

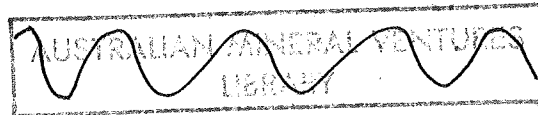
1891.

WESTERN AUSTRALIA.

REPORT  
ON THE  
GOLDFIELDS  
OF THE  
KIMBERLEY DISTRICT,  
BY  
HARRY PAGE WOODWARD,

E.G.S., F.R.G.S.,

GOVERNMENT GEOLOGIST.



*Presented to both Houses of Parliament by His Excellency's Command.*

[SECOND SESSION OF 1891.]

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## *Report by the Government Geologist on the Goldfields of the Kimberley District.*

*From the Honorable the Commissioner of Crown Lands to the Government Geologist.*

1. Upon your arrival at Wyndham, you will get all possible assistance from the Resident Magistrate and the Officer of Police there. The former I have wired to *via* Port Darwin, informing him of your intended departure, and asking him to let Mr. Baker know. The police, both at Wyndham and Hall's Creek, have been instructed by the Commissioner to render you every assistance, and do what they can to facilitate the object of your mission. The Warden, Mr. Dowley, will also be advised of your intended visit to the Goldfields, and asked to aid you as much as he can. I hope you will be able to reach Hall's Creek without much difficulty (I assume you will note the geological features and character of the country *en route*), and that on arrival there you will be able to arrange your programme of work in such manner as will best suit you, and enable you to see as much as possible of the country during the time at your disposal. I fear any hard-and-fast lines of instructions would only hamper you, and therefore I leave your plan of operations, as well as the details thereof, to your own discretion and good judgment—merely expressing a hope that you may be able to visit some parts of the country not already reported upon by Mr. Hardman; that you may be able to inspect and report upon all the various mining properties being worked, or that have been worked, taken up, or abandoned; that your report will give a general geological description of the country you pass over, both with reference to its possible auriferous character and the prospect of other minerals or metals; and that you, as far as possible, will ascertain, note, and include in your report any recommendations you may think fit to make as to assistance that might be offered by the Government to aid and expedite the development of the mineral resources of the country, and what shape such assistance should take.

2. The subject of water supply should have your attention, and you will please report as to the surface supply and the prospect of water being obtained by sinking or boring, specifying localities, &c. Should the wire be in working order between Hall's Creek and Derby you can, as opportunities offer, send me a wire stating your movements and notifying anything worth reporting. Either on your arrival at Wyndham or prior to your departure, I would ask you to visit and inspect (with a view to getting specimens and reporting) the shaft or well in the vicinity of Wyndham said to contain good coal shale or indications of coal. Please to note this, as it is important.

3. Mr. Baker, M.L.A., the member for East Kimberley, has expressed a desire to accompany you on your trip to the Goldfields, and possibly he may be disposed to do so, and as he is a keen, practical, sensible man, his company might be of advantage to you. Please to call upon him on arrival at Wyndham, and advise him as to your intended course of procedure.

4. As before stated, I leave the arrangement of your journey and work to your own discretion and judgment, and conclude by wishing you a safe and successful trip, and hoping that your visit to East Kimberley will be productive of benefit to the Colony and add greatly to our knowledge of the geological features and the auriferous and mineral resources of that, no doubt, rich country.

W. E. MARMION,  
Commissioner of Crown Lands.

30-7-91.

*From the Government Geologist to the Honorable the Commissioner of Crown Lands.*

SIR,

I have the honor, herewith, to hand you my Report on the Kimberley District, and would like to take this opportunity of thanking W. L. Baker, Esq., M.L.A., who accompanied me from Wyndham to the Fields; the Commissioner of Police and his officers, for assistance in obtaining horses, &c.; the Warden of the Goldfield to whom I am indebted for a great deal of information, and who accompanied me all round the Field and back to Wyndham; the officers in every branch of the Service in the District for their courtesy and assistance, and the settlers generally for their hospitality.

I have, &c.,

HARRY PAGE WOODWARD,  
Government Geologist.

20-11-91.

## KIMBERLEY DISTRICT.

### *General Description and Physical Geography.*

#### REPORT ON THE KIMBERLEY DISTRICT.

##### GENERAL DESCRIPTION.

This district is situated at the extreme North-East corner of the Colony, being bounded on the North and West by the Indian Ocean; on the South by  $19^{\circ} 30'$  South latitude; and on the East by  $129^{\circ}$  East longitude, which is the boundary of this Colony and the Northern Territory of South Australia.

##### PHYSICAL GEOGRAPHY.

###### SHAPE OF THE COUNTRY, &c.

This District consists, roughly speaking, of two tablelands, divided by an inverted horseshoe-shaped belt of broken country, along which the two principal rivers flow.

The tableland to the North extends from the King Leopold and Müller Ranges to the coast, and Eastward to the Ord River. It is much broken near its Northern and Western edge by rivers which have cut deep channels through the horizontally-bedded Carboniferous rocks, exposing vertical cliff sections of from 200 to 300 feet in height.

The tableland to the Southward is the high sandy plain of the interior, which overlies the Carboniferous rocks, and is covered by lines of parallel red sand hills, except at the South-Eastern corner of this district, where there is the large basalt flow called the Great Antrim Plateau.

As a whole it may be considered as a broken tableland, for it was, at no very remote geological period, one immense level stretch of country, covered with sand, the only thing which would break the monotony being the top of the King Leopold Range, this being composed of hard old crystalline rock and owing to its great height would then in all probability have stood up above this plain about 700 or 800 feet.

Looking at its present shape one would naturally wonder why, if it were originally a vast tableland, it should have taken its present form; but after a little consideration this becomes very simple, for the two great forces, upheaval and denudation, are both exhibited so plainly here,—the first in the great volcanic disturbance which has taken place at the Eastern portion of the district, and the second in the tropical rains which are thrown off the King Leopold Range on one side, and the basalt rocks on the other, and thus in the course of time the two large valleys of the principal rivers have been cut out.

###### THE COAST LINE.

The coast line of this district is the boldest and most broken of any part of Western Australia, consisting of a series of bold headlands and bays, which latter are the finest natural harbors in the Colony, the principal being Lagrange Bay, Roebuck Bay (in which the town of Broome is situated), Carnot Bay, Beagle Bay, King's Sound (this enormous sheet of water runs South for a distance of about 70 miles, and at its head the town of Derby is situated), Collier Bay, Camden Sound, Montague Sound, Admiralty Gulf, with Port Warrender, Vansittart Bay, and Cambridge Gulf, this is not so wide as King's Sound, but runs inland South for a distance of about 50 miles, and near its head the township of Wyndham is situated. The capes are too numerous to mention, but Cape Londonderry, about  $127^{\circ}$  East longitude, is the most Northerly point of the Colony. The islands are also very numerous, and many of them, as the Laccpedes and Jones Island, have been worked for guano. The rise and fall of the tide on this coast is very great, and causes a tremendous scour through the narrow mouths of the large gulfs, which makes it a very difficult matter to enter them at the ebb; its wearing action against the cliffs is so great that the water is heavily charged with mud for several miles out to sea.

## THE RIVERS.

The most important river which flows in a Westerly direction is the Fitzroy, which is about 350 miles in length, and is supposed to take its rise in the high country, about  $127^{\circ} 30'$  East longitude and  $17^{\circ} 20'$  South latitude, near Mount Dowley, Mount Wells, and Mount Luke, cutting its way through the high crystalline King Leopold Range, somewhere near Mount Leake; but, as its upper courses have not yet been traversed, its source is at present uncertain. It flows from the range first in a Southerly and Westerly direction, passing through Geikie Cañon towards St. George's Range, then Westerly and Northerly towards King's Sound, where it discharges itself. It flows for the greater part of its course over large alluvial flats, over which it spreads in time of flood, leaving large fresh-water pools, called locally "lagoons" and "billybongs," and cutting numerous bye-washes and secondary channels, which, in two places in its course, are of considerable length; the one to the Eastward near Mount Campbell being about 40 miles in length, whilst the other near its mouth is not quite so long.

The bed of the river is very wide, being as much as 800 yards in places, but, like most of the Northern rivers of this Colony, it is wider in the middle courses than at its mouth. This may be accounted for by the fact that so much of the flood water from the ranges is absorbed on these large plains; so that the same quantity would never be discharged at its mouth as would pass down its upper courses.

The principal tributary is the Margaret River. It is about 200 miles long, taking its rise a little to the South of the Fitzroy head, near Mount King and Mount Luke, flowing through rough rocky country, first in a Southerly direction, then to the Westward to its junction with the Fitzroy, a little below the Geikie Range.

This river has a main tributary called the Mary, which rises between the Bailey and McClintock Ranges, and flows mostly in a Westerly direction to its junction with the Margaret, near Mount Tean.

The next river of importance which flows to the Westward is the Lennard. It is about 120 miles in length, taking its rise in the King Leopold Range near Mount Eliza and Mount Broome, flowing in a Westerly direction, mostly over alluvial plains, dividing into two about 40 miles from its mouth; the Northern branch being called the Meda, and the Southern the May River, both of which discharge themselves into Stokes Bay, King's Sound.

This river has several small tributaries, all of which take their rise in the King Leopold Range, one of which is called the Richenda, and flows into it on the Eastern side, where a small patch of auriferous country has been discovered. Of the Glenelg, the Prince Regent, and the Roe Rivers, which discharge themselves further North along this coast, very little is at present known; but, from what can be gathered, they all present much the same character, running between vertical cliffs of horizontally-bedded rocks. The rivers which flow to the Northward, and discharge themselves into Cambridge Gulf, are the Forrest, the King, and the Ord; of these the last mentioned is the only one that has yet been surveyed. It is about 300 miles in length, and is supposed to rise somewhere near the same place as the Fitzroy and the Margaret. It flows first in an Easterly direction, then Northward, following the boundary of the Colony for a considerable distance, after which it takes a turn to the North-West towards Cambridge Gulf.

One of its principal tributaries, the Panton, takes its rise on the Nicholson Plains, flowing Eastward through the Albert Edward Range, where it is joined by the Elvira River; from which point they flow North until they join the Ord River at the bend where it starts to flow North.

The large tributary above mentioned, called the Elvira River, also takes its rise somewhere near the Nicholson plain, flowing Eastward towards the Albert Edward Range, where it is joined by the Black Elvira, which takes its rise near the head of the Mary. These two pass through a gorge in the Range, and then flow Northward, on the Eastern side of it, until they join the Panton.

There are also two other large tributaries on the Western side of the Ord, the Bow and the Denham; but very little is yet known of these, as they flow through rough ranges. On the Eastern side are the Behn, the Nicholson, the Forrest Creek, and several other smaller streams, but none of any great size.

## THE MOUNTAINS AND HILLS.

The most important range in the district is the King Leopold, but, although rising to a considerable elevation, it presents no striking characters, being of one rounded uniform appearance, peaks being extremely rare; Mount Krause being the most conspicuous. This range runs in a North-West and South-East direction for a distance of about 250 miles, and is composed of very hard quartzites and grits.

Further Eastward, and to the Northward of the Margaret River, is the Müller Range, which runs in a North-Easterly and South-Westerly direction, and attains a considerable elevation; it is probably the extension of the Leopold Range, as the rocks are similar.

To the Southward of the Leopold Range are some Carboniferous limestone hills called the Barrier Range, which is about 120 miles in length, and through it the Lennard, Fitzroy, and Margaret Rivers have cut gorges. It is known in different parts, as the Napier, the Oscar, and the Geikie Ranges.

The only other ranges of any importance on this Western watershed are the St. George's, at the bend of the Fitzroy, and the Grant, about 50 miles from its mouth; in both of which the rocks are Carboniferous limestone.

On the watershed of the Ord there are no very striking ranges, but the country as a whole is broken and hilly; the most conspicuous range is the Albert Edward, which presents a bold escarpment to the Westward where the Devonian rocks outcrop. From a distance it looks more like the edge of a tableland, but it is in fact only a narrow ridge, rarely more than a mile in width.

Further North, between the Bow and the Denham, on the Western side of the Ord River, there is a mass of rough country, called the Carr-Boyd Ranges; whilst Northward of this all the hills are tent-like, being capped by horizontally-bedded quartzites, with underlying shales of Carboniferous age. These hills, which are scattered about over the alluvial plains, often attain a considerable altitude, as the Bastion Hill, which is about 1,000 feet, and Mount Cockburn, which is considerably higher.

#### THE CLIMATE.

The climate of this district is hot and unhealthy near the coast, but is very pleasant for the greater part of the year on the higher land of the interior, where the nights are mostly cool; and in winter there are sharp frosts. This district is subject to tropical rains, which, aided by light winter showers, keep the creeks and rivers running most of the year.

#### WATER SUPPLY.

This is a well-watered district, this being the first dry season known; but even now water can be obtained along the road between Wyndham and Hall's Creek in pools which occur every 15 miles, or at the outside 20 miles; the only exception being one long stage of about 40 miles, but in that water could be obtained in Turkey or Mistake Creek at a shallow depth. Most of the traffic, however, follows the telegraph line, where water can be obtained half way, but this track is too rough for anything but pack horses.

This is one of the best watered districts in Western Australia, and on the field good water in almost any quantity can be obtained anywhere by sinking; so it is not the least use mentioning any particular localities, for the water-level of the country is, roughly, from 25 to 50 ft. below the level of the creek beds; and from this it will be easy to calculate the depth at which water will be obtained on the higher ground.

In the Northern portions of this district (near Wyndham) it is very different. The water supply is derived entirely from local sources, which are being severely tried this season, and many so-called springs have failed completely.

In this country the rocks are horizontally bedded, the water supply being obtained either on the top of or a little way into the shale beds, beneath which the whole subterranean drainage from the interior passes. Therefore, if a bore were put through these beds a large supply would be encountered, which would rise to the sea-level, if it did not rise a good height above the surface; in fact this is an artesian area.

#### THE SOIL.

The country that is of any use to pastoralists is where there are large alluvial flats or the large "Pindan" plains, both of which, in a good season, grow grass most luxuriantly, it not being at all uncommon to see it 10 or 15 feet in height, this latter of course is of very little use; but for feed the large alluvial plains, covered with Mitchell and other grasses, are not to be surpassed in any part of the world.

## Geological Formation, Extent of Gold-bearing Country, and Prospects of other Minerals.

TABLE OF GEOLOGICAL FORMATIONS (*Sedimentary Rocks*).

Cenozoic.	Recent.	{ Alluvium of the river valleys, river gravels, estuarine deposits, mangrove swamps, &c. Raised beaches along the coast.
	Pliocene.	{ "Pindan" sands and gravels, often cemented by oxide of iron.
Paleozoic.	Carboniferous.	{ Sandstones, grits, conglomerates, and shales, with small quartz veins, and nodules of ironstone. Limestones variously colored, mostly hard and often magnesian, with calcite and gypsum, agate, calcedony, and jasper veins, and lead, zinc, and copper ores.
	Devonian.	{ Sandstones, coarse grits, conglomerates, shales, slates, and hard limestones, with veins of agate and calcedony.
	Cambrian.	{ Crystalline limestones, sandstones, grits, quartzites, clay slate, and sandy flags, with numerous veins of quartz and calcite.
Azoic.	Archean, Crystalline.	{ Marble, quartzites, altered grits, mica slate, mica schist, chloritic schist, hornblend schist, talcose schist, garnet rock, gneiss, and granite, with numerous quartz reefs.

### IGNEOUS ROCKS.

Volcanic.	Basalt, dolerite, and volcanic breccia.
Plutonic.	Diorite, feldstone, amygdaloids, syenite, granite, porphyry.

### CÆNOZOIC.

#### RECENT.

*Alluvium*.—This loamy deposit is formed by the rivers, which wear away the old rocks, carrying the finer material down from the hills and depositing it on the open level country, forming large rich plains. These are often of great extent, and run back from the rivers for a considerable distance.

*River Gravels*.—These consist of sand, gravel and fragments of rock, and are found in the beds of the streams, nearer their heads as a rule than the loams.

*Estuarine deposits* are met with at the mouths of the large rivers. They are for the most part salt and overgrown with mangroves. They are mostly composed of a black greasy mud, full in many places of recent petrifications of crayfish, wood, and worm tubes.

#### PLIOCENE.

"*Pindan*."—These sandy plains are largely developed on either side of the Fitzroy River, stretching far away to the Southward, where they form Warburton's Great Sandy Desert; they are, as a rule, waterless; but, owing to the large rainfall, produce a large quantity of vegetation.

On the Ord River there are some small stretches of this country, but never of very great extent.

### PALÆOZOIC.

#### CARBONIFEROUS.

*Upper*.—These sandstones and shales, which are mostly seen forming flat-topped hills, attain their greatest development along the North Coast, but they are also met with in small patches, from the Dixon Range to Mt. Deception, on the Ord River; the Hardman Range, on the Nicholson River; the Haughton Range, to the South-West of Mt. Dockrell; the St. George's, the Grant, and several other small ranges on the Fitzroy River; also on the Lennard River.

*Lower*.—The largest extent of these limestones occurs between Mt. Elder and the Antrim Plateau, outcropping all along the edge of the basalt flow.

#### DEVONIAN.

This formation is largely developed in the Carr-Boyd Ranges, also in a wide belt, which runs South from the Saw Ranges to the Lubbock Range, a distance of about 200 miles. The narrow abrupt Albert Edward Range is also of this age, and is formed by the outcrop of these rocks, about 100 miles long. The Barrier Range, to the Southward of the Leopold Range, appears now, from the determination of the fossils, to be also of this age.

## CAMBRIAN.

In this group are classed all the older series of rocks that have not been too highly altered to preclude the possibility of organic remains being discovered in them. Two fossils have been determined as belonging to this age; therefore they will all provisionally be classed as belonging to this period.

These rocks extend in a North-East and South-West direction from the Burt Range to the Southward of Mt. Dockrell, and it is in this belt that the principal gold discoveries have been made. In places the rocks are highly altered, but this is mostly from purely local causes.

## ARCHÆAN AND CRYSTALLINE.

These rocks are largely developed in this district, extending in a horseshoe shape, from a point near the Denham River, South to near Mt. Dockrell; then from the Müller Range, which is a little further West, all through the King Leopold Range, to King's Sound.

## VOLCANIC.

This series of rocks are more largely developed in this district than in any other portion of the Colony, where they not only cover an immense tract of country near the border, but occur in many places as dykes. The basalt is often amygdaloid in character, the cavities in which are filled with silica of a green color. Up to the present no crater has been found, but this is probably due to the uninviting nature of the country, which has prevented exploration.

## PLUTONIC.

These rocks mostly occur as dykes amongst the crystalline rocks, but here and there granite and diorite dykes are also met with amongst the Cambrian and Devonian series.

## ORGANIC REMAINS.

Fossils are very scarce in this district, but those that have been found belong to the Lower Carboniferous marine beds, the Devonian and the Cambrian, but as yet none have been found from the Upper Carboniferous Series, in which our main hopes rest of finding a useful coal, but when it is considered how little is at present known of this district, and the little interest that would be taken in horizontally-bedded rocks in a gold-mining district, this can be easily accounted for, but it is highly probable that this formation does exist.

## EXTENT OF THE GOLD-BEARING COUNTRY.

The belt of auriferous country extends in a North-East and South-West direction for a distance of about 250 miles from Mt. Cecil, which is on the Eastern side of the Ord near the Eastern boundary of the Colony, and is about due East from Mt. Cockburn (North) to Christmas Creek, which is about 40 miles South-West of Mt. Dockrell. It is about 20 miles wide at Hall's Creek and to the Southward, whilst to the Northward it becomes gradually narrower.

The Southern portion of this belt is bounded to the Westward by granite. On the Eastern side it is skirted by the Devonian Albert Edward Range, and the Basalt Great Antrim Plateau, the Devonian Osmond Range and the flat-topped Carboniferous hills which overlie it to the Northward, under which it eventually disappears.

The rocks of this belt of country are quartzites, grits, clay slates, schists, gneiss and granite, with numerous veins of quartz and calcite, and dykes of basalt diorite, granite and syenite.

The strike of these rocks follows the direction of this belt of country, but the dip, which is mostly at a high angle, is sometimes to the Eastward and sometimes to the Westward.

There are numerous reefs, but the ones that follow most nearly the strike of the rock seem to be true veins. They are mostly compound, of great size, have well-defined walls, and can be traced at the surface for a considerable distance. The reefs which do not follow this line, although sometimes of great size, seem always to be of purely local origin, either shooting off from a dyke or from other true veins, and are very variable in size. Their walls are not well formed, and they can never be traced far at the surface.

## PROSPECTS OF OTHER MINERALS.

Copper lodes have also been discovered in this district, but, although the ore is very rich, it would not pay here, where the cartage is so heavy, now that the value of copper is so low.

The ores of copper and lead also occur, associated with the gold, but not in large enough quantities to pay to work, but it is highly probable that when these mines are opened up rich pockets of these ores will be found, if the lodes themselves do not consist largely of them. The strange thing is that at the Dockrell, where the lodes are composed largely of galena, except at the surface, where the

gold is visible in it, the galena itself does not seem to be very rich in either gold or silver; an assay made by the Government Analyst yielding 6dwts. 12grs. of gold, and 8oz. 9dwts. 21grs. of silver to the ton of galena.

Mica is also attracting a good deal of attention, but up to the present nothing of any size has been discovered; but it is highly probable that it will be found large enough to work in places along the belt of granite country to the Westward of the telegraph line.

Tin will most probably be also found along this same line of country, and will probably be in large crystals, similar to the lodes found in the Northern Territory of South Australia.

It is a typical mineral country, but it is so rich in gold that no one will trouble to prospect for minerals of less value in a district especially whilst working expenses are so high.

#### COAL.

It is highly probable that coal may be found in the Northern portion of this district, near Wyndham, where the Carboniferous rocks are largely developed; quartzite and sandstone capped flat-topped hills, with shale beds beneath, attaining an elevation of as much as 1,000 feet.

These shale beds must be of great thickness, for they are seen in sections in the side of the Bastion Hill 700 or 800 feet, and in the well at its base they were sunk into another 100 feet, whilst how much further they extend in depth is at present unknown.

The only way to make certain whether coal beds do exist or not is by boring, and as at the present moment a better supply of water for the town is needed, the boring might be made to serve a double purpose.

Some time ago, a sample of black shale, with thin coaly seams, was brought down by the late Honorable Colonial Secretary, and with these specimens a piece of steam coal had been put for comparison, of which he had not been informed, and so he only sent on this latter for assay and report, which caused it to be officially reported that good coal had been found at Wyndham.

### *General Description of Country passed over.*

#### DESCRIPTION OF THE COUNTRY PASSED OVER: THE COAST FROM THE MOUTH OF THE DEGREY RIVER TO WYNDHAM.

The coast to the North-East from the mouth of the DeGrey River is most uninteresting from a geological point of view, it being a long low sandy beach (the 90-mile beach), with behind it a high waterless sandy tableland ("Pindan") extending far into the interior.

At Roebuck Bay, which is a fine harbor, there is a patch of swampy alluvial land running to the North-East for a few miles, but this is all surrounded by the "Pindan" country, which at Entrance Point presents to the seaward some bold red sand cliffs, the age of which is probably Pliocene (Tertiary). At Broome the water supply is very bad, but a good supply will be struck in depth after sinking through the salt stratum. This sand formation extends up the coast to Cape Lévéque, where there are low cliffs of quartzite. These are probably the North-West extension of the crystalline rocks, which form the Kimbolton Range near Point Usborn, on the Eastern side of King's Sound.

King's Sound may almost be called an inland sea, as it is about 70 miles in length and about 35 in width, getting gradually narrower to the South end at the mouth of the Fitzroy River. On the Eastern side there is a indentation called Stokes Bay, into which the Lennard discharges itself by its two mouths, the Meda and May.

Large patches of alluvial and swampy ground run up these rivers and skirt round the Southern and Eastern sides of the Sound, but further inland the country is mostly sandy, with here and there low outcrops of Carboniferous sandstones.

The town of Derby is situated near the head of the Gulf, the great trouble being here, as at Broome, the water supply, which at present is very local and not at all permanent. Fortunately the rainfall is so good that the supply has never yet failed, but two or three seasons like the present would see Derby without any water. A large supply of water is sure to be struck here in depth, which will



most probably be good and under sufficient pressure to rise for certain to the sea level if not to flow at the surface.

The coast from this Point to the Northward is much broken with large bays and numerous islands, the rocks for the most part along the coast being horizontally-bedded sandstones of Carboniferous age, but here and there, as at the mouth of Admiralty Gulf, basalt flows of considerable extent.

It is highly probable that this formation extends for a considerable distance into the interior, but in places outcrops of the crystalline rock will make their appearance through it, for in the bed of the Glenelg River fragments of these rocks and pieces of copper ore were found.

Cambridge Gulf is about 50 miles in length, it is of no great width; but the water is deep, and it forms a grand harbor. Vertical cliffs rise in many places along this Gulf with horizontally-bedded shales capped with sandstone, grits and quartzite of Carboniferous age, whilst in other places it is fringed by alluvial flats and mangrove swamps.

The town of Wyndham is situated at its head, close under the Bastion Hill, which is a flat-topped hill about 1,000 feet in height, showing a fine section of the shales and sandstones.

The supply of water for this town is a very serious question, and after the past dry season it is being greatly felt, as the wells are only fed locally from the hill itself. These wells are sunk in the shales at the foot of the hill, the water being struck in small quartz strings which only yields a small supply. In these shales no great water supply will be obtained, but if they are sunk through and a porous bed struck, a very large supply of water (almost certain to be fresh) will be encountered, and under such great pressure that it will probably rise well above the surface.

The Ord River empties itself into this Gulf on the eastern side, whilst at its head is the King, and on the western side the Forrest Rivers.

#### FROM WYNDHAM TO THE PANTON.

On leaving Wyndham the road runs in a South-Easterly direction for 7 miles, following along the foot on the South-West side of the West Bastion Hills across marshy land, which is covered by very high tides. At the 7-mile the road crosses a basalt dyke, which passes through the gap between the West Bastion and Mount Erskine, and it is to this dyke that this break is due. The road from this point runs on still South-East over the large flooded plains (the 20-mile plain) of Parry's Creek to an old house called the 20-mile, situated on a large pool on Parry's Creek. To the Westward lies the rough flat-topped Erskine Range, which is only divided from the steep rough ridge C.N. 20, by the gorge-like channel of the creek. From this point the road strikes away to the Westward over some rough quartzites and sandstone ridges, the underlying shale beds showing in places in the gullies, with here and there beds of conglomerate and jaspery veins, whilst the two bold flat-topped hills called the Mounts Cockburn are seen away to the Westward on the other side of the King River.

Near Dead Horse Pool the country opens out into large alluvial plains, which extend for about 10 miles North and South, being bounded on the Westward by the Tier Range and Mount Rob, whilst to the Eastward the country is broken.

Near Dillon Springs the country suddenly changes, the nearly horizontally-bedded Carboniferous rocks giving place to the Devonian formation, which here consists of quartzites and slates much contorted, and dipping in places as much as 70° to the North-West. These rocks form the Saw and Deception Ranges which run in a North-East and South-West direction, following the strike of the rocks.

The Denham River flows over large alluvial plains where crossed, bounded on either side by what appear to be flat-topped ridges, this, however, is not really the case; as the road follows the course of the river, and the river the strike of the rocks, which here stand up in ridges of about one height all the way along, causing them to present this appearance from the distance.

There is a belt of very rough country between the Denham and the Ord Rivers, called the Carr-Boyd Ranges.

This class of country extends up McPhee's Creek as far as the 75-mile post, where granite and crystalline rocks suddenly make their appearance, forming a very rough strip of country, bounded on the Western side by the O'Donnell Range and on the East by Devonian ridges.

Near the top of the saddle, which divides McPhee's Creek from the Bow River, there is a great pile of granite rock, called Pompey's Pillar, which is visible for a considerable distance, whilst in the bed of the Bow and at the Rock Hole on O'Donnell's Brook some fine crystalline rocks are exposed.

From this point to Mistake Creek the country is very rough and stony, but the granite, as a rule, is more Metamorphosed, being bedded with schistose and gneissic rocks.

Along Turkey Creek the country is more open, the granite ranges being away to the westward; but at about the 135-mile post the road turns into them, on account of water, to Cartridge Spring, where such a fine stream flows as to make the little creek run for some distance.

At the "Jump Up," which is the dividing ridge between the Fletcher and Turkey Creek, a high ridge of schistose rocks rises so abruptly that it was very difficult to cross. These schistose rocks outcrop all the way down the Fletcher to the Ord River, which here runs in an Easterly and Westerly direction.

After crossing the Ord River, and following up Will's Creek, the first auriferous country is struck, the rocks being clay slate and schists, with numerous quartz reefs, and this class of country extends on as far as the Panton River, where a huge feldstone dyke, called Mackintosh's Hills, rises, forming a steep ridge to the Westward.

#### THE PANTON.

Between the 180-mile post on the telegraph line and the Panton River Crossing, which is five miles further South, a fairly rich patch of alluvial diggings were discovered along Grant's Gully and the Dead Finish Creek.

Looking to the South and South-East from the telegraph line, a large flat or basin, about five miles wide, is seen to extend in the direction of the Panton River, covered with low-rounded hills of clay slate, the whole being surrounded by high rough hills, with the huge razor-backed feldstone dyke, called the Mackintosh Hills running North and South, cutting it off suddenly to the Westward. The gold obtained here was of a very good quality, but only two or three diggers are at work on this part of the field at the present, as most of the rich deposits in the creek beds have been worked out, though after the first heavy rains these diggings will be worth reopening, as so much gold is carried in small quantities all over the surface of the ground, added to which all the old dirt, in which a considerable amount of gold still remains, will be naturally re-sorted and the gold concentrated in the gutters and pockets. Close to these rich patches some small but rich reefs were found and opened up; as, however, they were only in the hands of working miners, they had to be abandoned, as the stone was not rich enough to pay for hand crushing or carting 35 miles to the nearest battery; but such confidence had several holders in these properties that they carried on the work of prospecting until they had spent their last sixpence, as Kimberley at that time had such a bad name that no one would risk any money in it.

There are two series of reefs on this field, the first of which, striking North-East and South-West, are true veins, although small in size, they can be traced for a considerable distance at the surface, and it is on this series that most of the claims have been taken up. The second series appear at the surface as large quartz blows, striking East and West, cutting across the smaller veins, but they cannot be traced for any distance at the surface, and up to the present gold has only been found in the one called the Perseverance Claim, which is at the extreme Western edge of the field close to the Mackintosh Hills; but it is highly probable that the one on the Comet will also prove auriferous at its intersection with the smaller rich reef.

All the claims, with the exception of the Perseverance, are on two lines of the North-East and South-West reefs, the Eastern line starting at the South, near Grant's Creek, with the Caledonian, while further North, near a large quartz blow of one of the cross reefs, is the Comet, where the small reef has been thrown a little out of position, but it again follows along its true course North-East to the Lady Panton and Brockman King, the only noticeable difference at this end of the line being the number of small parallel reefs.

The Star of Kimberley, the Scottish Chief, and Lady Kimberley are on a larger and rather better-defined reef further to the Westward, the stone of which is also of a different character, and contains a great deal of copper pyrites in places, as well as the iron pyrites and galena carried in the other reef.

These reefs are often accompanied by veins of calcite, mostly massive, and a large quantity of good water is met with at a comparatively shallow depth, whilst the rocks are clay slate and schists, having much the same strike as the true veins.

Great difficulty will necessarily be experienced in working these reefs, as they are mostly small; the stone, although apparently rich in gold, contains so many other minerals from which it is difficult to separate it, and the large amount of water in depth will require extensive pumping plant to keep the mines dry. On the other hand, the stone is of a very promising character, the reefs are well defined, and give every promise of going down, and on one or two of the areas the reefs are large enough to work economically. There is a large supply of good water and plenty of timber, both for mining purposes and for fuel, close at hand.

The work done up to the present may be put down as next to useless, except so far that a good many tons of stone have been raised, which it will be very easy to test by crushing to determine if these areas are worth working.

## THE PANTON TO HALL'S CREEK.

This is a distance of about 30 miles, and the road passes over much the same class of country as on the other side of the Panton, the feldstone dyke running along in a South-Westerly direction, and the country is very rough in places.

## THE DUFFER RUSH.

This small field was situated about half way between the Panton and Hall's Creek. From all accounts it did not prove to be very good, but little information can be obtained about these old workings.

## MOUNT COGHLAN.

A little to the North-East of these diggings a reef was taken up, as some very rich specimens of gold-bearing stone were found, but, like many more, it has been abandoned for want of capital.

## HALL'S CREEK.

Hall's Creek is 212 miles by the telegraph line from Wyndham, and 304 miles from Derby. It flows into the Elvira a little below the township, which in its turn discharges itself into the Ord River.

The gold diggings, which were very rich here, followed a narrow North and South belt of country to the Westward side of the township, mostly along the Western side of a feldstone dyke, which forms a long steep ridge running a little East of North.

The country to the Eastward between this ridge and the Albert Edward Range, which latter presents a flat-topped appearance from a distance is a series of mostly low, broken, rough hills, of clay slate and schist, with numerous quartz reefs and basalt dykes, over the whole of which a little gold can be found; whilst to the South-Westward, after crossing the narrow belt of hilly gold-bearing country, there is a small open stretch of alluvial country, beyond which the bold granite hills rise. Very little prospecting has been done in this direction, but it is highly probable that some rich deposits may exist in the deeper ground, as it is in the heart of this rich gold-bearing tract.

The reefs here which carried gold were mostly small, but make here and there into large rich bunches. None of them have the appearance of being true veins, but simply local "gash" veins, caused by the intrusion of the large dyke to the Eastward. They have no walls worth speaking of, follow no regular course, cannot be traced for any distance at the surface, and pinch out in many cases, in depth. There is not the least doubt but that the gold in the gullies which cut these reefs was derived directly from them, but it is extremely questionable whether any will pay to work permanently.

The reefs worked on this line were the Jackson's Reef and adjoining claims, the Lady Broome and adjoining claims, the Gladstone, Black Mount and Jubilee. Out of these the Jubilee is the only one which has been able to keep on working by putting on as few men as possible, obtaining exemption from work as often as possible, and by picking the specimens out of this rich little reef, which are then carted to the Brockman, a distance of 10 miles, to be crushed.

This mine was never so showy as many of the others, but carries a rich shoot of gold down at a point where it is intersected by another cross-course, and it should certainly be followed down as long as such rich stone can be obtained.

There is a large quantity of stone at grass; it is not rich enough to pay for cartage, but will be a nice little start when the company decides to place machinery upon it.

The stone here contains a great deal of galena and oxide of iron, which will make into mundic in depth, so will make it more trouble to work. A sufficient water supply will not be struck here for a depth of from 100ft. to 200ft. All that can be said for this reef (as nothing can be said for the others) is that it has carried gold persistently down to a depth of 65ft., and, although the reef pinches in many places, it has always made again, the amount of stone ready for crushing at the surface, the quantity in sight, the certainty of obtaining good water and good supply at depth, and the quantity of timber and firewood at no great distance.

The water-level at Hall's Creek itself has not yet been determined, as up to this year water has always been standing in the pools, and a well was sunk only to a slight depth to obtain cleaner water. This has gone dry, as well as the pools this season, but has been deepened, without success, as all the water which finds its way into the well comes in about 10ft. from the bottom.

The position of this well was wrong in the first instance. It should have been on the Western side, or higher up the gully than the large dyke which crosses here, as rushes which grow by this natural dam indicate a supply at no great depth from the surface. This could be easily tested, and would be less expensive than deepening the old well.

## HALL'S CREEK TO THE MARY RIVER.

Following down the belt of gold-bearing country from Hall's Creek in a South-Westerly direction the rocks met with are mostly clay slate with numerous quartz reef and some calcite veins and diorite dykes. At the crossing of the Black Elvira there are some hard bars of blue slate, which dam up the water forming a fine pool, and it was between here and Hall's Creek that a great deal of gold was found.

To the Southward of this, on McPhee's Creek, the country is rough, the Creek having cut itself a deep channel through the hard rocks, forming bars from which a great deal of gold was taken, as well as from the patches of deeper ground which are found here and there along its course.

Between this Creek and the Mary River another rough belt of schistose country has to be crossed, but on approaching the head of that river the country opens out into large alluvial plains, portions of which will, when they come to be properly tested, prove to be very rich in gold.

## THE MARY RIVER.

On the large plains at the head of the Mary River some of the largest deposits of alluvial gold were found; these are still being worked when there is any water. One of the curious points about this part of the field is that gold was found here associated with calcite, and even in the spar itself. One reefing area was taken up here, but very little done, as it did not come up to the expectations of the shareholders, but it is highly probable that in this neighbourhood some very good reefs will be found that are at present covered by the more recent deposits.

## THE MARY RIVER TO MOUNT DOCKRELL.

The country between these two places is a good deal broken along the road following the North-West side of the McClintock Range, from which many streams run towards the Mary River.

The rocks along this belt of country are hard blue and grey clay slate schistose and gneissic rocks with numerous quartz reefs, the general strike of the rocks being North-East.

## MOUNT DOCKRELL.

About 70 miles to the South-Westward of Hall's Creek, and three or four miles on the South-Western side of the Mount, some very rich deposits of gold were found in the deep gullies, which led to certain reefs which cross them being prospected, 50 feet of the richest of which was taken up by McNeil. This was a rather curious reef, the rich part of the lode consisting largely of galena, in which free gold could be seen. On this line several others were at once taken up, but none proved so rich as this little area, and even on it the stone was found to be very much poorer in depth.

All these areas have now been amalgamated as the "Lady Hopetoun," and a very nice complete little crushing plant has been erected, but this is at present idle, on account of the scarcity of water, although a large supply could be obtained by sinking near the battery site, as higher up the gully it rises to within 25 feet of the surface.

There are many other promising reefs around here which cross gullies in which large quantities of alluvial gold have been found, but very little prospecting has been done yet, as reefs are rather a drug in the market. The Dockrell Reefs will be difficult to work, owing to the large amount of mineral contained in the stone, but if enough free gold can be saved by the ordinary processes to pay working expenses, the concentrate can be treated by another process afterwards.

Water and fuel there are in abundance, and the well-formed and highly-mineralised character of the stone promises well for its permanency in depth.

## CHRISTMAS CREEK.

For 40 miles to the South-Westward alluvial gold has been found rich enough to pay to work, but owing to the dryness of the present season no one is working there at present.

## FROM THE MARY RIVER TO RUBY CREEK.

To the Eastward of the Mary River is a rough bit of country which forms the water-parting between the rivers which flow into the Ord and those which flow into the Fitzroy. The rocks are mostly slate and schist, striking North-East and South-West, standing up in bold parallel ridges, with, as the Ruby Creek is neared, large quartz reefs running with the strike of the country, but so large and solid that they form the main ridges of the country, often rising 200 or 300 feet above that adjoining. When these reefs are cut by a deep creek it is not uncommon to find a spring breaking out, which proves that if the right sites were selected an abundant water supply could be obtained.

A few miles to the Eastward of the Ruby Creek is the Albert Edward Range (locally known as the "Sandstone"), which from the distance appears to be flat-

topped, but is in reality a bold rough ridge of sandstone of Devonian Age, from which, in the gaps cut through it by the stream, some fine springs break out.

#### THE RUBY.

This field is about 5 miles in length apparently on one main line of reef. The character of the country is large quartz reefs forming the main hills running nearly North and South, with the flat-topped Albert Edward Range, close to the Eastward, whilst to the Westward there is a belt of very rough slate and quartzite country.

Most of the leases and claims have been taken up here in a continuous line for a distance of over three miles. Then there is a break at the South end of half-a-mile to the last lease.

For convenience of description this line will be started with the Ruby Queen, from which it derived its name. This mine was worked from a small gully, which cuts the reef at something over 100 feet below the cap by a drive following the reef North and South; but although this part of the work was done cheaply and the stone stoped was of fair quality, the proceeds were eaten up by the construction of a road down the hill to the battery site, a distance of about one and a-half miles. There is a good plant on this area, but the water supply is at present insufficient, but this can be easily remedied by sinking or driving, whilst the mine itself can be very cheaply worked. To the Northward of this area is the No. 1 North Ruby Queen, where there is a patch of very rich stone on the top of the hill. The next is the No. 2 North Ruby Queen, but little work has been done here or on the Scandinavian Claim, which joins it. On the next few claims North of this the main reef has not been worked; but small off-shoots, rich in gold, these are the Pyramid or No. 3, the Union claims, and the West and Left or No. 4. On this latter a considerable amount of work has been done, and the reef tested to a depth of over 100 feet, or about the water-level. These leaders are very rich, and on this area of a fair size, making towards the main reef, in which direction they should be followed, although the small reefs on this area seem to be so well defined that there is every probability of their continuing in depth.

On the Goliath and the Ruby Queen North Extended, very little has been done, but on the Rising Sun, which is on the same line, on the North side of the Creek, a good deal of rich stone has been raised, but like most of these rich mines a great deal of money has been wasted in useless work. Several shafts have been sunk close together, where one would have done all the work, and had a level been put in from the battery site on the Creek, the whole length of the reef could have been tested at much less expense at a depth of about 150 feet from the present workings. The battery is, like most of the rest, deficient in steaming power, and the pumps will not throw enough water to keep the battery going. The water supply is good, but insufficient; this, however, can be easily remedied by deepening the present well to where it strikes the lode formation, when a large supply of water is sure to be encountered.

There are about three more areas along this line to the Northward, but little has been done to open them at present.

On a parallel line of reef to the Westward of this last-mentioned area and the Ruby Queen North Extended are the Sunny Corner and the Triumph, both of which are on well-formed reefs of a very promising character.

To the Westward of the Ruby Queen is the St. Lawrence Reef, which strikes off from the main line more to the Westward, and some very rich stone is in sight, but here also a great deal of money has been wasted. Joining this is the St. Lawrence Extended, but nothing here has been done yet.

On the main line to the Southward of the Ruby Queen is the Ruby Queen South and Ruby Queen South Extended, on both of which gold has been found, but neither of them is being worked just now.

As a whole this field is very promising, considering the size of the reefs, their defined character, the ease with which they can be worked and the gold can be extracted from the stone, the length of outcrop along which gold has been found, and the quantity of good water, timber and fuel.

Many of these mines are still being worked by the miners themselves, who raise stone and stack it until there is sufficient water to work the batteries, both of which on this field crush for the public; but as this way of working is very expensive, only the very rich stone is picked out. Many more of these areas should be at work, but the scarcity of money is the great drawback, and the miners having such a high opinion of them themselves would not part with them at anything less than a fabulous price.

#### BETWEEN THE RUBY AND THE BROCKMAN.

Northward from the Ruby these huge reef hills continue for a distance of 15 miles, with rough broken clay slate and sandstone country between them and the Albert Edward Sandstone Range to the Eastward.

## THE BROCKMAN.

About 10 miles to the South-Eastward of Hall's Creek, on Butcher's Gully, which is a tributary of the Black Elvira, are the Brockman Diggings. Here, as at Hall's Creek, the rich belt of gold-bearing country is narrow but extends for three or four miles in a North and South direction.

Very little is now being done in the way of alluvial work, but several leases and claims have been taken up on the reefs, some of which are still being worked.

The country is rough, the main feature being the large quartz reef which forms the main hill ridge of this part, attaining an elevation of as much as 300 feet above the low surrounding country, and it is upon this that most of the principal mines are situated, only a few being situated on the Lady Margaret line, which is a lower ridge further to the Westward.

On the main line, at the extreme North, is Faugh-a-Ballagh. On this area very little has been done. The next, which is about half-a-mile South, is the Golden Crown, where, in a break of the main reef, some very rich stone was discovered and worked out to a depth of about 70 feet. A great deal of useless work has been done, as two deep shafts have been sunk close together, on the top of a hill, whereas the reef might have been worked with great advantage from the gullies to the Northward, where the reef is cut at a level, at least 100 feet below the top of the hill. The machinery on this area is good, but badly erected. About two miles South of this is the Mount Bradley Tunnelling Claim, where a large area has been taken up as a reward for certain tunnelling work to test the reef, which work cost a great deal more than the rent of the extra ground would have come to, and the tunnel is comparatively useless, as the stone struck proved of no value and the battery has been erected on the opposite side of the hill. Anyhow, the tunnel is in the wrong place, as the side chosen (the Eastern) to start from is the foot-wall side of the lode, so that every foot from the cap of the hill down, leaving the slope of the hill out of the question, the reef is further and further to the Westward, but even the Western side would not be the place to tunnel from, for at the Southern end of the claim a gully cuts through the hill from which the reef could have been tested at the same level along its course, stone being raised all the time, instead of all this dead work through rock for 360 feet. The work at the surface is much on the same lines as the tunnel, and could all have been done for half the cost.

On this mine there is an ancient ten-head battery, and a Huntingdon Mill, which some local engineer considered was not properly constructed, so changed the feed from the centre to the side of the mill, the improvement being very questionable, as it is much the same as feeding a stone flour mill from the side. There are also a stone breaker and two engines, the combined power of which is insufficient to drive all the machinery.

The "too-many-cooks" proverb applies to this mine, as it is worked by a working miners' syndicate, the directors working in the mine under an employed captain. The result must be left to the imagination.

The Phoenix is a little further South, and can be worked cheaply from Butcher's Gully, which cuts the reef at about 200 feet below the cap, at which point all the work, up to the present, has been done, and where a good quantity of stone is stacked. This mine was formerly called the "Lady Carrington," and a good road was made from the battery site in the gully to the top of the hill, which cost so much money that the company abandoned it. On this line, if the natural features of the country were taken advantage of, added to which the large body of rich stone, the extent and well-defined character of the reef, abundant supply of water, fuel and timber, should enable these mines to be very cheaply and profitably worked.

THE AFGHAN, LADY MARGARET, NO. 1 NORTH LADY MARGARET,  
AND NO. 5 NORTH LADY MARGARET.

The Lady Margaret line, which is further to the Westward, has been worked, but, as a rule, these have been on small cross leaders, as the main reef was too poor to pay. One of these leaders on the Lady Margaret was very rich, but so small that it would never pay to put machinery on this area, and as a whole this line is not worth troubling about, although very rich, when there are so many other areas close by which could be so much more easily and profitably worked.

The Southern Cross, Mount Davis, and Brockman King are further South, but there is nothing worth mentioning to be said of any of these claims.

A large water supply can be obtained in this belt of country, at a depth of from 30 to 50 ft., but at both the Mount Bradley and Golden Crown the wells have not been sunk deep enough to obtain enough for continuous crushing.

## FROM HALL'S CREEK DOWN THE ELVIRA AND ORD RIVERS.

From Hall's Creek to the Eastward down the Elvira River as far as the Albert Edward Range, the country is very rough and broken, but the large reefs which are met with on the Ruby and Brockman do not extend so far North. The rocks are clay slate and schists, with numerous quartz reefs and basalt dykes.

In the gorge of the Elvira a fine section is exposed, first of contorted slates and schists striking North and South, on the upturned edges of which are thick beds of hard grits and conglomerates dipping at an angle of about  $45^{\circ}$  to the South-East, overlaid by limestones, grits, slates, limestones, and shales, whilst below the gorge are shaley beds overlying limestones; the surface is strewn with much quartz. This section is about one mile in length, and the whole series cut is supposed to be of Devonian age.

After passing through this gorge the river takes a sharp bend to the South and then North, passing between the Albert Edward Range and the Eliot Range, in which latter the grits and sandstones are much contorted and faulted.

Passing round the Eastern end of the Eliot Range the Great Antrim Basalt Plateau comes in sight. This great basalt flow extends North continuously as far as the Dixon Range, near the junction of the Pantón and the Ord, and Eastward into the Northern Territory of South Australia.

The Elvira flows North along the belt of soft shaley country, having the Albert Edward Range to the Westward and the basalt tableland to the Eastward until it joins the Pantón, where it takes a sudden turn to the Eastward, cutting through the narrow belt of basalt country which runs North here, on the Eastern side of which is a belt of limestone country of Carboniferous Age.

Eastward of this, and dividing it from the Hardman Range, is a large alluvial plain, which also extends all round it; then running away in a North-East direction, broken here and there by low ridges of Carboniferous limestone, which also skirts the basalt tableland.

This class of country extends North as far as Mount Elder, where the flat narrows in and the rough grit and sandstone hills of Carboniferous age close in upon the river.

After passing Mount Deception, and crossing the Negri River, another stretch of basalt country is met with, but here it is a great deal more broken than the Antrim Plateau, and is flanked by Carboniferous limestone hills on the Western side.

On the Behu River there is a line of bold rough hills running in a North-East and South-West direction, the rocks of which are basalt, this continues North along the boundary of the Colony as far as Mount Brooking. In the bed of the lower part of the Behu, limestones and shales make their appearance, whilst at its junction with the Stockade Creek a bold mass of Devonian rocks rise abruptly from the plains, whilst further to the Westward across the Ord River is a belt of Metamorphic country, the Northern extension of the auriferous belt which runs in the direction of Mount Hensman, and so on to the Burt Range. A little to the South of Mount Hensman there is a huge granitic dyke, which rises to a considerable elevation, forming the main ridge, and is flanked on either side by low slate and schist hills, with numerous quartz reefs of a highly auriferous character.

To the Westward of this belt of country the rocks by Cockatoo Springs, Emu Springs, and Button's Crossing are of Devonian age, being mostly sandstones and grits, though here and there slate beds outcrop. These sandstones are overlaid in many places by belts of sandy country called "Pindan," but large alluvial flats also occur in great abundance.

From the great Western turn of the Ord River, as far as Wyndham and the North Coast, the country is open, with flat-topped hills of Carboniferous age and large alluvial flats.

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## KIMBERLEY GOLDFIELD.

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### *Report on the Mines.*

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#### THE KIMBERLEY GOLDFIELD.

This goldfield, having a proclaimed area of 47,000 square miles, is situated in the North-Eastern corner of the Colony, its principal diggings and mines are near the Eastern boundary of the Colony, about 212 miles by the telegraph line from Wyndham on Cambridge Gulf, and 304 miles from Derby on King's Sound; in the broken country at the head of the Elvira and Mary Rivers, the main tributaries of the Ord and Fitzroy Rivers.



This goldfield was discovered in the year 1882 by the late Mr. E. T. Hardman, then Government Geologist, who, in 1884, reported on and issued a map of the district showing the places where gold was likely to be found. These in every case proved to be correct; but as most of the alluvial deposits were very thin, no time was lost in sinking, so that a single miner was able, in a short time, to work out a large quantity of ground, which, unfortunately, led diggers in other parts of the world to believe that the diggings were much more extensive than they really were, from the large returns of gold that passed through the Customs hands in a short time.

The official centre on the field is at Hall's Creek, which is connected with Perth, via Derby, by a telegraph line. There is also a line to the Port of Wyndham, but this is not yet in working order.

The Adelaide S.S. Co.'s steamer "Rob Roy," which runs between Cossack and Port Darwin, calls at Derby and Wyndham about every three weeks; thus connecting this district with the Southern portion of this Colony, the Eastern Colonies and Singapore, via Cossack, and the North-Eastern Colonies, via Port Darwin.

The road is now fairly good between Wyndham and the field, a distance of about 250 miles, and is well watered, the longest dry stage being 40 miles, but this can be avoided with pack-horses, whilst water could be easily obtained on the main road at the depth of a few feet, either in the bed of the Bow River, Mistake, or Turkey Creek, but no wells have been sunk, as this is the first dry season experienced since this district has been settled.

#### PANTON.

##### CALEDONIAN.

This lease of two acres in extent is situated on a small creek, which flows into Grant's Creek, about four miles North-East of the point where the telegraph line crosses the Panton River.

The rocks on this area are mostly clay slate, often of a shaley nature, but there are also beds of mica slate and veins or beds of calcite, their general strike is a little East of North, whilst they dip to the West at a high angle.

The quartz, which is of a rather glassy dark-blue or mottled appearance, is from 6in. to 1ft. in thickness, well defined, with a strike of North 35° East, whilst it dips in a Westerly direction.

The stone is often gossany and much iron-stained, and is associated with a vein of calcspar.

A large number of trenches and small shafts have been sunk on this area, the deepest of which is 50ft., but so much water was encountered that it was found impossible to sink any deeper. The water was struck at 25ft. from the surface, and is perfectly fresh.

Up to the present no trial crushings have been made from this area, and as the deep shaft is now used as a well, and the other workings are unsafe, it is impossible to say anything about this reef in depth, but should the stone (a large quantity of which is at grass) prove rich when crushed, in spite of the small size of the reef it would be worth opening up further, as from its well-defined surface, character, and length of outcrop, it is almost certain to go down, and will probably increase in size, as the reefs in this field vary very much in size in a short distance.

##### THE COMET.

The situation of this area, which is one acre in extent, is about 33 chains to the North-East of the last mentioned.

The shaft, which is partly vertical and partly on the underlie, is 55ft. in depth, and has been sunk on a small leader or spur on the Western side of a large quartz blow, supposed to be the broken extension of the Caledonian reef, but which appears to be too much to the Westward for that idea to be correct.

The leaders, or cross-courses, vary much in size, the one worked being about 2ft. wide at the bottom of the shaft, but sometimes in sinking it was smaller, although good-sized bunches of stone were here and there met with.

The stone is similar in character to the Caledonian, but is more iron-stained and the rocks, which are here mica slate, dip at a high angle to the Westward.

It was impossible to examine this mine, as it is not being worked now and the shaft is unsafe.

A very nice patch of stone was struck at the surface, and one ton fourteen cwt. picked from it, yielded 134oz., but the stone has been so well picked over that it is now difficult to find even a color in any of the stone at the surface.

This is not a true vein, but an offshoot from the large body of stone to the Eastward, but still may be found to go down for a considerable depth, varying greatly in size, and from time to time rich patches of stone will probably be met with, and certainly its junction with the main reef should be prospected.



## THE PANTON QUEEN.

From the Comet a series of well-defined reefs run in a North-easterly direction for sixteen chains, where an area has been taken up and one of the reefs prospected under this name.

There are two shafts on this area, the first of which is vertical, about thirty feet deep on a gossany and iron-stained reef, which is from two to three feet wide in an indurated mica slate without well-marked wall, whilst the other is about 60 feet, mostly on the underlie.

The stone from this shaft is highly mineralised, containing copper pyrites, malachite, galena, and iron pyrites, the reef is well defined at the surface, being traceable for a considerable distance, but what it is like in depth is impossible to say. A good quantity of stone has been raised, which, although not showing much gold, may crush well. If it does, this area will certainly be well worth further testing, for although the reef is a good deal broken near the surface it will probably make into a good well-formed reef when it is traced down into the solid ground. The only difficulty will be in extracting the gold from a stone which contains so much mineral matter.

Up to the present there has been no crushing from this area, as the nearest battery was thirty-five miles away, but it is shortly to be tested, when it is to be hoped that it will turn out as good as is expected.

## THE BROCKMAN KING.

This same line of reef continues on to the North-East, in which direction at ten (10) chains distance from the last mine, another area of one acre has been taken up, on which a shaft has been sunk seventy feet on the reef all the way down, which here dips nearly vertically.

The stone is very similar to the last mentioned, but is only from six inches to one foot in thickness, although from the appearance of the stone from a depth, which has a good casing on it, the reef must be well formed, and has probably good walls.

Some small specks of gold are visible in the stone, often amongst green stains of copper, which seems to point to the fact that it will be found associated with iron and copper sulphides in depth.

There are also some crystals of talc in the stone.

This has not been tested yet by a crushing, but from its appearance will probably crush well, and as it is the Northern extension of the Panton Queen reef, and is well defined, it will be probably found to go down, and also to increase in size. Up to the present very little real prospecting has been done on these reefs to test the extent and richness of the gold-bearing stone, these areas being only taken up, and one or more shafts sunk, because either rich gold was found in the gullies across which these reefs run or colors were found in the outcrop of the reef itself. They were worked as long as the money and credit lasted, but ultimately had to be abandoned.

## THE LADY KIMBERLEY.

On a parallel line of reef about twenty-four chains to the Westward of the last mentioned this area of one acre in extent is situated.

This reef is well defined at the surface, although very variable in size, being from six feet to a few inches in width along its outcrop. It contains less galena and copper pyrites than the Brockman, but is a good deal iron stained.

There are two shafts, one of which is 35 feet in depth, where the reef is from four to six feet in width, whilst in the other, further North, which is about 15 feet in depth, the reef is about one foot wide.

The stone is a darker blue, less glassy, and does not contain so much mineral as the other line, but is very nice-looking stone, and the reef gives every indication of going down.

The country is indurated slate, which dips with the reef to the Westward.

No stone has yet been crushed from this area, and it is not being worked at present, but should the stone already raised prove rich when crushed the owners should be encouraged to prospect this area to a greater depth.

## THE SCOTTISH CHIEF.

This lease of one acre is supposed to be on the same line of reef as the last, it is about 32 chains to the South-west, and on it a shaft has been sunk to the depth of 60 feet in a decomposed mica slate.

The reef here is about one foot wide in the shaft, but pinches to about six inches towards the South end of the claim, whilst the stone is not so iron stained.

There is another line of reef a little further to the Eastward, the stone of which is far more like that of the Lady Kimberley. This was in the original claim, but has been left out of the present smaller lease. On this reef a shaft

has been sunk 50ft., and in it the stone is about 1ft. in width, and appears, from its character, to be a continuation of the main line of reef.

Both these reefs are well defined, but small in size, and although no gold is visible in the stone about the shafts (as it has been well picked over), very rich stone is said to have been obtained; and as there were rich patches of alluvial ground, where these reefs were cut by the gullies, it is highly probable, from the character of the stone, that if it is found to increase in size in depth that it will be well worth working.

#### THE STAR OF KIMBERLEY.

About 105 chains to the South-West of the Scottish Chief there is an area of two acres, supposed to be situated on this same line of reef, which here is about 1 to 4 feet 6 inches in width.

The stone is banded, and contains copper and iron pyrites, blue and green carbonate of copper, and galena, and is of a highly mineralised character.

There are three shafts on this area, the deepest, sunk for 60 feet in blue shaley slate, dipping slightly to the Westward, the reef being about the width of the shaft, and is well defined at the surface, but what it is like in depth it is impossible to say, as the bottom could not be examined. The other shafts are of slight depth, and there are also several pits and trenches.

From this claim one ton was crushed, which yielded 16 dwts. of gold, but it is probably much richer than this, the loss of gold being due to the quantity of copper pyrites and galena.

The appearance of this reef and stone is very promising, but great trouble is sure to be experienced in its treatment, and if special machinery is not put on the claim it will be very little use in trying to treat it.

These six areas, with another called the Lone Star, have now been successfully floated as a company in Melbourne, under the name of the Panton River United Gold-mining Company, and machinery is now on its way to the field, where it will be erected in a central position for the purpose of testing these properties.

The machine area is situated on Grant's Creek, at the point where the Star of Kimberley line of reef crosses it; and as the creek bed was very rich below this point, it is highly probable that good stone may be struck upon it.

A large supply of water will be obtained at a very slight depth, and there is abundance of wood near at hand. The amalgamation of the gold will not be at all simple, as there are so many other minerals contained in the stone; but it is to be hoped that this Company will give these reefs a fair trial, and that their enterprise will be rewarded.

The plant now on its way to the field is very complete, but is weak in driving power; the cartage being so heavy, a portable engine has been selected, which lacks the first essential for this district, namely, a large fire-box.

It is said to be a 20 h.p., but the steaming power is quite nominal, and it will probably only work to about 6 or 8 h.p., with a fuel like wood, and this has to be cut up so small that a head of steam cannot be maintained.

#### THE PERSEVERANCE.

About one mile to the Westward is an abandoned area on which a little work has been done. It was taken up on a large quartz blow, which strikes East and West. This seems to follow the same line as the large lines of reef, which are seen on the same plain further up to the North-East.

A shaft has been sunk to a depth of about 20 feet, the stone from which is dark blue, but very gossany and iron-stained.

The reef is about 40ft. thick at the surface, but has not been cut through or tested below.

The stone is very solid, but a good deal mixed with partings of talcose slate, a crushing of which yielded 30ozs. of gold from five tons of stone.

This is rather interesting from the fact that it proves that both the reefs that follow the strike of the country and the cross courses carry gold.

There being such a large body of stone on this area, it will be well worth prospecting further, as the expense of working a large reef like this would be far less than in the smaller ones.

#### HALL'S CREEK.

##### JACKSON'S REEF.

This abandoned area is situated on Hall's Creek, and the reef has been tested by a shaft 70 feet in depth, where it was 1ft. 6in. near the surface, but pinched out at a depth of 50 feet, being very rich in places. This vein strikes North and South dipping nearly vertically, but a little to the Eastward. It is not a true vein, and cannot be traced for any distance at the surface, as it cuts out entirely in a trench about 20 feet South of the shaft.

The country is a hard blue slate, with small veins of quartz, and the water-level is here about 70 feet from the surface. There is another reef to the Eastward, which carries no gold. Several other shafts have been sunk on this area, but no reef has been struck, although there was a good show of quartz at the surface, which carried a little gold.

There are several veins of calcite on this area, which often having a crystalline structure, has more the appearance of marble.

From this area 78 tons of stone were crushed, which yielded 56ozs. 18dwts of gold.

#### THE NO. 1 SOUTH JACKSON'S.

On this abandoned area a shaft has been sunk to a depth of 70 feet, but there is no true reef only some very small leaders, carrying a little gold, the rock being chloritic slate with calcite veins.

#### THE NO. 1 NORTH LADY BROOME (LATE HOMEWARD BOUND).

On this abandoned area, a small reef from 1ft. 6in. to 2ft. in width strikes East and West, and dips at a high angle to the Southward. The stone is of a whitish granular quartz, with galena and gossan in a greenish hornblendic slate, with iron stains and manganese on the cleavage planes.

About six tons of stone were crushed, which yielded 4ozs. 3dwts. of gold.

#### THE LADY BROOME.

On this lease of 25 acres there are two shafts 70 feet in depth, connected at the bottom, which is the water-level. One of these shafts is partly vertical and partly on the underlie of the reef, which strikes here across the country, underlying to the South, and is from two to four feet in thickness, the stone being white and iron-stained, but it contains no galena. Of this stone 400 tons are said to have been crushed, which yielded 30ozs. of gold.

#### THE NO. 2 SOUTH BLACK MOUNT.

On this claim an underlie shaft was sunk 70 feet on a small reef dipping to the East, in which some very rich patches of gold were found.

On the top of the hill there is a large reef of a bluish iron-stained quartz, which contains a little copper.

#### THE BLACK MOUNT.

This abandoned area is to the Eastward of the latter, and a very rich patch of leaders were struck at the surface, but it was found to pinch in depth. 8 tons 11 cwt. of stone were crushed, yielding 3ozs. 8dwts. of gold.

#### THE GLADSTONE.

This area is also in the immediate neighborhood, but there is no defined reef. Two tons of stone crushed yielded 3ozs. 17dwts. of gold.

#### THE JUBILEE.

A little further South, on this same line of country, is the only area still held. It is six acres in extent, but is not at present being worked on account of the scarcity of water.

The reef is at the head of a long gully in which one of the richest patches of alluvium was found. It strikes East and West, dipping to the North, and is from 4 feet to a few inches in width.

There are three shafts, the No. 1 being 65ft. in depth, with a drive along the reef to the Westward. From this point it is connected by a rise with the bottom of the No. 2 shaft, which is 40ft. in depth, and from the bottom of that there is a drive to the Southward. At the bottom of the 65-foot shaft there is a North and South cross course, cutting the reef, which latter is very rich just here, particularly on the North side; it is also rich on each bend along the drive to the bottom of the 40-foot shaft.

Where this cross-course cuts the reef it contains a great deal of hæmatite, black oxide of copper and galena, but the gold does not extend along it more than 2ft. In the drive at the bottom of the 40-foot shaft the reef seems to be cut out by a hard slate bar, but makes again at the end of the drive, but here it is poor in gold.

Most of the work has been done on either side of the 65-foot shaft, near its junction with the cross-course, and by picking the stone in spite of having to cart it ten miles to a battery, it has, up to the present, paid working expenses. It is not a true vein, and will not probably be found of great extent, but may go down a considerable depth, as it seems to owe its origin to a dyke on the East side; and as it has proved so rich to the 65-foot level, it is decidedly worth while carrying on the work; and as there is a large quantity of stone at grass, rich in gold yet too poor to cart ten miles, it would be well worth sinking a shaft to test this reef in depth, and to obtain water at the same time, and if the result thus obtained

proved satisfactory, machinery could be erected on the spot, and all this stone turned to profit. The stone is a nice-looking quartz, often containing a good deal of galena and pyrites, 9 tons, 17 cwt. of which have been crushed and yielded 403oz. 13dwts. 12grs. of gold.

## THE BROCKMAN.

### THE GOLDEN CROWN.

On the main line of reef towards the north end of that portion of the field known as the Brockman, this lease of 24 acres is now being worked.

The workings are on the top of a small steep hill, at the cap of which a large body of stone outcrops the course of which is West-North-West and East-South-East.

It is being worked by two shafts 60ft. apart, the one at the South-East end being 70ft. in depth, and the other about 50ft., whilst the ground between them has nearly all been stoped for a width of about 5ft. This lode has no defined walls but consists of a broken mass of veins and leaders, intermixed with the country, which is a greenish blue sandy slate, striking North-North-East and South-South-West, and dipping at a high angle to the North-West, intersected by many cross veins. This body of stone goes down nearly vertically, some parts of it being very rich, but the returns were much reduced by the quantity of non-gold-bearing stone and country that was crushed; 1,000 tons are reported to have yielded about 1,250ozs. of gold, but had this been sorted the result would have appeared much better in proportion.

At the 70-ft. level the leaders are small, none being over 9in. in width, and they appear at the South-East end to take a sharp bend to the Southward. On the top of the hill, at the surface, there is a large body of quartz a little to the South-West of the shaft, but its relation to the part worked has not yet been determined.

This reef cannot be traced on its course at the surface much beyond the shafts in either direction, and is not cut by the deep gullies at either end, but a large main line of reef which follows the strike of the country is seen running away North from the Western end and South from the Eastern end of this outcrop. This seems clearly to indicate, and is supported by the turn in the reef at the 70-ft. level, that this rich broken mass of stone which has been worked is nothing but a portion of the main line of reef thrown out of its course; therefore this North and South reef should be tested, as it is highly probable that it will carry gold, and if it does this will be a very valuable property, as the reef is of great size, well defined, and can be easily worked.

On this area there are a ten-head stamper battery, two boilers, engine, pans, pumps, &c., the whole connected with the mine by a tramway, but at the present time it is not in working order.

The well is a little outside the boundary of the area; it is about 50ft. in depth, the water is good, and rises to within 30ft. of the surface, but the supply is only sufficient to work the battery for 12 hours continuously, but this could easily be overcome by either deepening the well or by driving in the bottom across the country.

### THE LADY MARGARET.

This claim is about 24 chains to the Westward of the Golden Crown, on the Western side of a large quartz reef, which follows the main line of the country, which here runs North and South.

The reef worked is a small leader, which strikes West-North-West from the main reef, and dips to the Southward. It varies in size from 2 inches to 3 feet, is well defined, and was exceedingly rich.

It was worked by two shafts, the Eastern one (which is on the high ground) being 60ft. in depth, whilst the Western one is 50ft. They are connected with one another by a level, from which another small shaft has been sunk 18ft., and it is at the bottom of this that the reef attains its greatest size.

From the 60-ft. shaft the stone, which is about 6 inches in size, has been stoped to the Eastward at about 20ft. from the surface for a distance of 20ft. Also at the 30 and 40ft., for a distance of 30ft., where the reef is 2ft. 6in., but at the bottom of the shaft it is only 6 inches in size.

The level between the shafts passes through a dyke mass, through which the reef is very pinched near the surface, but makes a little in depth, the vein being only an inch or two in width, and has a band of calcite on either side of it. It is much iron-stained and vuggy, which cavities are often filled with a powdery black oxide of iron very rich in gold.

The country to the Westward of the dyke is solid blue clay-slate, whilst to the Eastward it is sandstone, with thin beds of indurated slate.

At the Western end of the lower level, after passing through the dyke, the reef takes a turn to the Southward, the dyke forming the Eastern wall with a

clay-slate Western or hanging wall, and it is here that the reef is better formed, of greater size, and seems to be turning round to follow the strike of the country. It would be worth while continuing the workings in this direction if the stone is found to carry gold, as it appears to be forming into a well-defined reef.

Although small this reef was very rich, as 97 tons of stone yielded 251oz. 14dwts. 19grs. of gold; but without it is found to be rich enough to work at the Western end, where the reef is increasing in size, it will never pay to continue the workings to any great depth on so small a vein.

The large reef to the Eastward has not been prospected, nor has the leader been traced to its junction with it, as the stone seems to pinch in that direction; but this would be worth testing, as a rich patch in the main reef may be struck at this junction.

#### THE NO. 1 LADY MARGARET NORTH OR HARDMAN'S HOPE.

This abandoned area joins the Lady Margaret to the Northward, and it has been tested by three shafts, which have been sunk, one of which is an underlie to the Eastward 80 feet in depth, and two vertical, one 23 feet and the other 37 feet.

From this area 20 tons 10 cwt. of stone was crushed, which yielded 16oz. 6dwt. 12grs. of gold.

The workings are not safe now, so nothing can be said about the formation, but there would have to be a large body of stone for it to pay.

#### THE NO. 5 LADY MARGARET NORTH.

This forfeited area was to the Northward of the last mentioned and four small shafts along the line of reef, which appears to be a good size, but as the shafts are unsafe it was impossible to examine it below.

6 tons 10 cwt. of stone was crushed from this area, which yielded 9ozs. 6dwts. of gold. If there is more stone of this quality, considering the size of the reef, it should be thoroughly tested.

#### THE AFGHAN CROWN, PART OF THE LADY MARGARET SOUTH.

This lease of 5 acres, is to the Southward of the Lady Margaret, and there is a reef which varies from a few inches to six feet in width, striking a little East of North, and dipping to the Eastward. A shaft has been sunk to the Eastward to a depth of 40ft. but it has not cut the reef, but will probably do so at about 50ft.

The stone is gossany, and forms a large mass or blow to the Northward end of the area, following the course of the dyke which was cut in the Lady Margaret drive.

A crushing of 64 tons of stone taken from the surface, where a series of small leaders outcrop, yielded 48ozs. 8dwts. of gold.

#### THE BROCKMAN KING.

This area is a little to the South-West of the Afghan, but is now abandoned.

A shaft was sunk about 30ft. on a solid quartz reef about 3ft. in width, in which there is a good deal of mundic. It follows the strike of the country, which is here solid blue slate, dipping to the Eastward, but the reef cuts out altogether in a small gully, about 60 feet to the Northward of the shaft.

Some very rich specimens were obtained from this claim, but the stone generally does not show gold.

#### THE SOUTHERN CROSS.

To the South-Eastward of the Brockman King, there is an area of 10 acres, on which two lines of reef have been tested.

On the Eastern line of reef there are two shafts, the Northern one is 25ft. in depth, showing a reef from 1ft. 6in. to 2ft. in thickness, and is intersected by some cross leaders, which run through the hill, which latter have been traced by a small drive to the North-Westward. Further South there is another shaft 15ft. in depth, with a drive along the line of reef, the stone of which is about 2ft. in thickness, dipping very flat at the surface, and is grey gossany and much iron-stained.

On the Western reef, at the Southern end, a shaft has been sunk 50ft., following the stone all the way down, which is from 2ft. to 2ft. 6in. in thickness, and is well-defined, but much more iron-stained than the Eastern reef, whilst the country is here sandstone. Further North are some small workings on a small reef, the stone from which is much whiter, very variable in thickness, but shows a fair formation when opened up. A crushing from this area yielded 3oz. 5dwts. of gold for 5 tons of stone crushed.

#### MOUNT DAVIS.

A short distance due East from this last-mentioned area there is a lease of 6 acres, but no work has yet been done upon it, and no reliable information could be obtained as to what prospects had been obtained.

#### THE MOUNT BRADLEY TUNNELLING CLAIM.

This area of 30 acres is a little to the North-East of the last-mentioned. It is held as claims and reward claims in consideration of certain prospecting having been done by tunnelling.

The reef is large, well-defined, and forms the main ridge in this part of the country, running North and South from the Ruby to the Golden Crown, and attaining an elevation here of about 200ft. above the surrounding country.

The stone is blueish, iron-stained, and gossany, dipping to the Westward, and having a sandstone foot-wall and clay slate hanging wall. The main shaft is near the top on the Eastern side of the hill, and has been sunk 100ft., but 20ft. from the surface a tunnel has been driven out to the Western side of the hill. About 3ft. of the stone was very rich here, and this has been stoped for a distance of 20ft. on either side of the shaft, but it pinches to the Southward and also in depth.

A small shaft has been sunk on the Western side of this reef on a small leader running off from the main reef in a South-West direction, which was very rich in gold.

Further to the Northward, on the Western side of this hill, a large body of stone from 12ft. to 14ft. in thickness has been worked to a depth of 30ft. It is well defined, with good walls, particularly on the Eastern side, and was very rich in gold, the shoot dipping to the Northward.

On the Eastern side of the hill a tunnel has been driven into the hill for a distance of 320ft.; it cuts the reef at about 110ft. in depth from the surface, a little to the South of the last-mentioned workings, and between them and the main shaft.

The first 70ft. of this tunnel passes through clay slate, afterwards through sandstone, which is more of a fine-grained sandy flag or shale near the reef, which is here well-defined, 14ft. in thickness, but poor in gold.

On the Western side of the hill is the battery site, where a ten-head battery and Huntingdon mill, stone-breaker, &c., have been erected; but as there is not sufficient driving power to work both these, some alterations have been made in the mill so as to work it as an amalgamator after coarsely crushing in the battery. There is a good well here 70ft. in depth, in which the water rises to within 30ft. of the surface, at which level there is a drive 60ft. in length, and there are also two 15-ft. drives at the bottom of the well.

The rock from the well is a bluish black slate, with veins of graphite and quartz with mundic.

There is a sufficient supply of good water to work the battery continuously for eight hours; but this supply could be greatly increased by either deepening the well or by extending the drives at the bottom.

From this mine 789 tons of stone have been crushed, yielding 810oz. 9dwts. 15 grs. of gold; but in spite of this good return and the cheapness with which this mine can be worked, it is at present in liquidation; but this, it must be clearly understood, has nothing to do with the mine, which should be an exceedingly valuable property.

#### THE PHENIX (LATE LADY CARRINGTON).

This area of 6 acres is on the same line of reef further South, on the hill the other side of Butcher's Gully. There is a large outcrop of quartz here, a large quantity of which has been got out ready for carting, and a good road constructed up the hill to the workings from the battery site.

The reef appears to be about 20ft. in width, and is a whitish quartz much iron-stained and gossany; no gold is visible, but some small trial crushings are said to have yielded very satisfactory results. Should this be correct, everything is in the favor of this mine.

#### THE FAUGH-A-BALLAGH.

This area of 5 acres is situated at the extreme North of this line to the Northward on the same line as the Golden Crown.

Some small shafts have been sunk, and a trial crushing of 6 tons of stone taken out, which yielded 6oz. 5dwts. of gold.

#### THE RUBY.

##### THE RUBY QUEEN.

This lease of six and a-half acres is upon the main line of reef of the district; and from the fact that this was the first mine worked on the Ruby Creek, it has been called the Ruby line; the various leases taken up North and South being commonly known as No. 1 North or South, &c., as the case may be.

This reef forms the main hill ridge of the district, attaining an elevation on this area of about 350 feet above the surrounding country. This fact will greatly



reduce the cost of working, as a great part of it can be worked by drives and tunnels.

The reef has been worked on the Eastern side of the hill, at the head of a small gully, about 138 feet from the top of the ridge, by two drives along its course, one North 265 feet, and one South 160 feet; also by a shaft in this gully 55 feet in depth, where the reef was found to be a good deal broken, and to have pinched out to a small body of stone.

In the North drive the lode is from four to eight feet, and is well-defined between good walls, the country being sandstone and clay-slate, dipping West. It has been stoped in places to the surface. There is also another level above this one, and to judge from these two the shoots of gold will dip to the Northward.

In the South level the lode mass is rarely all quartz, but consists more of a mass of leaders, the largest of which are about two feet in width, intermingled with broken country.

The stone is of a dark blue color, gossany and iron-stained, with patches of a greenish gossan, resulting from the decomposition of arsenical pyrites and galena. There is also a little mundic visible in places, but gold is rarely seen in the stone.

About two thousand tons of stone have been crushed from this mine, which is said to have yielded one thousand five hundred ozs. of gold.

Considering the well-formed character of this lode, its size, and the ease with which it can be worked, if the above-mentioned return is correct it should pay well to work.

The machinery area is about three-quarters of a mile from the mine on a large creek, where there is a dam, well, and good crushing plant, but this has now changed hands, and is being used as a public crusher.

The well is forty-seven feet deep, the water rising to within twenty feet of the surface, and the supply is sufficient to crush continuously for eight or ten hours; but although the water is perfectly good to drink, a prejudice exists against it for crushing purposes, as it is supposed to act chemically upon the silver, so the well has never been deepened to obtain a larger supply.

#### THE NO. 1 NORTH RUBY QUEEN.

This lease of four acres is situated on the same line of reef immediately to the Northward, and the reef has been tested on the top of the hill at its outcrop by a shaft 45 feet in depth on two leaders on the hanging-wall side of the main reef, which are, when taken together, about three feet in width and are very rich in gold.

Another shaft has also been sunk to a depth of 60 feet in which the reef is about six inches in width, and shows gold well in the solid stone. There are also several pits and trenches from which good stone has been raised.

Up to the present all the working expenses have been paid by the gold obtained from this area; and as the main Northward extension of the Ruby Queen passes through it, which can, owing to the natural features of the country, be so cheaply worked, this should prove a very valuable property.

#### THE NO. 2 NORTH RUBY QUEEN.

This was a lease of six acres joining the North side of the No. 1, but running a little further to the Westward. The main reef passes through this area and a small shaft has been sunk, but it has now been abandoned.

The Scandinavian Claim joins this area to the Northward, and is a little more still to the Westward, but this is now also abandoned.

#### THE PYRAMID, OR NO. 3.

This lease of three acres is the next on the main line, but it has not been tested, for the tunnel which was driven into the hill on the Western side following a small leader, was not extend far enough to cut it. It is now abandoned.

#### THE UNION.

This claim is four hundred yards by four hundred yards in extent. It adjoins to the Northward of the last mentioned.

The main reef has not been tested, but a small shaft has been sunk on some leaders on the Westward side of it.

These leaders were then followed by a drive to their outcrop, on the side of the hill, a distance of sixty feet from the bottom of the shaft through a soft white slate, but this leader proved too small to be worth working.

Further down the gully, to the Westward, some more small leaders running North and South have been prospected by a forty feet shaft, but the present workings are situated still down the hill, where there is a small shaft, about twenty-five feet in depth, in which there is a small but very rich leader about one foot to one foot six inches wide, which is being worked, but this pinches towards the bottom of the shaft.

There are several pits and trenches along the crop of this leader from which very good stone is being taken. It contains a good deal of mundic, but there is a good quantity of free gold, as thirty tons of stone crushed yielded forty-five and a half ounces.

These leaders, although very rich, will only pay to work, as they are being worked now to a slight depth by the owners themselves, but should the main reef, which passes through this area, when prospected, prove rich in gold, this would be a very good claim.

#### THE WEST AND LEFT, OR No. 4.

This lease of seven acres one rood and fifteen perches joins the Union on the North side, and towards the South end a cross leader which strikes East and West, dipping South, and from one foot six inches to three feet in width has been tested by a shaft to a depth of 70 feet.

At the surface this leader seems to make in size towards the main reef, which is to the Eastward of it, and to pinch out towards the West.

At the forty-feet level in the shaft the reef takes a turn and runs North-West and South-East down the shaft, whilst another leader from one foot to two feet six inches, running East and West, was cut here. These two join at the bottom of the shaft, making together about three feet of stone, and a trial crushing of which yielded about three oz. to the ton.

The Central shaft is about twenty feet, and was sunk on some leaders which follow the strike of the country, but the stone was not so rich here.

The North shaft is closer to the main reef to the North-West of the latter, on an East-and-West leader, which goes down nearly vertical. It is one hundred and eight feet in depth, which is about the water-level here.

At the sixty-feet level there is a drive thirty feet West, where the reef is one foot six inches, and fifty feet East, where it increases from two feet six inches to three feet, it has a well-defined North wall, but no South wall.

At the bottom of this shaft is a well-defined body of stone about three feet six inches in size. The stone is dark-blue, much iron-stained, and shows gold freely in crushing. It yielded 1oz. and 15dwts. of gold to the ton.

There is also a small shaft on the main line of reef about ten feet deep, and the stone carries a little gold.

Altogether 189 tons of stone have been crushed from this mine, which yielded 376ozs. 18dwts. of gold.

These leaders, although not true veins, are so rich and of a fair size that they will pay well to work, whilst their general characters seem to indicate that they will go down for a considerable depth.

As they make in size towards the main reef, it would be as well to prospect them in that direction, as other rich shoots may be found near it.

When machinery is erected it had better be placed on this area itself to save all expense of cartage, as an abundant supply of water will be struck by deepening the main shaft a few feet.

Up to the present this mine has been very rich, and will probably continue so for some time to come, but working expenses must greatly increase, as the stone has to be raised from greater depths; but when machinery is erected on the area a great deal of stone will pay to crush which will not at present pay to cart to the public crusher.

#### THE GOLIATH, OR No. 5.

This lease of eight acres joins the West and Left to the Northward, but no work worth mentioning has been done, and it has now been abandoned.

#### THE RUBY QUEEN EXTENDED NORTH, OR No. 6.

A lease of fifteen acres under this name was taken up to the Northward of the Goliath, but it was not worked, and has not been abandoned.

#### THE TRIUMPH.

The situation of this little lease of two acres is at the North-East corner of the last mentioned.

The reef prospected is a parallel line about six chains to the Westward of the Ruby Queen line.

A small shaft about fifteen feet in depth with a small level at the bottom along the reef, which here strikes a little East of North, dipping slightly to the Westward. The stone is not so dark in color or so iron-stained as that from the



main line, but is about four feet in thickness, showing gold. It is a well-defined reef, and shows at the surface for a considerable distance, but very little prospecting has yet been done on it.

#### SUNNY CORNER.

This lease of two acres is to the North of the latter, on the other side of the Creek, where a small cross leader has been worked by a shaft which has since fallen in, but is now being tested by a drive from Eastward.

About 18 or 20 tons were crushed from this shaft, and are said to have yielded about 60ozs. of gold.

A little more to the Eastward a shaft has been sunk in clay slate to the depth of 45 feet, where further work was stopped by striking water.

This reef is probably an off-shoot of the Triumph Reef, which passes through this area, but which has not been prospected on this area.

#### RIISING SUN, OR No. 7.

This lease of 12 acres is on the main line to the Northward of the Ruby Queen Extended North, on the opposite side of the Creek, and to the Eastward of the Sunny Corner.

This reef is the main Ruby line, and has been tested near the battery, where it crosses the creek; a trial crushing of 20 tons yielding 8ozs. of gold.

The main workings are on the top of the hill, more to the Northward. The first shaft is called the prospectors' shaft. It is about 60 feet in depth, with stopes on either side; the reef dips West, and is well defined between sandstone and clay-slate walls, showing well in an open cutting, being from 1ft. 6in. to 3 feet in width, and some very rich specimens were obtained.

The central shaft is a little more to the Westward, and is about 50 feet in depth, with a level at 40 feet connecting it with the original working, and also with the North shaft. The North shaft is about 50 feet vertical; then follows down the reef on the underlie for another 40 feet. At the bottom of the vertical a large mass of very rich stone was struck, about 13 feet in width, but below this level the stone decreased in size, making again at the bottom of the underlie into a large body, but the stone is not so rich.

The stone is of a light color, and a good deal iron-stained. A crushing of 500 tons is said to have yielded 437ozs. of gold.

There is a ten-headed battery, with amalgamation pans on this area, with a dam and well, which latter is 60 feet in depth. The water is good, and rises to within 30 feet of the surface, yielding 3,400 gallons a day, but this supply could be greatly increased by deepening it, as in 20 or 30 feet the main reef will be struck, when a large supply of water is sure to be encountered.

On this area a very great deal of useless work has been done, all of which might have been saved, and the reef thoroughly tested, by putting in a level near the battery in a Northward direction along the line of reef, by which means the entire length of the reef might have been tested at a depth of considerably below the present workings; besides which nothing but stone need have been brought out. Rich patches might have been stoped, and all the stone would have been landed from the trucks at the battery without any haulage or cartage, the battery being on the line of reef.

The position of this mine is adapted in every way to cheap working; and as it is also on a large deep main branch of the Ruby Creek, a dam could be constructed which would hold a large quantity of water, into which it could be returned after passing through the settling pits.

The crushings from this mine have for some reason always been kept private; so that the returns stated above are not reliable, but if they are correct this mine should be a good payable property.

#### THE No. 8.

On this area, which is now abandoned, there are two shafts, one 70ft. and the other 60ft. in depth. They are 50ft. apart; and a leader, 1 foot in width, rich in gold, is said to have been cut in the 60-ft. shaft, but the main reef is a good deal split up at this end.

#### THE No. 9.

On this abandoned area there is an underlie shaft 20 feet in depth, with a cutting at the South end. There is also a vertical shaft 25 feet, both of which are supposed to be on the same leader as worked in No. 8.

#### THE ST. LAWRENCE.

This lease of 5 acres 3 roods and 36 perches was taken up on a branch reef which runs away to the Westward from the West side of the Ruby Queen lease. This has been worked to a depth of 36 feet, and the stone, which is

from 3 to 4 feet in width, stoped for a distance of 50 or 60 feet; it strikes in a North and South direction, turning sharp at the South end to the Eastward. The stone is dark, nearly black and gossany, and shows gold freely, a crushing of 233 tons of which yielded 277oz. 10dwts. of gold. Further down the gully a drive was put into the hill to cut the reef, a level driven along it for a distance of 95 feet, following the lode formation, which strikes here North and South.

#### THE ST. LAWRENCE EXTENDED SOUTH.

A lease of 8 acres was taken up, but is now abandoned on the South side of the last-mentioned area, with the idea of working the same reef, but the St. Lawrence takes a bend to the Westward, and runs into the Ruby Queen area. No work has been done upon this area, as it is on neither line of reef.

#### THE RUBY QUEEN SOUTH.

Joining the Ruby Queen, on the South side, a claim was taken up on the main line of reef, but nothing has been done, and it is now abandoned.

#### THE RUBY QUEEN EXTENDED SOUTH.

About 36 chains to the Southward, on the same main line of reef, a lease of 4 acres was taken up, and a little prospecting done, as gold was found in the cap of the reef, but like many more it is now abandoned.

#### REFORM CLAIM.

This claim is situated on the Mary River, and was prospected by a small shaft about 20 feet in depth, with a drive of 15 feet to the Eastward at the bottom.

The reef is granular quartz, much iron-stained, from three feet to four feet in width, and is well defined, following the strike of the country and underlies to the Eastward. A trial crushing from it yielded 11ozs. of gold for three tons three hundred weights of stone.

The Bijou Claim is situated close to the East side of Mount Dockrell. There is a large white quartz reef a good deal iron-stained, underlying to the Westward, in mica-slate country.

Two small shafts have been sunk on this claim, and from the West shaft some very rich specimens were said to have been obtained, but the South shaft, which is ten feet, did not cut the reef.

#### THE LADY HOPETOUN

Consists of the Victoria United, Hard Labor, McNeil's Fifty Feet, and Black Prince.

#### THE HARD LABOR.

On the Hard Labor Claim a shaft was sunk to a depth of thirty feet in the lode all the way down, which at the bottom is about four feet in width. The stone is white and granular, containing a good deal of galena and some copper pyrites, with a hard blue slate wall on the West side, and a broken wall with strings and leaders coming in from the Eastward.

There has been no crushing from this shaft, but an assay yielded twenty ounces of gold to the ton.

#### MCNEIL'S, FIFTY FEET.

A shaft has been sunk on some reefs on this claim twenty-five feet showing ten feet of broken country, with quartz leaders, dipping to the Eastward with a galena vein on the foot-wall two feet in width, from which some very rich specimens were obtained, and a crushing of 40 tons yielded three hundred and fifty-one ounces fourteen pennyweights of gold.

#### THE VICTORIA UNITED

Joins McNeil's, and is on the same reef, and a shaft has been sunk thirty-five feet, and fourteen feet of underlie, from which four tons of stone were crushed, yielding 123ozs. 6dwts.

A main shaft has been started on this claim thirty feet to the East of the reef, to cut the reef at depth of one hundred feet, but it is at present only down thirty feet.

#### THE BLACK PRINCE

Joins the last mentioned, but the reef worked is further to the Westward. A shaft has been sunk 20 feet in a soft grey decomposed slate, at the bottom of which is a small leader, which is very rich; which in a cutting a little North making it four feet in width, but is not so rich.

Some of the stone from the cutting mixed with the casing crushed as much as four ozs. four dwts. of gold to the ton.

There is another little shaft further South, but it did not strike the reef.

There is a very good, complete, but light, crushing plant on this mine; but at present it is not working, as the dam is dry, but plenty of water can be obtained by sinking.

There is a well about a quarter of a mile up the gully, where the water-level is eighteen feet. This well has now been sunk to a depth of 25 feet, and there is a good supply.

These reefs at the Dockrell, wherever they were tested, have proved very rich, the gold occurring mostly associated with galena, some very fine specimens of which were at one time found here, showing the galena thickly studded with gold.

The galena itself in these mines does not seem to be combined with much gold and silver, most of which occurs free in the quartz or gossany veins; so up to the present very little trouble has been experienced in its extraction, but as it will probably be found more in combination in depth all the blanketings should be saved to be specially treated later on. The lodes are well-defined, and contain a great deal of mineral. In a shaft near the battery the stone is full of mundie, and to judge from the appearance of a great deal of the rich stone that was raised from McNeil's, that reef will also contain a great deal in depth.

It is not at all likely, that these very rich patches which were struck at the surface will go down, but the stone will probably be found rich enough to pay, and no time should be lost in obtaining water near the battery and starting to work, crushing as soon as possible.

#### CHRISTMAS CREEK DIGGINGS.

For 40 miles to the South-Westward alluvial gold has been found rich enough to pay to work; but owing to the dryness of the present season no one is working there at present.

#### PROSPECTS OF THE FIELD.

Considering the extent of this field in length (150 miles), over which gold has been found, the size, well-defined character of the lodes, their richness, and length that they carry gold at the surface, the comparative cheapness with which they can be worked, and the good supply of wood and water, there is every reason to predict that this field will eventually become one of the important reefing districts of Australia. At the present it is suffering from a dreadful reaction, as, being the first goldfield discovered here, it was thought a good deal more of than it was really worth; people with a little money rushed madly into speculations of which they knew nothing, and generally ended by losing all they had. Large numbers of speculators in the other colonies were equally unfortunate, as Kimberley, being so far away, reliable information was very difficult to obtain, and many of the reports were utterly false. Another thing which has done a great deal of harm on this field is the power managers have of raising money on the companies' property, without the companies' consent, and the same being disposed of by public auction after a notice has been posted on the claim for a few days, and as there is no one on the field who can buy machinery it is always sold for next to nothing. Now, it must be clear to everyone that capital will not find its way into this country if it is not protected in some way by law, and it would be wrong to advise anyone to put a sixpence into anything on this field until they receive more protection. It may be said, on the other side, that many of these companies' cheques were dishonored and large accounts unpaid, but if people will give credit they must run the risk. A great deal of trouble would be saved if credit were made illegal to no-liability companies.

There can be no immediate future for this field, as most of the richest areas are in the hands of working miners or storekeepers, into whose debt they have run, but to whoever they belong they have the same idea that their fortune is in the particular area in which they are interested, and, therefore, would want much too large a sum to transfer their interest to anyone with capital sufficient to work it, as it is quite out of the question for anyone to pay fancy prices for untested claims in this far-away field, although they will, probably, be good steady dividend-paying mines if properly worked. As most of the rich reefs on the field are still held, it follows that the field cannot go ahead by the aid of outside capital until all the stone which is rich enough to work as at present is exhausted, or till all those interested are so deeply in debt that they will be glad to take anything to get clear of it.

#### IN CONCLUSION,

It is absolutely impossible to estimate the quantity of gold raised from this field, as at the start of the field there was an export duty on gold; most of it was smuggled out of the Colony, but it must have been very large, as all the diggers agree that this field was the richest yet discovered in this Colony.

The following is the most complete list obtainable of the returns from the different mines and the number of tons of stone crushed:—

	Tons cwts.	Yielded oz. dwts. grs.
THE PANTON—		
The Star of Kimberley ... ..	1 0	0 16 0
The Comet ... ..	1 14	134 0 0
The Perseverance ... ..	5 0	3 0 0
HALL'S CREEK—		
The Jubilee ... ..	9 17	403 13 12
The Lady Broome ... ..	400 0	30 0 0
The No. 1 North Lady Broome ... ..	6 0	4 3 0
The Gladstone ... ..	2 0	3 17 0
The Jackson's Reef ... ..	78 0	56 18 0
The Black Mount ... ..	8 11	3 8 0
THE BROCKMAN—		
The Lady Margaret ... ..	97 0	251 14 19
The No. 1, North Lady Margaret ... ..	20 10	16 6 12
The No. 5, do. do. ... ..	6 10	9 6 0
The Afghan Crown ... ..	64 0	48 8 0
The Mt. Bradley ... ..	789 0	810 9 15
The Golden Crown * ... ..	1000 0	1250 0 0
The Faugh-a-Ballagh ... ..	6 0	6 5 0
The Southern Cross ... ..	5 0	3 5 0
RUBY CREEK—		
The Ruby Queen * ... ..	2000 0	1500 0 0
The Union ... ..	30 0	45 10 0
The West and Left ... ..	189 0	376 18 0
The Rising Sun * ... ..	500 0	437 0 0
The Sunny Corner ... ..	20 0	60 0 0
The St. Lawrence ... ..	233 0	277 10 0
THE MARY RIVER—		
The Reform ... ..	3 3	11 0 0
MT. DOCKRELL—		
The Lady Hopetoun (McNeil's) ... ..	40 0	351 14 0
The Victoria ... ..	4 0	123 6 0
Total ... ..	5519 0	6218 8 10

\* The Returns from mines marked thus \* are only approximate.

But this gold is mostly of a low value, realising at the Mint in Melbourne about £3 11s. 6d. per oz. This is partly due to the fact that the copper plates on the tables are scraped down with knives so as not to lose any gold, but mostly to the addition of copper to increase the bulk, as granulated gold is the currency on the field; and as only £3 7s. 6d. is allowed for it, they reduce the standard, which is really, if properly treated, very high.

These returns, which are mostly authentic, clearly prove that the reefs worked are payable; and it will be seen at a glance that in only a few instances, where small quantities of stone were crushed, was it picked. The larger crushings, taken as a whole, would return about 1oz. to the ton of stone, which should pay handsomely. One great mistake on this field is that the batteries are erected as a rule far from the mines, with the idea of obtaining water at a shallow depth. This is a great mistake, because there is not an area on the whole field where water will not be found somewhere at a depth not greater than 200 feet, but generally much nearer the surface. If this were done this reef might be tested at the same time; all carting would be saved, and anywhere a good supply of water is sure to be struck on a line of reef.

A regulation is also necessary forbidding the removal of timber from abandoned workings; many of which are well worth another trial, which is often prevented by the shafts having fallen in.