company and the area has since been held at intervals by various individuals.

The workings consist of prospecting shafts, trenches and stopes along a line bearing east of north and west of south over a distance of 900 feet. Quartz occurs on the dumps of the greater number of the openings and suggests the presence of possibly five veins at the southern end. In the north one vein only has been uncovered as indicated by three short lengths of surface stopes on the north side of Scottsdale-Waterhouse track. The assay results of a general sample taken from the dump of the middle stope showed no gold or silver.

IX. CONCLUSION

The survey has shown that the gold deposits of the Waterhouse district consist of quartz veins contained in quartzites and slates. The latter are intruded by granite from which the veins are derived.

The veins occur in two adjacent north-east trending belts of country to the west and south of Lyndhurst town reserve respectively. This association may be purely accidental due to the covering of the bedrock by later sands and gravels in adjacent areas but there is a possibility of some structural significance.

The veins are of the quartz arsenopyrite gold type and represent high temperature deposits which agrees with their closeness to the intrusive granite. The quality of the gold is not good being largely exceeded by the silver content.

The gold bearing reefs in both belts are generally similar in strike. In the southern area the strike appears to closely follow folding in the enclosing rocks along anticlinal axes. Here also the reefs dip in general conformity with the limbs of the anticlines.

The field contains several old mines which were not successfully operated but of which little detail can now be obtained. The reefs were worked in places to a possible maximum depth of 100 feet from surface and, although rich shoots of ore were found at surface, the sulphide zone was reached at shallow depths and values decreased.

The known reefs do not appear to offer favourable possibilities for future operations. Owing to the covering of bedrock by superficial deposits in adjacent areas, the chance of disclosing hitherto undiscovered reefs in the vicinity are remote.

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22nd July, 1947.