

Bay, this there is good authority for stating is not a fact. Whilst owing to the bad nature of the surface even carting to the Robinson landing will be always expensive and quite impossible in the wet season, whilst the river below the landing is so full

of banks that a 4-ton boat can only attempt the passage twice a month on the spring tides."

The following are the results of assays of six samples from this district made in the Departmental Laboratory:—

Locality.			Class of Ore.			Copper.	Lead.	Zinc.	Silver per ton.			Gold per ton.
						per cent.	per cent.	per cent.	ozs.	dwt.	grs.	grs.
Narlarla North Shaft	...	...	Oxide	...	...	4.43	42.39	4.47	4	8	14	3
Do. do.	...	...	Sulphide	...	...	42	13.94	40.83	3	7	0	Nil
Do. South Shaft	...	...	Transition	...	...	52	39.66	1.34	5	1	6	Trace
Grant's Reward	...	...	Oxide	...	...	34.63	.72	?	0	4	22	20
Do.	...	...	do.	...	...	23.22	Nil	?	0	1	15	20
Wilson's Reward	...	...	do.	...	...	37.58	Nil	?	0	11	10	20

CUE, DAY DAWN, AND CUDDINGWARRA.

A more or less detailed Geological Survey of Cue, Day Dawn, and Cuddingwarra was carried out by Mr. H. P. Woodward, with the co-operation of the Field Assistant, Mr. Talbot. The following synopsis of the results of Mr. Woodward's observations was prepared on his return to Perth on the conclusion of the field work; a detailed report accompanied by explanatory mining plans and geological maps and sections is in course of preparation. In consequence of the exigencies of the service necessitating Mr. Woodward's presence in the Minilya River district, in connection with an important geological question affecting the water supply of the district, it has not been possible for him to proceed immediately with the preparation of his report on the Cue Survey; this delay, however, has not been without its uses, in that it has enabled good progress to be made with the drafting of several of the more important of the maps.

"Cue, which is the official centre of the Murchison Goldfield, is one of the oldest gold-mining centres in the southern portion of this State, and from it a very large quantity of both alluvial and reef gold has been obtained.

"In the early portion of 1890, it attracted considerable attention and a large number of properties were floated upon the London market, but owing largely to the heavy expenses that were necessarily incurred upon transport, etc., and to the fact that milling appliances were erected previous to development the expected returns were not forthcoming and as a consequence the greater part of the capital was withdrawn to be placed in the then booming Kalgoorlie district.

"The greater number of the mines are in practically the same condition as when abandoned some 10 years ago, but they are inaccessible owing to the fact that the workings are flooded and in most cases the shaft collars and logging have been removed. Masonry foundations indicate the positions of batteries and engines, etc., but sands resulting from the crushings have for the most part been removed to cyanide works or have been subsequently treated on the spot when the quantity warranted it. The mines being worked and those worked during the last ten years are for the most part privately owned, the stone being crushed at one of the Public Batteries. The only Company working at the present time is the Salisbury where an up-to-date mill has been erected which is employed solely upon the treatment of ore from that mine.

"The Cue area of reproductiveness is situated at the junction of the Grano-diorites (called granite) and the greenstones, the greater number of the mines being in the granite area.

"The reefs generally may be classed under two heads: first, those which radiate from the contact zone in a northerly direction into the granite, and secondly, those which follow the contact zone, having a more or less easterly and westerly course; these latter are met with on both sides of the junction and may be called parallel contact veins. The universal dip of the radiating series is to the westward, whilst the parallel contact series with one exception dip to the northward.

"The radiating series as a rule present well-defined outcrops which can be traced in some cases for a distance of a mile, whilst half a mile is quite common, but the parallel contacts are not individually of great extent although a series of lenticular veins may be so grouped as to present the appearance of one continuous fissure.

"Under the head of radiating reefs may be classed the Victoria, the Deceiver (Brilliant and Lily), the Belgravia, the Campania (Real MacKay), the Bonnie Dundee, the Welcome (New England and Maori), the Young Colonial (Maude), the Lady Mary (Lady Florence), the Cue No. 1 (Rising Sun), the Arcadia, the Salisbury, the Light of Asia, the Perseverance (Star of Asia and Three Crows), the Sarepta (New Bismark), the Duke of York (Great White Eye).\*

"Of these only three are being worked at the present time, viz.:—Cue No. 1, which is situated upon the northern boundary of the town, which mine is practically idle at present but a Government Subsidy has been granted the owners for driving southward at the 500 feet level in order to prove whether the reef, which produced a considerable quantity of gold, carries its values at depth.

"In this mine the zone of enrichment (? shoot) in the upper levels appeared to dip to the southward, which is quite exceptional in this district. The question therefore to be tested is whether or not a shoot does dip in this direction; if this should prove to be the case it will possibly throw a considerable light upon a class of ore deposits upon the field which have been looked upon as bunches without continuity in depth, therefore this work will be watched with very considerable interest.

"Upon the Salisbury, development work is being energetically carried on, the main shaft was now

\*Names in parentheses refer either to other leases upon the same or to names by which the individual mine has been called.

been connected with the lode at the 250 feet level and the reef driven on to the northward with the object of cutting a well-defined shoot of stone which has been worked from the surface to the 200 feet level. The reef is contained in a large formation between good walls, the whole of which carries gold but the reef is the only portion which so far has proved to be payable.

"The Light of Asia is a large quartz reef in which two shoots of gold have been discovered, the southern of which was worked down to the water level some years ago by a company, whilst the northern one which is being worked by the present owner is rapidly approaching that depth. The quartz body is of considerable size but is not very rich; however it pays well to raise and cart to the Gem of Cue Extended Battery.

"Of the parallel contact lodes, only a few are being worked at the present time; the Princess Royal, which is situated at the back of the Hospital, is being tributed in the upper levels.

"The Catalpa, which lies to the eastward of it, is being unwatered with the object of further trial.

"The Caledonia Hill upon the Northern boundary of the town is being worked at the 100ft. level where occasional rich patches are met with.

"Upon the Princess, a small cross reef is being worked, whilst the Cue Victory and Golden Stream Extended are being worked in the upper levels only.

"The Agamemnon, which is a large quartz blow, was originally worked by an English Company to the water level, but the present owners have discovered another shoot farther to the eastward, which being of considerable size pays well to cart and crush.

"Other parallel contact veins such as the Lady Forrest, Polar Star, and the Homeward Bound, upon which considerable work has been done, are at present idle.

"Beneath the rich dryblowing patch, which is situated upon the northern side of the town, a series of flat reefs have been discovered and worked, being generally known as the Volunteer Group; they include the various Volunteer leases, the Starlight, the Twilight, and the Countess Extended.

"Upon the surface of this area not only was free gold discovered but also a large number of specimens (quartz embedded with gold) which would generally be considered as indications of the proximity of an auriferous reef, so far however all the outcrops have proved to be practically of low value, therefore the only solution which can be suggested is that the gold and specimens were derived from the disintegration of a horizontal vein overlaying those recently worked.

"Although the flat reefs overlying this area are not of phenomenal richness they have yielded, for a considerable period, a very material proportion of the gold production of the district, therefore assuming that the surface gold was derived from a similar deposit, it would be reasonable to expect that other veins of the same class might exist at a greater depth. This question could be readily tested by boring at points above where the greatest enrichment has been proved to exist in the flat reefs already worked.

"Besides the reefs before mentioned there is a group situated about 2½ miles to the north-westward of Cue which strike in a north-easterly direction dipping to the north-west, but although several of these present bold outcrops for a considerable distance, little work has been done upon them since the Companies abandoned them in the early days.

"When everything is considered, it must be allowed that the Cue district has never had a really fair trial since capital was withdrawn at a critical stage, therefore what work has been done since has not been carried out in the best interests of the mining, because only the richest portions of the lode would pay, the balance of lower grade ore, which would have paid well if treated with the richer ore on the spot, has been left *in situ* and is therefore by itself of no value.

"*Day Dawn.*—Upon the north side of the Trenton Hill at a point about four miles to the southward of Cue is the township of Day Dawn. The country rock consists entirely of greenstones, which are sometimes schistose but often massive, the foliation rarely extending much below the water level except along the main lode fissures. The main fissures of this district may be said to run in a northerly direction, but apparently owing to a line of disturbance which crosses the foliation of the rocks in a south-westerly direction certain of the reefs have changed their course for a short distance.

"At the present time and for some time past, very little productive mining has been done in this district, with the exception of the Great Fingall, where work of such magnitude has been carried on as to dwarf all others.

"The large rich shoot in this mine has produced about three-quarters of a million tons of stone, which has yielded upon the average about one ounce of fine gold per ton. It occurs in the reef at a point where the buckling of the rock has turned the fissure from its normal northerly course to the north-west, in which direction the shoot dips. This shoot has now been followed down to a vertical depth of about 1,300 feet where although the stone is not of great value it is payable and the reef well formed and of great size.

"The zone of greatest enrichment in this shoot appears to have been mainly influenced by the junction of a comparatively flat reef upon the footwall side at the No. 5 level; should another of these unite with the main body it is quite possible that the values may again be considerably raised.

"The Trenton mine is situated upon the eastern side of the hill of that name and it is now after many years of idleness being reopened by an underlay shaft which it is proposed to continue down to a depth of 500 feet. The old workings in the early days of the field were carried down to a depth of 250 feet upon a well-defined ore shoot which increased in size from the surface downwards dipping to the north, but although there was a battery upon the mine and some 8,000 tons of stone crushed, which yielded 14 dwts. to the ton over the tables, it was not in those days considered to be worth working.

"The Kinsella mine is situated upon the eastern side of the railway line; the reef is of great size in places and upon it a considerable quantity of work has been done, but owing to the fact that the payable stone appears to occur in patches without

definition and of rather low grade, the mine is at present idle and full of water.

"The Creme d'Or, adjoining the railway yard upon the east, upon which a long and rich shoot was worked some years ago, is now being opened by a vertical shaft sunk to a depth of 200 feet, from which a crosscut is being driven to the reef. In a winze sunk below the old workings in the direction of this crosscut the reef was found to go down strongly and to carry gold at the rate of  $1\frac{1}{2}$  ozs. per ton.

"To the northward of the last is the East Fingall, where a vertical shaft has been sunk to a depth of 500 feet with the object of cutting the dip of the Eureka No. 5, which belongs to the same company. Two quartz reefs have been cut at the bottom level, one of which carries gold in payable quantities, but without some very great dislocation has taken place it cannot be the Eureka reef.

"A fissure, very heavily charged with water, was cut in the 250ft. crosscut, therefore this has now been dammed up; however had it been possible to continue that another 40 feet the Eureka reef must have been cut.

"The Rubicon has practically ceased to be a productive mine since the lode in the lower levels, although of considerable size and well defined, carries no values. Prospecting has been carried on upon a most extensive and systematic style to a depth of 800 feet, but unfortunately so far without results.

"Adjoining the Rubicon upon the east are some old mineral leases which have recently been retaken up. Upon these there are some small copper lodes of very fair ore, but sufficient work has not yet been done to form any opinion as to their permanency.

"There are a large number of these gold-bearing reefs in the district some of which are being worked upon a small scale, but owing to the large volume of water met with at a comparatively shallow depth and the expense of getting the stone crushed and carted when raised, proprietary mining is on the whole extremely quiet.

"Cuddingwarra is situated about seven miles to the westward of Cue, in the greenstone area upon the western side of the grano-diorite belt.

"At the present time there is only one mine working, viz., the Victory United, and upon this property only development work is going on.

"In this mine, a short but rich shoot has been traced down from the surface to the 600ft. level and the lode, apparently rich, followed down for another 100 feet by a winze.

"There are a number of apparently promising reefs in this district, but owing to the heavy water struck at a shallow depth and other great expenses such as cartage and treatment it would be quite impossible to work there without capital."

#### BARRAMBIE AND ERROL'S.

Mr. H. P. Woodward visited Barrambie and Errol's and in November submitted the following report on the result of his inspection:—

"Barrambie is situated at the 284 mile post upon the Rabbit-proof Fence and about 72 miles due east of Cue; by road however the distance is about 90 miles owing to the fact that the old Lake Way road

is followed (which runs in a north-easterly direction) until it intersects the new cut track from Nannine to Barrambie at a point near Barangi Rock. Several attempts have been made to obtain a direct track from Cue but owing to the rough and broken nature of the country between the two points this has so far proved to be impossible.

"The nearest railway station is Nannine, which is 60 miles distant, and from it a direct road *via* Quinns has been cleared, but since there is at present no State Battery at this centre a good deal of the traffic has been diverted to Tuckanarra, 70 miles distant, where there is one, on account of the chance of return loading.

"The Barrambie Ranges present a bold appearance when approached from the westward, but since they are backed up by an elevated tableland upon the east, from that side they appear only like a series of low rocky peaks.

"The rocks composing this range are schistose greenstones the foliation of which runs in a nearly north and south direction with a dip to the eastward. The surface is extremely rough, the rocks being little weathered except immediately along the ore channels along which they have been considerably altered to a depth of 100 feet.

"Upon the eastern side of the range the rocks are much more highly altered where, in some canyon-like ravines, sections of 30 to 40 feet of weathered rock with cappings of detrital laterite are exposed.

"Little quartz is exposed along the main belt but in the direction of the General Kuropatkin, which is about  $1\frac{1}{2}$  miles in a south-easterly direction, large reefs are in abundance.

"The main lode can be traced at the surface along the range for a distance of 34 chains without a break, but about 3 chains south of the main shaft in a small cross gully it apparently ends. This is possibly a fault line which has thrown the reef to the westward since south of this point a well-defined lode can be traced for 15 chains in that direction.

"The Barrambie Ranges G.M. Co. own the principal group of leases but it is only upon one of these that any development work can be said to have been done, this is called the Golden Treasure, G.M.L. 1458, and upon it three shafts have been sunk to a depth of about 100 feet and one to 45 feet and the whole connected by a level. There has also been sunk a shaft to the same level upon the boundary of this lease with the Golden Hill, G.M.L. 1459, which together prove the existence of the lode at the 100ft. level for a length of 500 feet.

"The main shaft, which is upon the underlay, has been sunk to a depth of 105 feet, the grade being about 70 degrees from the horizontal. This shaft is now equipped with a head gear and winding engine, the latter being located in the engine room which also contains the engine intended to drive the 10-head stamper mill, which latter is already erected and housed. It is proposed to add rock breakers and automatic feeders to the plant, also concentrating tables, in order to eliminate the sulphides before the sands are passed in to the cyanide vats.

"From the bottom of the main shaft, the lode has been driven on in a northerly direction for a distance of about 400 feet and this level will be carried on (so soon as the winding engine is working) to the shaft that has been sunk just within the Golden