MINERAL DISCOVERIES AT NARLARLA, IN THE WEST KIMBERLEY DISTRICT.

In the month of August Mr. H P. Woodward, the Assistant Government Geologist, submitted the following report:—

"In the early part of June this year considerable excitement was caused by the publication of a report by Mr. J. H. Grant, who was engaged by the Narlarla Hills Silver Lead Co. This company's shares had for some time previous been quoted on the market but until this report appeared in the Press it was not generally known that the properties were situated in this State.

"These properties consisted of the Narlarla Hills silver-lead leases, which are situated in the Napier Range, West Kimberley district (142 deg. 43 min. E. long., 17 deg. 16 min. S. lat.) 75 miles due east of Derby upon the south side of the Barker River Gorge at a point a little above that river's junction with the Leonard River, at Narlarla, or Marlarla by the native name; and Mondooma Copper leases situated about 30 miles north-west of the Narlarla blocks close to Trig. Station L 2 (124 deg. 28 min. E. long., 16 deg. 56 min. S. lat.) at the north end of the Napier Range and about 10 miles south-east of Old Mondooma Station upon the Robinson River.

"These leases had in the early part of the year been applied for by Mr. Poulton, the company's representative, who was one of the early settlers of this district and at one time owner of the Mondooma Station.

"These discoveries were by no means new since leases at both localities had been taken up by Mr. Pettigrew as far back as 1900 and 1901, but as developments did not turn out to his satisfaction they were abandoned.

"A good deal of confusion has been caused by the use of the name Narlarla Hills because this name does not appear upon the maps, neither is it known by the settlers whilst the name of Napier Range has been known and used upon all the State maps, for the last 25 years.

"The Napier Range, the rocks of which are crystalline limestone, was described in 1884 by the late Mr. E. T. Hardman, who was at that time Government Geologist, and are classed by him in conjunction with the overlying sandstones and shales as Lower Carboniferous. The rocks strike in a north-west and south-east direction whilst the individual beds dip at an angle of from 12 to 23 degrees to the south-west, the lower or basial beds consisting of limestone conglomerates containing fragments and boulders of the schistose and granitic rocks which underlies them uncomformably.

"The range rises abruptly from the flat which lies to the westward to an altitude of from 200 to 400 feet, whilst both the Barker and Leonard Rivers have cut gorges through it, the latter known as the Wingrah Pass, being historic as the stronghold of the outlaw Pigeon.

"This range like most limestone hills is riddled by numerous caverns, some of which are of very considerable dimensions and have in the past been used by the natives as places of interment, but strange to say they are almost destitute of stalactites, and when these do occur they are of a dull grey colour.

"There are a number of fine springs along the base upon the western side of the range, some of which flow from caverns whilst others are met with at some little distance from the hills.

"The Narlarla blocks are situated on the top of the range upon the south side of the Barker gorge, the leases being pegged in a more or less north and south direction under the supposition that the lode followed that course.

"The ore deposits consist of two small parallel iron-stained blows of carbonate of lead about 20 chains apart whilst the limestone country between is found upon close examination to contain small stains of carbonate of copper here and there which apparently gave rise to the belief that the lode ran in a north and south direction.

"These blows upon development proved to be small veins of lead ore following the bedding of the rocks, the caps of which had fallen over, thus making a considerable surface show whilst the supposed width, viz. 40 or 50 feet is in reality the length of the vein beyond which no sign of a fissure can be traced.

"The south blow from which some high-grade ore was obtained at the surface is found upon sinking to pass into iron pyrites with little or no lead at a depth of 8 or 9 feet.

"The north blow is better defined, the vein apparently following the bedding of the limestone in a north-west and south-east direction with a dip of 23 degrees to the south-west. The ore in the lode cap is iron and copper stained carbonate of lead but this passes rapidly into the sulphides near the water level which is here strange to state only 19 feet below the surface although the river gorge which is close by is some 200 feet below. The lode at the water level is much more settled, there being one well-defined vein of galena about 2 feet in thickness, whilst the other portions carry a considerable quantity of zinc and iron pyrites.

"The lode contains a considerable quantity of calcspar in places, some of which is of a brown colour, this is what was supposed to be scheelite.

"A number of other leases have been applied for but little or no work has been done upon them, some have been taken up on account of copper stains, some upon small lead outcrops, but mostly as position blocks.

"Although there are a good number of tons of very fair ore upon the surface of these leases, even with its silver contents it is not of sufficient value to pay the cost of mining, transport, and treatment, whilst the lodes themselves give no indication of continuity either horizontally or vertically, being in all probability nothing more or less than segregations deposited in fissures in the limestones which themselves apparently carry small quantities of metallic ores.

"The Napier Range terminates to the northward a little south of Trig. Station L 2, the limestone being replaced by mica schist and diorite dykes, which here strike nearly east and west, and it is at the contact of these latter rocks that a copper stained ferruginous reef can be traced for a distance at the surface of about 300 yards.

"The cap of this reef has been crosscut at three points in each trench, however the lode proves to be very small and to carry very little copper ore.

"Although a few tons of fair ore might be raised which would possibly pay expenses, the negative character of the developments are such as to prove beyond a doubt that the lode is of no value.

"As the outcome of the reported discoveries before referred to, further prospecting companies were formed, the most noticeable amongst these being Grant's North West Prospecting, the local representative of which, Mr. J. H. Grant, in July last reported certain fresh copper discoveries in the vicinity of Mt. Nellie. These he applied for as a reward claim and a number of leases on behalf of his company. He also applied for certain leases called the Mt. Nellie blocks, on behalf of the Narlarla Hills Silver Lead Company.

"Mt. Nellie is situated (124 deg. 3 min. E. long., 16 deg. 33 min. S. lat.) about 60 miles north-east of Derby and about 15 miles south-west of Collin Bay. It has been used as a locality name although the discoveries are situated at some distance from it owing to the fact that this tract of country is unsurveyed and therefore this is the nearest named hill. The Mineral discoveries are in reality situated some few miles east of Mt. Nellie upon the Little Taragee River, which is not shown upon the map, although it is of considerable size.

"The mineral belt which is schist and slate intersected by quartz reefs and diorite dykes extends in a north-westerly direction from Mondooma upon the Robinson River to Mt. Nellie, where it is overlaid by a flat-topped quartzite range from beneath which it again appears to the northward and apparently extends in the same direction towards Yampi Sound.

"In this schist belt to the northward of the Taragee River and extending up to the base of the quartz range, there are a series of dyke-like mineralised quartzose ridges, containing quartz veins usually much copper stained. These ridges which are generally of considerable length have the appearance of being fissure lines which have allowed the flow of the mineral solutions that have altered and silicified the adjoining schistose rocks.

"These dyke-like lines are intersected by numerous quartz veins or lodes some of which are of considerable size and length being usually copper stained whilst they sometimes contain copper ore either in veins, bunches, or disseminated through the quartz itself.

"Numerous leases have been pegged out of which Grant's Reward is one of the most promising, this is situated at the extreme north end of the mineral belt close to the quartzite range. The lode mass rises in the form of a razor-back up to a height of 100 feet above the adjoining flat, its base being about 50 feet in width whilst it can be traced for a distance of over 1¼ miles in length. In this there are three distinct quartz veins or shoots, the central one which is the largest being seven chains in length and varies from 2 up to 17 feet in width at the surface.

"The ore, which is mostly green carbonate with a little red oxide, is met with at one or two points in the form of small veins or bunches of high-grade ore, but it generally occurs intimately intermixed with quartz, when it varies from a low-grade siliceous ore to stained quartz.

"Since the outcrop must have been subjected to considerable leaching action, in its present undeveloped state it is absolutely impossible to form anything like an estimate of the value of the lode but this, owing to its character, can be quickly and cheaply proved by crosscutting by means of drives from the adjoining flat which will not only demonstrate its character in the solid ground but will prove its richness at points varying from 50 to 80 feet below the outcrop and so near the water level that it is quite possible that sulphides will be met with.

"There are a number of similar lode masses in this locality but so far these possess no further indications than copper stains, they therefore are apparently of no value and are not worth expending money upon unless Grant's Reward proves when developed that this class of lode improves with depth.

"Upon the north side of the Taragee River and about six miles south of Grant's Reward and the same distance north of Boulder Hill, Mr. R. Wilson has pegged out some leases upon a series of broken ridges which are very similar in character to those previously mentioned, the copper ore however is generally of a higher grade and is in more concentrated condition but the individual portions of the lode which carry the ore are not so extensive either in length or breadth.

"Upon the northern block, a series of small but rich veins of ore occur, which apparently cross the quartz lode at an angle, whilst upon the southern blocks the veins run parallel with the quartz. These ore bodies cannot be so cheaply tested as Grant's since the portions of greatest enrichment are not met with at points where the lode attains any considerable elevation, and therefore sinking will be necessary.

"The examination of this district has demonstrated that a highly promising mineral belt extends for a distance of 40 miles in a north-westerly direction from Mondooma upon the Robinson River to Mt. Nellie on the quartzite range, and since the schists outcrop again to the northward of that range it will probably be found to continue further.

"At the south end of this belt to the westward of Mondooma, the slatey country is intersected by numerous parallel quartz reefs of considerable length and of a very promising appearance. This tract of country should be well worthy of the attention of prospectors.

"Mt. Broome diggings situated at the foot of the Leopold Range at the head of the Richenda River was also visited, but although this area has been worked off and on for a number of years, only comparatively small quantities of gold have been obtained, whilst owing to the fact that there are no quartz reefs, dykes, or lodes it is not probable that any great discovery will be made in this locality.

"In conclusion it may be stated that although a very promising belt of mineral country exists it would not be advisable for prospectors to undertake its examination unless a strong party with ample funds, for not only may trouble be experienced with the natives but owing to the fact that large tracts of country are flooded in the wet season it will be necessary to have sufficient supplies to last over this uncertain period.

"It has been stated that a good road without engineering difficulties can be obtained to Secure

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. dwts. 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 has now

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