Western Australia.

REPORT

on

The North Kimberley District

of

Western Australia.

By

WILLIAM R. EASTON, L.S., etc.,
In Command of
Kimberley Expedition, 1921.

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by direction of the Hon. H. P. Colebatch, M.L.C.,
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To the District Surveyor for the North.

I have the honor to submit, for the information of the Honourable Minister for Lands, the following report on the results of my examination of the North Kimberley District.

On receiving intimation from you, that the Hon. Premier had approved of my appointment as leader of the expedition, I immediately proceeded to make arrangements for the carrying out of the work, and recommended the appointment of the following *personnel*:—

Mr. S. Rea—Second-in-command.
Mr. O. Siddins—Assistant.
Mr. N. Wright—Assistant.
"Jungabyne"—Native tracker.
"Mick"—Native tracker.

Advantage was taken by the Forestry Department of the opportunity of investigating the flora of these regions, and Mr. C. Gardner, of that department, was attached to the party for the purpose of making a botanical collection.

Having received my instructions from you, and all necessary arrangements being complete, I left Fremantle for Derby on the 24th March, 1921. On arrival at Derby, I was met by Mr. Siddins, who had preceded me, and who had taken charge of the mules which had been shipped from the North-West, assembled the saddlery, and carried out a number of preliminary arrangements. At the time, there was a big shortage of horseflesh along the Fitzroy Valley, but Mr. Rea, through sound judgment, was able to get together, what was, under the circumstances, an excellent plant of horses.

I had previously arranged for Mr. Rea to bring the horses from "The Fitzroy Crossing," to Derby; but through the courtesy of the Commissioner of Police in lending me police horses, I was able to leave Derby without delay, and assemble the outfit at Kimberley Downs station, thus saving time, and sparing the horses 120 miles of travelling.

Through the kindness of Mr. A. Lloyd, manager of Kimberley Downs station, we were able to make our starting depot at the homestead, thus having the use of the station yards and equipment for handling the unbroken horses and mules, shoeing, packing, etc.

Throughout the trip we were dependent on the rifle and fishing line for our meat supply, and it is significant of the abundance of game throughout the country that there was never any shortage of this commodity.

The main source of our meat supply.
(The view showing Second-class Country.)

Although subjected to fairly hard conditions of living, the whole of the party maintained their health, and no sickness, even of the most minor description, was experienced.

Distances travelled were estimated by time, and positions were checked daily by astronomical observations and bearings.

It is worthy of noting the relative value of horses and mules for this class of work. Horses will not stand long journeys, and great care was required in handling them. The rough and continuous nature of the work soon told on some of the horses, and placed a number of them out of action. They appeared to have no initiative in looking after themselves generally, and in bad places often became excited and knocked themselves about.

The mules did about three times as much work as the horses, and finished in very fair condition. They would not camp without the horses: but when travelling, were always in the lead. They showed considerable intelligence in choosing the easiest travelling and in getting round obstacles, and in dangerous places would remain calm until shown a way out of their difficulty.

In the following report I have expressly avoided the use of scientific terminology, except where it appeared that some ambiguity may exist. In such cases I have used both the common and technical names.

The photos. illustrating the water were all taken towards the close of the journey, and therefore at the end of the dry season.

PHYSIOGRAPHY.

The North Kimberley District has, at some remote period, apparently been one vast sandstone tableland or plateau, but its present configuration is somewhat rugged, due no doubt to the natural erosion caused by the heavy tropical rains which fall throughout the summer months of the year.

In consequence of the heavy rains, the country is intersected with a number of fine watercourses, most of which take their rise in the vicinity of Mt. Hann, the watershed of North Kimberley, and flow outwards to the Indian Ocean. On their way to the sea they flow along tablelands, then through deep channels and gorges which they have cut in the soft sandstone rock, out across wide valleys, and generally empty into tidal estuaries. Some of the rivers attain a fair length and are perennial, the Drysdale River being over 250 miles long.

In places the original tableland has been completely eroded away, until the underlying masses of intrusive igneous rock have been left exposed. These valleys, for such they are, being walled in by the surrounding tablelands, vary in size from a few acres up to many hundreds of thousands of acres, and are of great importance, inasmuch as they form the better class pastoral lands, on which the finest and most succulent grasses grow.

Few of the hills and ranges are due to deformation, but owe their existence to the hard nature of the rocks with which they are capped, having resisted the processes of erosion longer than the softer rocks of the surrounding country. The capping generally consists of a layer of indurated sandstone, or laterite; the hills capped with laterite being generally magnetic, *e.g.* Mt. Bradshaw.

Mt. Hann.

Some of the mountains present a remarkable and striking appearance, and stand as grim reminders of "the gnawing tooth of time." Originally, they formed part of the one vast tableland, but now stand as isolated monuments to the huge masses of rock that have been moved by the processes of weathering. They are generally isolated, flat-topped, and cliff-faced, and do not attain any great elevation

above the surrounding country; the highest, Mt. Hann (about 2,800 feet above sea level), being only about 800 feet above its base.

A number of other mountains are merely elevations on the tablelands.

The tablelands are generally bluff-faced and seamed with deep gullies and gorges which have been scoured out by the heavy tropical downpours, and are rapidly yielding to the violent effects of weathering (erosion and insolation), which occur in these parts.

GENERAL OUTLINE OF COUNTRY, RESOURCES, ETC.

In accordance with my instructions, I made an examination of the coast-line from Walcott Inlet, northwards to Napier Broome Bay, with the object of locating the most suitable site for a new port to serve the large tract of vacant country lying between the King Leopold, and Durack Ranges. I also examined sufficient of the hinterland to enable me to make a rough classification, and form a fair idea of its potentialities, and general suitability for stock-raising and agricultural purposes.

The country under consideration comprises an area of approximately 15,000,000 acres, exclusive of the aboriginal reserve of 4,000,000 acres; and the period spent in examining it was during the dry months of the year, April to October, when the country is at its worst.

About 1,100 miles of country were traversed on horseback, about 640 miles by boat, and about 320 miles on foot. These distances represent the main courses travelled, and are exclusive of side travelling, which would amount to some hundreds of miles.

The area under review can be roughly divided into two main classes—basaltic and sandstone—and it is particularly noticeable that the watercourses usually flow along the lines which separate the igneous from the sedimentary regions, thus acting as rough boundary lines between the basaltic and sandstone areas.

The basaltic country consists principally of a reddish brown loam; but varies in quality from rough stony hills and rises, to magnificent black-soil plains, which have a great depth of free soil, but are of no very great extent in area.

Lime occurs abundantly throughout the basaltic areas.

The hills and valleys are invariably grassed with many varieties of fine grasses (a collection of grasses was made for the Forestry Department, but have not been identified yet); mitchell, flinders, bundle-bundle, and blue grasses were observed in certain localities.

The igneous areas are very lightly timbered with box, coolibah, nutwood, ironbark, bloodwood, etc.

Mimosa (Acacia bidwilli, and suberosa), a valuable fodder shrub, and several varieties of leguminous plants, which are much sought after by stock, grow in limited quantities throughout the basaltic areas.

The creeks and rivers are generally fringed with leichardt-pine, pear, chestnut, fig, cadjeput, and pandanus trees.

The sandstone country generally consists of a light sandy soil; but varies in quality, according to the amount of gravel and rock it contains. On the tablelands there are large areas free of rock, whilst the scoured areas near the coast are practically nothing but a mass of broken sandstone. The sandstone areas are generally clothed with soft spinifex (a valuable fodder plant), fair grasses, leguminous plants, and many varieties of topfeed.

The predominant timbers are:—Woollybutt, messmate, pine, wattles, quinine, kurrajong, white gum, etc.

Numerous grevillea and swamp banksia flats occur throughout the sandstone areas. These flats consist of a moist, rich, sandy loam; but are generally of no great extent in area.

North Kimberley is pre-eminently a pastoral country, although there is little doubt but that the climate, and certain areas are well suited for the growth and production of many articles of commercial economic value, which now form the basis of important industries in other countries. The solution of the problem of the successful agricultural development of this country rests with labour.

The district's greatest asset is its wonderful water supply, which renders it practically drought-proof. It is interseeted with many large rivers, and innumerable creeks and springs. The flow of the rivers is considerably reduced towards the end of the dry season, but this does not detract from the value of the water supply, as even then, there is a superabundance of water for all pastoral requirements.

Some of this country is fairly rough; but rough as it is, it has a high feeding value, being grassed with soft spinifex (a valuable fodder plant), many varieties of topfeed, and grassy flats along the creeks and springs which abound in this country.

Country equally as rough, exists on some of the premier stations in both the East and West Kimberley districts, but whilst the rough country of the North Kimberley district has a high feeding value, the rough country of the East, and West Kimberleys is clothed with coarse porcupine grass, which is practically useless for many months in the year.

The district, as a whole, is quite equal to either of the other Kimberleys, and has a big future ahead of it, provided it gets the right type of settler.

ROUTE.

All arrangements being complete, we left Kimberley Downs Station on the 10th April, and headed out for a pass over the King Leopold Ranges. Owing to the lateness of the rainy season, the swollen rivers, and the boggy nature of the country, we were compelled to made wide detours, and were considerably delayed.

We crossed the Lennard River about six miles below the junction of the Barker River, and struck the Barker about one mile below the junction of the Wombarella Creek, at the southern entrance to the Barker Gorge, through the Napier Range. The country traversed thus far consisted of extensive alluvial river flats, and small black soil plains, the whole of the country being splendidly grassed with mitchell, flinders, bundle-bundle, and other fine grasses, and lightly timbered with coolibah and box.

There was evidence of the extensive nature of the recent heavy floods.

After passing through the Napier Range, we travelled up Wombarella Creek, through similar country to that already described, until, after passing Mt. Amy, the country changed to rough granite hills with fair travelling between.

This brought us to the foot of the King Leopold Ranges, in the vicinity of Mt. Hart. Ascending the foothills, we found fair travelling along several grassy flats, and finally passed through the main range by a gorge known as "Gardiner's Gap." This pass was discovered by Mr. F. Gardiner last year; it is somewhat rough, but a fair road could be made with little expense.

We were then compelled to make a very wide detour, in order to keep on the basalt country, owing to the boggy nature of the sandstone areas. This detour took us up the Isdell River to the vicinity of Plover Hill.

After crossing the Isdell River, we passed through splendidly grassed undulating basaltic country for about 20 miles, and then through gently rising sandstone country, finally coming out on the edge of a line of precipitous cliffs, which form the Synott Range.

Descending from the Synott Range, we travelled across splendidly grassed undulating basaltic country until, on the morning of the 25th April, we came out on the edge of a magnificent gorge on the Charnley River. This gorge is about 25 miles long, and at the point where we struck it, was about 500 feet deep, with perpendicular sides.

The Charnley Gorge.

Travelling upstream about three miles, we found a fair crossing, and spent the remainder of the day transporting the packs on rafts, and swimming the horses across the river, which was swollen by the recent heavy rains.

Our greatest difficulty lay in getting the horses across, as the river has scoured its course out of the solid rock, which is covered with slime, and which afforded a very precarious foothold for the animals when landing. It took us a day to get them across, and they were very badly knocked about on the rocks.

We then set out to cross the Edkins Range, which consists of sandstone and quartzite, and is seamed with precipitous gorges. After about two miles of very rough travelling we came out on the edge of a very fine valley, which was running in the direction we wished to travel. We descended into the valley and followed it along, but after about eight miles of splendid travelling, it gorged, and

became impassable. We then camped and spent the rest of the day endeavouring to find a way out without having to go right back. We were unsuccessful, and the following day had to retrace our tracks to where we first entered the valley. We then found fair travelling along sandy flats and gullies between the sandstone ledges. After a few miles of good travelling the country began to get rough, and it was frequently necessary for us to dismount and search ahead for a track. After a very trying day's travelling, we succeeded in crossing the Edkins Range, and camped on the Calder River in fine basaltic grass lands.

North-Westerly from the Calder River, along the base of the Harding Range, and across the Panter Downs to the Sale River, the whole of the travelling was over magnificently grassed and splendidly watered basaltic country.

After crossing the Sale River, we entered very rough sandstone country. Fair travelling was found along sandy flats and gullies, and across small basaltic plains, until the divide was crossed a few miles east of Mount French. Great difficulty was experienced in travelling down to the Glenelg River, and in places the country became almost impassable. Although this country is very rough, it has a fair feeding value, and good tracks could be found by searching.

Travelling North-Westerly from the point where we crossed the Glenelg River, we passed over splendidly grassed basaltic country until striking the Macdonald Range, a few miles east of Augustus Water.

Transporting packs across a stream.

Passing over a saddle in the Macdonald Range, we travelled up a rough basaltic valley for about two miles and came out on an opening of about 1,000 acres in extent, on which is located the Port George Presbyterian Mission Station.

The Mission is managed by Messrs. Paull and Beard, who entertained us hospitably during our stay there.

The station is surrounded by a garden of a few acres in extent, which demonstrates the fertility and suitability of the soil for the growth and production of many species of plants. In addition to the garden, they have about 100 goats, and several head of cattle.

After leaving the Port George Mission, we travelled Easterly for about 30 miles over rough sandstone tablelands, which were seamed with deep fertile valleys running into St. George's Basin. We then struck in to the Prince Regent River, and endeavoured to find a crossing.

Beyond St. George's Basin the river has no great breadth, but the banks are very precipitous and rocky, except for small belts of mangroves, which occur at distant intervals along either side. The river is very deep, and there is a continual rush of water, owing to the high rise and fall of the tide (36 feet).

After several attempts to find a crossing, we were compelled to abandon the idea, as we were completely enclosed in a maze of impassable sandstone ranges and gorges, which were a complete barrier to any further progress, and necessitated our retracing our steps for some considerable distance in order to get on to the divide.

Crossing the Glenelg River near the lower falls.

In endeavouring to travel along the Prince Regent River, we had completely worn out the horses and ourselves.

Since leaving the Port George Mission the travelling had been very trying, and it was frequently necessary for us to go ahead and search for a track. Sometimes, after spending hours making a road, we would have to turn back and abandon it, and very often, after a whole day's travelling, we would only be about two miles from our previous camp.

In trying to find a track along the Prince Regent River we often had to remove our boots, and travel barefooted, in order to obtain a foothold on the face of the cliffs.

In the last attempt to force a crossing, we spent eight days of wearying travel in a fruitless search, during which period we crossed an almost impassable range of mountains, and succeeded in finding a track down to the water's edge where the river was only about 15 chains wide. The river was crossed by swimming, and an examination made of the opposite bank; but it was obviously impossible to get the horses across without great risk, and no alternative was left but

to abandon the idea of trying to find a crossing. We then set out to get on to the divide, and two days later we passed a spot that we had camped at 10 days previously.

Although the travelling had been somewhat rough since leaving the Port George Mission, the country passed over, consisting of sandstone tablelands and grassy valleys with numerous pockets of well-grassed basaltic soil, may be classed as useful pastoral country.

Travelling South-Easterly along the divide, we found a good road, and passed through very fair sandstone pastoral country until striking the headwaters of the Drysdale River.

Headwaters of the Drysdale River.

Leaving the Drysdale River, we travelled Northerly through splendidly grassed basaltic country, until striking the headwaters of the Moran River, along which we travelled for about 25 miles. For about 10 miles, the river flows through a deep gorge, the country on either side consisting of useful sandstone tablelands. The country on the West then opens out into splendidly grassed basaltic hills and valleys, which extend Westerly to the Roe River.

In the vicinity of Mt. Bradshaw, we left the Moran River, and travelled Northerly through splendidly grassed basaltic country for about 16 miles, at which point we struck a large stream flowing in a North-Westerly direction.

We travelled along this river, through splendidly grassed river flats for about 20 miles, when it bore away to the West. We then left the river, and continued our course Northward across well grassed basaltic and laterite country.

On the 10th July, we reached a point about seven miles South-East of Swift Bay, when all further progress was barred by a line of impassable cliffs. Arrangements had previously been made for a boat to meet us at Swift Bay on the 15th July, in order to replenish our supplies. After seven days' fruitless search for a track it was decided that two members of the party should walk to Swift Bay and arrange to have the stores taken round to Crystal Head, in Admiralty Gulf, to which point the remainder of the party were to proceed and wait. The boat arrived at Crystal Head on the 21st July.

It was found to be impossible to travel horses along the coastline, and in view of the fact that the rough and continuous nature of the work was beginning to tell on them, it was decided to split into two parties, one party to make an examination of the coastline Southwards, to Walcott Inlet, by walking and using the boat as a supply depot, and the other party to make an examination of Admiralty Gulf and Vansittart Bay, and giving the horses a much needed rest.

We separated the same day; one party, under Mr. Rea, proceeding to examine the coastline to the East, and Mr. Siddons and myself leaving to make an examination to the West.

Mr. Siddons and myself made a thorough examination of the whole of the coastline and inlets southward from Admiralty Gulf to Walcott Inlet, and on the return journey, examined portions of the coastline between Admiralty Gulf and Napier Broome Bay.

The Carson River.

We arrived at the Drysdale River Mission on the 22nd August, and the following day Mr. Rea and his party rode in, the horses looking much refreshed after their spell.

After joining forces, we spent a few days shoeing the horses and examining the surrounding country.

The Drysdale River Mission is controlled by the Benedictine Community —a sect of Spanish monks. The Fathers entertained us very hospitably during our brief sojourn with them, and gave us of their best. The Mission is situated on a low sandy flat about half a mile from the sea. It is surrounded by a garden, several acres in extent, in which is growing many species of tropical and sub-tropical plants, such as bananas, cocoanuts, dates, sugar cane, upland rice, etc. They also have a number of pigs and goats, a small herd of cattle, and a few donkeys.

On the mountains near the source of the Prince Regent River.
Mt. Agnes on the right.

After leaving the Drysdale Mission, we travelled due South; the first four miles was through poor sandy country. We then ascended a rough sandstone range, and came out on fair tableland country. About 11 miles South of the Mission, we passed into splendidly grassed undulating basaltic country, and travelled through the same class of country until striking the Carson River, about eight miles from its junction with the King Edward River.

The Carson River is a fine stream, very wide and deep, with earth banks, and is flanked with magnificently grassed river flats. We travelled along the river for about 30 miles to where it emerges from the sandstone country.

We then travelled South-Westerly through fine sandstone tableland country for about 30 miles, after which we passed into well grassed basaltic and laterite country, in the vicinity of the Couchman Range. Passing over the Couchman Range, which only rises a couple of hundred feet above the surrounding country, we continued South-Westerly through well-grassed basaltic and laterite country for about six miles. From this point, until reaching the Drysdale River, the travelling was mainly through good sandstone tablelands, and several patches of basaltic grassland, the whole area being splendidly watered, and having a high feeding value.

After striking the Drysdale River, we followed it along through fine basaltic and sandstone flats, to the headwaters of the Prince Regent River.

To the South of Mount Agnes, we passed through fine basaltic country for about five miles, after which the travelling was through fairly rough, but useful sandstone tableland country, until reaching Karl Lagoon, on the Calder River.

Southern approach to Hann Pass along the valley of the Barker River.

Looking South, along the Barker Valley, from Hann Pass.

From Karl Lagoon we travelled South-Westerly across magnificently grassed basaltic country to the head of Walcott Inlet. We travelled along the West bank

for about 10 miles, and crossed the inlet on a firm sandy bottom, about a mile below the mouth of the Charnley River. There is a rise and fall of about 20 feet at this spot, but when the tide is out, the bed is dry, except for a couple of channels about five chains wide and three feet deep.

We found good travelling across the Artesian Range, and after passing through undulating basaltic country for about 18 miles, arrived at the northern approach to Hann Pass, over the King Leopold Ranges.

Ascending a steep basaltic rise, we travelled along the banks of a creek for about six miles. We then descended a rather steep gully, and came on the headwaters of the Barker River.

This pass is a wonderful track, and with the exception of the steep jumpdown referred to, which is not very bad, may be classed as a good stock route. Throughout its entire length of 11 miles, there is an abundant supply of good feed and water.

Northern approach to Hann Pass over the King Leopold Ranges.

We then followed the Barker River down until we struck our outward tracks at the junction of Wombarella Creek. We reached Derby on the 15th October, at which place the party was disbanded.

PASTORAL LANDS.

For the sake of convenience in describing the country, I have arbitrarily divided it into five zones, as follows:—

South-West.—Embracing the country between the Prince Regent and Charnley Rivers, and extending Westerly from the headwaters of the Drysdale River, to the Indian Ocean.

North-West.—Embracing the country between the Prince Regent, and the King Edward Rivers and the Indian Ocean.

North.—Embracing the country between the King Edward, and Drysdale Rivers; including the area between the King Edward River, and Vansittart Bay.

East.—Embracing the country contained in the aboriginal reserve between the Drysdale River, and Cambridge Gulf.

Central.—The area south of the Drysdale River.

South-West Zone:—

The country between the Charnley, and Calder Rivers, consists of a series of rugged sandstone and quartzite ranges, gorges, and sandy tablelands. In places this country is exceedingly rough, and almost impassable. There are many fine valleys and grassy flats, but none of any great extent. Further to the East, the country becomes less rugged, and opens out into fairly extensive tablelands, which consist of a light sandy soil. Fine grevillea flats occur at intervals throughout this area, and help to raise its general standard.

The whole of this area, with the exception of the grassy flats, is clothed with soft spinifex and several types of topfeed. It is somewhat rugged, and would be fairly difficult to muster in, but will ultimately prove to be useful pastoral country.

A superabundance of water occurs throughout this area in the form of springs and running creeks.

The predominant timbers are—

Woollybutt, quinine, pine, whitegum, kurrajong, and swamp banksia.

The whole of the area lying between the Calder, and Sale Rivers, exclusive of the Harding Range, consists of magnificently grassed, undulating basaltic country. The soil, which is rich in lime, consists principally of a reddish brown loam, alternating with small black soil plains, and stony basaltic hills and undulations.

The whole of this country is heavily grassed with many fine grasses, the principal of which are:—

Mitchell, flinders, bundle-bundle, and blue-grasses, and is lightly timbered with coolibah, box, bloodwood, and nutwood. Mimosa, and several other fodder shrubs are plentifully distributed throughout this area. This country is splendidly watered with creeks and springs, the banks of which are fringed with pandanus, leichardt-pine, fig, pear, and chestnut trees.

The Harding Range consists of a bluff-faced sandstone tableland with steep basalt slopes. The tableland is about 1,300 feet above sea-level, and about 900 feet above the surrounding country. It is inaccessible except at a few isolated points, and becomes very rough towards the coast, where it is seamed with deep valleys. It is clothed with soft spinifex and small grassy flats, and is lightly timbered with woolybutt, pine, etc.

The area between the Sale, and Glenelg Rivers, is composed mainly of rough sandstone hills and valleys, with occasional pockets of basaltic grass-land, which vary in extent up to several thousands of acres. Towards the Glenelg River it becomes very rough and almost impassable. The whole of this area is magnificently watered with creeks and springs, the banks of which are fringed with fine grassy flats. It is clothed with soft spinifex, and good topfeed, and is very useful grazing country. Although rather rough, good tracks could be found through it, and no great difficulty should be experienced in working it. The principal timbers are woollybutt, pine, kurrajong, etc.

From the Glenelg River to the Macdonald Range, and extending Westerly, the country consists of splendidly grassed basaltic hills and valleys. The soil, which is principally a reddish-brown loam, varies in quality from stony hills and rises, to splendid black soil plains. These plains are rich in lime, but do not amount to any great area in extent. The principal grasses are bundle-bundle, flinders, blue, and other fine grasses. Mimosa, and several varieties of leguminous plants are distributed over this country, which is lightly timbered with coolibah, box, nutwood, etc., and fairly well watered with creeks and springs.

From the Macdonald Range, Northwards to the Prince Regent River, the country consists of broken sandstone tablelands, with fair grassy valleys. In places, this country is exceedingly rough, and practically useless. In the vicinity of the Port George Mission Station, there is a fair patch of basalt country, but it does not exceed more than a few thousand acres, a considerable portion being rather stony.

Basalt Country, near Port George IV. Mission.

There are some very fine flats along the valleys running into St. George's Basin.

The good land along each valley probably does not exceed more than a few thousand acres.

With the exception of the valleys, which are clothed with fine grasses, this area is grassed with soft spinifex, and fair topfeed, and although rather rough, it contains some fair pastoral country.

The country lying between the Prince Regent, and Charnley Rivers, and extending Easterly from the Calder, and Glenelg Rivers, to Mount Agnes, consists of a series of sandstone tablelands, which are intersected by numerous well watered creeks, falling to the North, and the South from the divide. On the watershed, the country consists of fairly extensive level plains, but becomes rugged towards the North, and South. Most of the creeks have cut their way down to the underlying igneous rocks, and now flow along deep, narrow, well grassed basaltic valleys. These valleys are of considerable importance, inasmuch that they lend variety to the feed, and help to raise the general standard of the surrounding country for pastoral purposes.

This area is clothed with soft spinifex, and good topfeed, and is intersected with numerous grassy flats, and occasional patches of basaltic country. To the South of Mount Agnes, there is a stretch of about 20,000 acres of splendid basaltic grass land. The whole of this country is magnificently watered, and forms in the aggregate a very useful pastoral area.

North-West Zone :—

The country between the Prince Regent, and Roe Rivers was not inspected, but appeared to be somewhat rough. It apparently consists of rough sandstone ranges, or a high tableland. It is probably grassed with soft spinifex and fair topfeed, and is likely to be fair grazing country.

In the vicinity of St. George's Basin, and extending Northerly, and Easterly for some distance, there is a large area consisting of well grassed basaltic hills and valleys. This country was taken up and stocked many years ago, but was abandoned on account of the hostility of the natives. It will probably be found to contain some fine pastoral country.

The country for about eight miles to the South of Mount Hann, and extending for several miles on either side, consists of splendidly grassed basaltic country, and is rich in lime. To the East, the country is fairly level; but is undulating towards the West.

It is lightly timbered with coolibah and box, and is well watered. Between this country, and the Drysdale River, there is a strip of rough sandstone country about 100 chains wide.

Typical Basalt Valley, in sandstone tableland country, near Mt. Agnes.

The country along the Drysdale River consists alternately of well grassed basaltic and sandy flats.

In the immediate vicinity of Mount Hann, there are a number of fairly rough sandstone ledges which are intersected with fair grassy gullies.

To the North of Mount Hann, and extending about the headwaters of the Moran River, there is an area of about 30,000 acres of fine basaltic grass land, which is supplemented with good sandstone tableland country.

The whole of the country between the Moran, and Roe Rivers, consists of magnificently grassed basaltic hills and valleys. The soil, which is principally a deep red loam, is rich in lime. This area is splendidly watered with creeks and springs, and is lightly timbered with coolibah, box, etc. Mimosa, and several other fodder plants, grow plentifully throughout this area.

The Mitchell River.

Fine basaltic country (the continuation of that already described), extends in a northerly direction from Mount Bradshaw, to the source of the Mitchell River.

The country to the east of Mount Bradshaw, opens out into fine sandstone tableland country, which is well grassed with soft spinifex and fair grasses, and carries good topfeed. It is well watered, and is lightly timbered with woollybutt, messmate, pine, etc.

For about 25 miles from its source, the Mitchell River flows through splendidly grassed river flats, which are very lightly timbered with box, and white gum. The soil is principally a reddish brown loam, and extends some distance to the South-West. To the north, the country gradually rises to a high basaltic tableland, and the soil becomes mixed with a large amount of decomposed ironstone. This tableland extends northerly to the shores of Admiralty Gulf, and is fairly heavily timbered with messmate, and box, and is not so well grassed as the ordinary basaltic country.

The country lying between the Prince Frederick Harbour and the Mitchell River, and extending northerly to Montague Sound, is composed of very broken sandstone country. The central portion consists of fairly open sandstone tablelands; but it is surrounded by exceedingly rough country, which is almost impassable. This area is splendidly watered, and is grassed with soft spinifex, and fair topfeed. Its present value is very low, but it may some day prove to be useful pastoral country.

Southerly from Port Warrender, and extending round the upper reaches of Admiralty Gulf, the country consists of a high basaltic tableland which is splendidly grassed with fine grasses, and carries fair top feed. It is lightly timbered with box and messmate, and is well watered by creeks and springs.

Headwaters of the Woodhouse River.

Northern Zone.—The area between the Drysdale and Woodhouse Rivers, consists of well-grassed sandy country, which is lightly timbered with messmate and woollybutt.

To the north of the junction of the Drysdale, and Woodhouse rivers, and extending for about twelve miles on either side, the country consists of splendid basaltic grasslands, which are lightly timbered with coolibah and box, and well watered with creeks and springs.

To the west of this area, and extending westerly to the Moran River, and Northerly to the headwaters of the King Edward River, the country consists of good sandstone tablelands, which are intersected with pockets of splendidly grassed basaltic country. Towards the West, and the South, the country becomes rather rough. It is well clothed with soft spinifex, fair grasses, and good topfeed. The principal timbers are messmate, woollybutt and pine. The country is well watered, and may be classed as very fair pastoral country.

Headwaters of the King Edward River.

For several miles on either side of the Couchman Range, which comprises a series of low ironstone ridges, the country consists of undulating basaltic and laterite grasslands. This country, which extends Northerly along the King Edward River, and Northerly and Southerly along the Carson River, is splendidly grassed with many fine grasses, and carries a fair amount of mimosa.

Between the Carson, and Drysdale rivers, and extending Easterly, the country is somewhat rough, and consists principally of sandstone tablelands, which are intersected with numerous valleys. The country is well clothed with soft spinifex, fair topfeed, and good grassy flats along the valleys.

Several miles north of the Couchman Range, a low sandstone tableland rises above the surrounding basaltic country. This tableland contains some very fair grazing country, and is well watered with creeks and springs. It is principally grassed with soft spinifex, and contains many fine grassy flats along the watercourses.

Northerly from this country to the King Edward River, the country consists of magnificently grassed basaltic hills and valleys, and is splendidly watered with springs and creeks.

The country in the vicinity of the King Edward River, for distances of about twenty miles, up and down, from Mount Reid; consists of undulating sandstone tableland country, containing fair soils, and well clothed with soft spinifex and fair grasses.

Between the King Edward River, and Vansittart Bay, the country consists of light red gravelly soil, and contains a number of basaltic pockets. It is well grassed, and lightly timbered with messmate, woollybutt, box, and wattle; and is well watered.

To the East, the country changes to splendidly grassed basaltic hills and valleys, and is well watered.

The country North of Encounter Cove, between Admiralty Gulf and Vansittart Bay, consists of well grassed basaltic and laterite country.

For about ten miles south of the Drysdale River Mission, and extending easterly to the river of that name, the country consists of poor sandy soil, and rocky ledges. It is fairly well clothed with soft spinifex and fair grasses, and contains a fair amount of good topfeed.

Camp in the Sir Frederick Hills, about 6 miles South of the Drysdale River Mission.

The country East of the junction of the Carson and King Edward rivers, and extending about fifteen miles Northerly along the Drysdale River, and about thirty miles Southerly along the Carson, consists of magnificently grassed basaltic country, a considerable portion consisting of heavily grassed river flats. In the vicinity of Mount Connelly, the plain crosses the Drysdale River, and runs Northerly for about thirty miles, with an average depth of about eight miles. The whole of this area is splendidly watered, and contains some valuable pastoral lands.

To the East of the Drysdale River the country consists of a large sandstone tableland, apparently extending many miles to the East.

Eastern Zone.—I have not made a personal examination of this area, but from information gathered from various sources, it appears to consist generally of

Typical Basaltic Country. Vicinity of Carson River.

sandstone tablelands, which are intersected by numerous fairly well-grassed valleys. It appears to be rather rough in places, but no doubt will be found to contain much good land, and will probably prove to be a very useful pastoral area. At present it is reserved for the use of aborigines, but is much too large for this purpose, and could certainly be put to much better use.

Central Zone.—From its headwaters, to the junction of the Gibb River, the country along the southern bank of the Drysdale River consists principally of splendidly grassed basaltic river flats, which vary in depth up to several miles. The soil varies in quality from a reddish-brown loam, to a rich black soil, and is magnificently grassed throughout.

To the South, and to the East, the country appeared to consist mainly of sandstone tablelands which are rather rough in places. The whole of this area is well clothed with soft spinifex and fair topfeed, and is intersected with numerous valleys and flats which contain fair grasses. It is lightly timbered with messmate, woollybutt and pine, and splendidly watered throughout.

AGRICULTURAL LANDS.

On the accompanying plan I have marked off the basaltic agricultural lands in green, and the sandstone agricultural lands in yellow.

Innumerable pockets of good land occur throughout the country, but only large areas can be dealt with.

The basaltic agricultural lands vary from a rich reddish-brown loam to a black friable soil. All of these soils have a great depth, and are wonderfully fertile.

The sandstone agricultural lands usually consist of a light sandy soil, which in places contain a considerable amount of decomposed ironstone.

Numerous grevillea and banksia flats occur throughout the sandstone areas, and vary in extent up to a few hundred acres.

There is, roughly, about 800,000 acres of first class (basaltic) agricultural land, which is made up as follows:—

Between the Calder and Sale Rivers	about	50,000 acres.
Along the headwaters of the Drysdale River	„	150,000 „
Between the Glenelg River and Macdonald Range	„	100,000 „
Between the Moran and Roe Rivers	„	50,000 „
Along the Mitchell River	„	70,000 „
South-West of Admiralty Gulf	„	40,000 „
Vicinity of Couchman Range	„	40,000 „
Along the Carson River	„	100,000 „ *
Along the Drysdale River	„	60,000 „
Along the King Edward River	„	30,000 „
Scattered	„	100,000 „

Second class lands scattered throughout sandstone areas, as shown on accompanying plan.

ACCESSIBILITY AND NEW PORT.

Although possessing many fine harbours, the North Kimberley District is very inaccessible, owing to its peculiar physical and geographical formation.

The coastline, except at a few points, is bordered by a line of precipitous cliffs which rise hundreds of feet from the water's edge, and is flanked by rough sandstone ranges running parallel to the coast. For this reason many of the harbours (some of which possess great depths of water to within a few chains of the shore, and are almost landlocked) are practically useless from a commercial point of view, owing to their being quite inaccessible from the back country.

The country consists generally of a series of plateaux, and valleys. The plateaux are generally bordered by lines of precipitous cliffs which present complete barriers to all forms of wheeled transport, and are often impassable to animal transport.

Some of the better class lands are completely isolated by this cause—notably the fine basaltic country lying between the Calder and Sale rivers. This area is completely enclosed by precipitous cliffs and ranges, and is quite inaccessible to wheeled transport. It is only accessible from the sea by a narrow valley between the Harding Range and the Calder River, in the vicinity of Mount Daglish. This valley is very rough and suddenly rises several hundred feet, thus completing the inaccessibility of this area.

Mr. Brockman made mention of the fact that Walcott Inlet might possibly be utilised as a means of access to the back country. This would be impossible for the reason mentioned in the last paragraph, apart from the fact that the entrance is very dangerous owing to the whirlpools caused by the great rush of tides. It is a *cul-de-sac*, and is completely enclosed by high mountain ranges which are impassable to all forms of wheeled transport, and only passable to pack animals at a few points. It would be a handy point at which settlers further inland could get their supplies landed from one of the adjacent ports.

The location of a site for a port is governed, to a large extent, by the approaches from the country to be served, and for this reason the number of suitable localities is somewhat limited, as there are very few points along the coast which are reasonably accessible from the back country by wheeled transport.

Camden Harbour is the only site South of the Prince Regent River, while Napier Broome Bay provides the only site to the North, which could be considered suitable and which are reasonably accessible from the back country. These sites can only be classed as fair, and are not in keeping with what might be expected on a coastline which contains many fine harbours. A number of harbours have been suggested as probably containing possible sites for the establishment of a new port, but reference to the detailed description of the coastline will explain their various disadvantages.

The establishment of a new port is dependent upon many essential conditions, and is governed, to a large extent, by the uses to which the country is put.

If minerals were discovered, the location of the find would probably automatically fix, and justify the position of a new port.

For Agricultural Purposes.—Most of the better lands are situated at distances from the coast which are too great to permit of their being put to agricultural uses without some form of light railway. Routes exist, where railways could be built without meeting with any great engineering difficulties; but the cost of maintenance would be very high, owing to the heavy tropical rains, etc. Conditions would not as yet justify the construction of railways in these parts, and, as closer settlement is dependent upon cheap transport, the possibility of immediately utilising the country for agricultural purposes is precluded.

As a Supply and Mail Depot.—There are many fine estuaries and inlets along the coast, where prospective settlers could, and probably would, get their supplies landed from Broome, or one of the adjacent ports, at much lower rates than they could transport them overland from a fixed centre. For those settlers further inland, Derby or Wyndham would be almost as near for them to obtain their supplies.

For Pastoral Purposes.—The establishment of a new port for pastoral purposes only, is unwarranted, and owing to the peculiar physical and geographical formation of the country, would entail very little more benefit, save to those in its immediate vicinity, than Derby or Wyndham would. Several years must elapse before any cattle could be marketed off this country, and much may happen in the interim, which might render the most suitable port of to-day, the most unsuitable then. The country is magnificently watered and is practically drought-proof, and as good stock routes exist, the ports of Derby and Wyndham are quite suitable to serve this area for years to come. Considerable help could be afforded prospective settlers by improving the routes into the country, and granting some concession in the appraisement of the rentals.

DESCRIPTION OF COASTLINE.

Walcott Inlet:—

The entrance to this inlet is a narrow passage between high precipitous cliffs, and is very dangerous owing to the whirlpools caused by the rush of the tides, which have a range of about 36 feet. It is impassable except at the change of tide, and then only to small boats. For about 30 miles both banks are flanked by high precipitous ranges which rise from the water's edge; the water then becomes very shallow, except for a narrow channel which is constantly changing its course, and dries at low tide. The ranges on the north recede for a distance of about eight miles, and then close in again near the end of the tidal waters. The inlet is a *cul-de-sac*, and is inaccessible from the back country, except at a couple of points, and then only by pack animals.

From Walcott Inlet to the Prince Regent River, the whole of the coastline, with the exception of Camden Harbour, is flanked with rugged sandstone ranges which rise from the water's edge, and run parallel to the coast. These ranges are quite impassable to any form of wheeled transport, as also is the adjacent country, so that this portion of the coastline is not worthy of any serious consideration.

Port George IV. and several other inlets in Augustus water, appear to be fine harbours, but they are quite isolated from the back country by high precipitous sandstone ranges.

Camden Harbour is the only port South of the Prince Regent River, from which reasonable access can be obtained to the back country, and was the site chosen by the Camden Harbour Association, when they attempted to settle that portion of the country about 60 years ago. It is well protected, and has a depth of five fathoms of water to within a few chains of the shore. The approaches appear to be clear, but further soundings would be necessary in order to make sure that no dangers existed. The cliffs, with which the coastline is flanked, break away at this point, and allow good access to the adjacent country, which consists of gently undulating basaltic grass lands.

The whole of this country is magnificently grassed with fine grasses, and although a considerable portion of it is rather stony, there are about 100,000 acres of good agricultural country within a radius of 20 miles of the port.

The basaltic country extends right down to the water's edge, and there is a good site for a town. Although there is no large supply of surface water in the immediate vicinity, there are ample supplies within a few miles. Water could probably be obtained by boring, or could be conserved in the hills to the North, and gravitated down by a short length of pipe line.

A good track could be located right through to Mt. Hann and beyond, but owing to the inaccessible nature of the surrounding country, a port at Camden Harbour would only serve a very limited area.

St. George's Basin contains a fine sheet of deep water, and is practically landlocked. Entrance is gained by a narrow passage, through which the tides rush with great force, and would, therefore, be unsafe for big shipping. It would only serve a very limited scope of country in its immediate vicinity, and is quite unsuitable as a possible site for a port. Several fertile valleys open out from St. George's Basin, and when these are settled, it will prove valuable as a waterway for the carriage of the produce by small boats.

The Prince Regent River is flanked on either side by high precipitous cliffs which rise from the water's edge. It is navigable for small craft for about 17 miles from St. George's Basin, but it is very doubtful whether it has any value as a possible means of access to the country.

The Mouth of the Prince Regent River.

A port between the Prince Regent River and Prince Frederick Harbour, would be of no use, as all avenues of approach from the back country are cut off by the Princess May Ranges.

Rothsay Water is a very fine harbour, and has a great depth of water. The bottom could not be found with a 15-fathom sounding line two chains from the shore. It is surrounded by well grassed basaltic hills and valleys, and possesses some very fine scenery, but is disqualified for the reasons mentioned in the preceding paragraph.

son and Careening Bay are two very nice little harbours; but are of s they are isolated from the back country.

nce Frederick Harbour is a fine open stretch of water, but the whole of the shoreline is bounded by precipitous sandstone cliffs which rise hundreds of feet from the water's edge. Two hours' hard climbing were required to ascend the cliffs

Rothsay Water.

on the Southern shore, whilst an attempt to climb the cliffs on the North shore was abandoned after two hours' climbing, without having ascended half way. Apart from the fact that there is not a sufficient area of land on which a townsite could be built, it would be impossible to gain access to the back country, on account of the very broken sandstone ranges surrounding the harbour.

The upper reaches, which are very shallow, may provide a means of access by which local settlers could get their supplies landed at some convenient point within reasonable distance of their homesteads.

The Hunter River is a fine estuary, but flows between high perpendicular cliffs for miles beyond the safe limits of navigation.

Mudge Bay, and Swift Bay, have been recommended as being very fine harbours. They undoubtedly are, but are useless from a commercial point of view, as the country for miles around is rock bound, and consists principally of sandstone ledges, which are quite impassable for animal transport of any description.

The Western shores of Admiralty Gulf are flanked by a basalt tableland which rises about 600 feet from the water's edge. The slopes were too steep for us to take our horses down, and are a complete barrier to the establishment of a port in that locality.

About two miles West of Crystal Head, there is a nice little cove by which access can be gained to a fine area of basaltic country, but it is too shallow to permit of it being used by any other than very light craft.

Several fair sites exist along the Eastern shore of Admiralty Gulf, but these are rendered useless by a range of precipitous cliffs which run parallel to the coast and which are quite impassable.

A close examination of the coastline of Vansittart Bay was made, including Encounter and Rocky Coves, but no suitable sites were located. At the Southern end of the Bay there is a good depth of water to within a few chains of the shore; but the approaches are very rough, and there is no country suitable for a townsite.

Napier Broome Bay offers the best claims for consideration in connection with the establishment of a new port along the coastline of this territory.

The principal points in its favour are—

(1) It is the most accessible port from the back country, and is quite as central as any other point along the coast would be.
(2) There is a deep clear entrance, and a good even depth of water throughout.
(3) It has the lowest range of tides (about 6 feet at springs), along the coast, compared with 28 feet at Prince Frederick Harbour, and 36 feet farther south.
(4) There is a large area of good land within a short distance.

Scene near Crystal Head, Admiralty Gulf.

There are several sites with deep water within a short distance of the shore. Of the three best sites two are situated in Mission Bay, and one at F.B. 81, near Guy Point, the latter site having been recommended by Mr. F. S. Brockman.

All of these ports provide good safe anchorages, having sand and mud bottoms, and have a depth of five fathoms of water close inshore.

These sites can only be classed as fair, and are rather disappointing, considering the number of magnificent harbours which exist along this coast. The country adjacent to the coastline, and extending back for a few miles, is rather poor, although, judging by the results achieved at the Drysdale River Mission, it appears to be

fairly fertile. It consists of a light sandy soil, and is intersected with rough sandstone ledges, the whole being lightly timbered with messmate, woollybutt and wattles, and lightly grassed with soft spinifex, etc. At F.B. 81, there are good springs within a short distance of the shore, but good water can be obtained at shallow depths at any of the sites.

A Well at the Drysdale Mission.

There is a good climate and a cool sea breeze every afternoon throughout the year.

The coastline is low, and contains many fine sandy beaches which are safe, and very free of mangroves.

Good access can be obtained from any of these ports to the whole of the back country, and there is very little doubt but that they are the best along the coastline.

Walcott Inlet, near the mouth of the Calder River. Harding Range in background.

POTENTIALITIES.

In outlining the resources of the North Kimberley District, I do so, not recommending that these industries be embarked on immediately, but merely as a guide to the latent possibilities of this territory. While fully realising that the time has arrived when we must put our vacant lands to their greatest practicable use, there are many obvious reasons why this country must run its course the same as other countries have had to—first the pastoral industry, then grazing, and finally, closer settlement and agriculture.

Minerals.—There appears to be little prospect of minerals being discovered in this district unless traced through from the East or West Kimberleys, owing to the fact that if they do exist they are probably hidden by the overlying sedimentary rocks. But only systematic prospecting can prove this.

Pastoral.—This country is admirably suited for pastoral purposes, it being splendidly watered and containing many valuable varieties of stock feed. Most of the waters are permanent, and there is an assured rainfall, which renders the district drought-proof.

The feed varies from mitchell, flinders, and bundle-bundle grasses, to soft spinifex; while practically every shrub is an edible one.

It was reported that a cattle poison grew in the vicinity of Napier Broome Bay. Although a keen search was made, none was found, and I am led to believe that the country is free of any type of plant injurious to cattle or sheep.

Dingoes are very numerous, and will no doubt cause a lot of trouble.

In common with the rest of the Kimberleys, the country is evidently infected with cattle tick. On several occasions, when kangaroos were killed, cattle tick were found on them.

There is no evidence regarding horse disease in this country.

The country is principally suited for cattle, although there are large areas which are eminently suitable for sheep.

Agricultural.—The possibility of immediately utilising this district for agricultural purposes is precluded by a number of causes, the principal of which are:—Closer settlement must proceed from a nucleus or centre where the facilities and cost of transport are both good and cheap. Unfortunately, this district is considerably handicapped by the fact that the better class lands lie inland at some distance from the coast, and could only be served by railways, the construction and maintenance of which is unwarranted under present conditions.

Although there are large areas of very fertile and magnificently grassed country, very little of it is suitable for present day agricultural methods. A large proportion of the basaltic country is rather stony, which does not interfere with the value of the land from a pastoral point of view, but renders it practically useless for agricultural purposes.

Over 90 per cent. of the rain falls during five months of the year, and although there is a superabundance of water for pastoral purposes, the ground becomes rather dry towards the end of the season.

Most of the basaltic country is undulating, and there is every possibility that if the ground was ploughed up, the first heavy shower (which might amount to several inches in an hour) would wash all the soil away, unless the slopes were terraced. After a shower of rain the country becomes very boggy, and it is problematical whether the ground would bear the weight of modern agricultural implements.

At the present time it is uncertain whether this country would be suitable for horses.

Existing conditions of labour.

This country is unworthy of serious consideration for agricultural purposes at the present time, as there are several hundred thousand acres of rich land within a very short distance of Wyndham and Derby, which are eminently more suitable for such purposes, beside being very accessible, and within a short distance of established ports.

Although I have pointed out a number of disadvantages, there is little doubt but that both the climate and certain areas are well suited for the growth and production of many articles of commercial value, which now form the basis of important industries in other countries. The soil is suitable in every respect, as it has a depth and richness which are unknown in the southern portion of the State, and appears to contain large quantities of those essential constituents of plant food—lime, potash, phosphoric acid, and nitrogen—while its producing powers are made manifest by the quantity and diversified nature of the vegation now growing on it.

That many species of commercial tropical and sub-tropical plants will grow, has been proved beyond doubt by the gardens in existence at the Port George Mission, and the Drysdale River Mission.

The Garden at the Drysdale Mission.

Dates, cocoanuts, rubber (suitable varieties), bananas, plantains, peanuts, sisal hemp, pineapples, tobacco, sunflowers, sorghum, paw-paws, sweet potatoes, beans, pumpkins, beets, cabbages, onions, tomatoes and melons grow to perfection. Cotton will grow almost wild. Upland rice grown on poor sandy soil without any fertilising agent, and harvested under the most primitive conditions (*i.e.*, hand-sown, cut by sickle, the grain trodden out by bullocks, and winnowed by the wind), has yielded 33 to 44 bushels per acre for several years, while sugar cane, which generally requires a rich soil, is growing to perfection at the Drysdale Mission, on the poorest sandy soil I have seen on the trip. This soil, which only occurs in the vicinity of Napier Broome Bay, is very similar in appearance to the yellow sandy

soil between Perth and Fremantle. Although I have made mention of sugar cane, yet I do not think that it could be profitably produced in these parts. Probably many other varieties of economic plants would grow, but cannot be spoken of authoritatively.

The North Kimberleys appear to be fairly free of white ants, probably on account of the heavier rainfall, and the moister ground. Their depredations would be minimised by cultivation, as when their galleries are destroyed, they soon clear out, while many are destroyed by ordinary ants. Flying foxes would probably prove to be a severe menace to fruit growing.

Typical Lagoon, some of which, like this one, are of great depth.

Probably the three most suitable plants for production are cotton, upland rice, and tobacco. It is beyond the scope of this report for me to enter into details on this subject: but much valuable information may be obtained from an excellent handbook on Tropical Agriculture, written by Mr. A. Despeissis, late Commissioner for Tropical Agriculture, and published by the North-West Department.

A considerable amount of ignorance exists regarding the cultivation of cotton and rice, especially with regard to the idea that black labour is essential to their successful commercial production, that a few brief notes may not be out of place.

Cotton is no more a coloured labour crop than wheat is. It requires only the simplest methods of cultivation, and gives very prolific returns for which there is always a ready market. From planting to harvest, the expense of a cotton crop is much less than that of a cereal one. It demands no outlay beyond the cost of picking, and is much easier to work, while any person can work out the relative returns from a crop of cotton at 1,000lb. per acre, and an average crop of wheat.

There are many valuable by-products such as seed, short lint, hulls (which, mixed with cotton seed meal form a valuable fodder), oil, and finally the oil cake, which remains after the oil has been expressed.

When the crop has been picked, stock may be turned into the field, where they will find nourishing fodder off the leaves of the plant, after which it may be ploughed out or pruned as the planter so desires.

After the young plants have sprung up about a foot, they are practically drought-proof.

The average yield is about 1,000 lbs. per acre, of which 280-350 lbs. is clean lint and the remainder seed. Up to 1,500 and 2,000 lbs. per acre have been obtained in Queensland.

Different varieties of cotton demand different geographical and climatic conditions.

The cotton plant generally requires a warm equable climate, and an atmosphere impregnated with salt, together with heavy dews, which contribute to the perfect maturing of the fibre. These conditions are all found in the Kimberleys, and the cottons of the United States should find as congenial a home there, as they do in Virginia and Carolina.

It is hardly likely that the world's cotton supply will ever exceed the demand, for it is the cheapest clothing material known, and at the present time only about 50 per cent. of the world's population is regularly clothed, so that it is fairly safe to assume that the output could be considerably increased. America has reached the limit of her cotton producing capacity, as also have India and Egypt, so that there are great prospects for Australia in the cotton producing and manufacturing line.

Upland Rice is another tropical product in which the labour question is not a very serious problem, as every facility exists for its cultivation by mechanical contrivances. The ground may be ploughed, the seed drilled, and the crop harvested in the ordinary way. Its value as a stock fodder is great, but as a food there is an unlimited demand for it, and many years will elapse before the supply comes up to the demand. It is a heavy yielder, and at the Drysdale Mission, where it has been sown broadcast on comparatively poor soil, without any fertilising agent, it has yielded 33-45 bushels per acre for several years.

I have made mention of a number of articles which could be produced in the North Kimberleys, whether profitably or not, depends, to a large extent, on the individual.

If it is intended to proceed with closer settlement, I would urge that it be done cautiously, and that only persons who are experienced, and fitted by temperament, be allowed to enter the scheme, for one successful planter would do a lot of good, whereas a few failures may do incalculable harm to the movement.

The above remarks also apply to the country in the vicinity of Derby and Wyndham.

Dairying.—At some future date, when cold storage and transport are available, there are good prospects for dairy farming.

Pig-raising.—Pigs do remarkably well on the natural grasses and roots of the Kimberleys.

Timber.—With the possible exception of the pine, there are no timbers of any commercial value in the North Kimberley district. There are several trees which yield a valuable timber, but they are too few and scattered, to be of any commercial value.

The Cypress Pine yields a valuable timber which resists the attacks of white ants. It is somewhat scattered and grows throughout the sandstone areas, generally attaining a height of about 50 feet, and a diameter of about 14 inches. It generally grows in rough country, and it is very problematical whether it has any great

commercial value at the present time, owing to its inaccessibility, distance from a market, and the excessive cost of labour. It is not nearly so plentiful as is generally supposed, and is very scattered. The largest and finest belt of pine seen on the trip, was growing in the vicinity of Lizard Point, Collier Bay.

Typical Cypress Pine.

METEOROLOGICAL.

Although the area under review is situated well within the tropics, there is very little beyond the fact that it has summer rains to warrant it being classed as a tropical country.

Throughout the trip it was possible to travel during the hottest portion of the day with comfort, and the weather was never oppressive.

The vegetation is of a distinctly non-tropical character, while the climate is both healthy and equable, and more congenial than certain parts of the South-West, principally owing to a greater portion of it being situated at a considerable altitude above sea-level, although the statement also holds good for some of the country along the coast, as the following records serve to show:—

The Calder River.

Port George IV. Mission.

Average thermometer readings—June, July—Max. 85deg., Min. 65deg.

Average thermometer readings—Dec., Jan.—Max. 92 deg., Min. 75deg.

The thermometer has only recorded higher readings than 97 deg. on six occasions since the mission was established in 1915. The highest reading recorded was 103 deg. and the lowest 37 deg.

This station is surrounded by hills, so that the normal temperature of the surrounding country would probably be a shade lower than the above.

Rainfall.

1915	.. ..	No record.	
1916	.. ..	60.43	inches.
1917	.. ..	81.46	„
1918	.. ..	57.26	„
1919	.. ..	48.11	„
1920	.. ..	75.67	„
1921	.. ..	46.00	„ to 1st May.

Drysdale River Mission.

Average thermometer readings—June, July, Max. 85 deg., Min. 61 deg.

Average thermometer readings—Dec., Jan., Max. 93 deg., Min. 74 deg.

The century has only been exceeded on a few occasions: the highest temperature recorded was 104 deg., and the lowest 42 deg. The average rainfall for 10 years is 35 inches—the lowest being 27 inches, and the highest 42 inches.

The missionaries at both stations, informed me that there is no great amount of humidity in the rainy season, and that the heat is not very trying. At the Drysdale Mission there is a cool sea breeze almost every afternoon throughout the year.

The rainy season generally extends from the middle of November to the middle of April. About four inches of rain falls during the dry months—May to October.

Heavy dews, which have a very beneficial effect on the grasses and vegetation, are precipitated almost every evening throughout the dry months. The beneficial effect of the dew can be gauged by the fact that green feed will shoot up several inches, on burnt country, within a few weeks of burning.

The country is free from the ordinary tropical diseases of cholera, blackwater fever, smallpox, plague, etc., while with ordinary care one should escape malaria and dengue.

A great deal has been said by those in authority, both for and against the suitability of tropical Australia as a home for the white race, that I would like to quote the following letter, which I gleaned from one of the Eastern States papers:—

"Scientifically speaking, white people cannot live in the tropics. Southern theorists agree, whilst we, in the meantime, are doomed to carry on as though death were at hand. The fact is, though the discomforts of heat are considerable, they are by no means as great as the discomforts of the cold, nor are the heat diseases so numerous, deadly, or painful.

We have no knowledge of consumption, asthma, sciatica, or rheumatism. There are plenty of obvious reasons why the tropical savage suffered from few diseases until the pale-face arrived from the so-called temperate zone. People in the tropics have no dread of water, and are therefore cleanly.

Their homes are open and well ventilated, so that they breathe no foul air. Their clothes are light and loose, which places them in a continual air bath.

Ever since the discovery of Australia, someone in authority has been pointing out that various parts of Australia were unfit for habitation by whites, and contemporaneously with the announcement, numbers of people have settled in the condemned region, and done well, both physically, and financially. The scientifically prohibited area is steadily moving North, and when it reaches the equator and whites thrive there, the old prejudice against warmth, cherished by those whose climatic standard is London, will presumably disappear."

WATER SUPPLY.

Very little comment is required on this subject, as the district's greatest asset is its wonderful water supply. The brackish waters of the southern portions of the State are unknown in these parts.

The main source of the water supply is rain, while the geological formation of the country is extremely favourable for its conservation. The open texture of the overlying sedimentary rocks allows the water to percolate through, and the underlying igneous dykes hold it up, so that there is very little doubt but that large additional supplies could be obtained by sinking, should it ever be required.

The sandstone areas are, as a rule, much better watered than the basaltic country.

Crossing a Stream.

Some of the rivers are permanent, although, of course, their flow is much diminished during the winter (dry months) of the year; others form into large pools, which are joined by small running streams. One pool met with was, at least, twelve miles long, six chains wide, and very deep.

Most of the rivers lend themselves to the storage and conservation of water on a large scale. Fine springs are abundantly distributed throughout this country, and it can be safely stated that at no place would cattle have to walk more than three or four miles to water. In most places they would not have to walk more than one mile.

This country has an assured rainfall, so that there is no danger of the water supply ever failing. The presence of water within a few feet of the surface is often indicated by a vigorous growth of cadjeput and pandanus trees.

GEOLOGY.

The general formation of the country consists of sandstones, indurated sandstones or quartzites, and conglomerates, in association with which are intrusive and bedded masses of igneous rock, the principal types being andesite and dolerite.

The igneous rocks are frequently amygdaloidal, the cavities being filled with zeolites.

Although a keen look-out was kept, no fossils were met with amongst the sedimentary rocks.

Sandstone Gorge, Edkins Range.

Quartz veins are common throughout the igneous and sedimentary rocks, but show no sign of being metalliferous.

Extensive beds of volcanic ash and breccia were observed in the vicinity of the Calder, Glenelg and Carson rivers. Near the mouth of the Calder River there is a bed of volcanic mud of a black shaly nature resting on a bed of andesite. On the north side of Walcott Inlet there is a large amount of quartz containing iron pyrites.

Some of the greenstones may be goldbearing, but show no outward sign.

It is fairly evident that, if any minerals exist in this area, they are probably hidden by the overlying sedimentary rocks.

Typical Cascade; at the end of the dry season.

FLORA.

Mr. Gardner, of the Forestry Department, who was attached to the party for the purpose of making a botanical collection, is preparing a full report, so I will confine myself to a few casual notes on the subject.

The vegetation of the North Kimberley district is of a distinctly non-tropical character, and such as might be expected to exist in a more temperate zone. The country consists of savannas, and very lightly timbered forests, which are devoid of undergrowth, in place of which grow succulent grasses and herbage.

The lines of demarkation between the various types of flora are very distinct, and are governed to a large extent according to the geological nature of the country.

The basaltic country is almost invariably lightly timbered with box and coolibah (*Eucalyptus microtheca*), whilst bloodwoods (*Eucalyptus pyrophora* and *terminalis*) are fairly common, and ironbark (*Eucalyptus crebra*) occurs at a few isolated points. Ironwood (*Terminalia circumlata*) grows on some of the stony basaltic hills.

Fine grasses, the principal of which are flinders (*Anthistiria membranacea*), bundle-bundle (*Anthistiria imberbis*), mitchell (*Astrebla triticordes*) and blue grass (*Andropogon sericeus*), together with numerous other species of *Andropogon Panicum, etc.*, were observed growing in the basaltic areas. Extensive areas of salt grass (*Sporobolus virginis*) grow along the banks of Walcott inlet, whilst wild rice (*Oryza sativa*) grows plentifully along the watercourses. Two valuable fodder shrubs, mimosa (*Acacia bidwilli* and *suberosa*) together with several species of leguminous plants, which are much relished by stock, are confined to the basaltic areas.

Among the Coronation Islands.

The box and bloodwood generally attain a height of about twenty-five feet, and a diameter of about eight inches, although individual specimens may be found which greatly exceed these measurements. They have no commercial value; but have a considerable local value, inasmuch that they are white ant resisting, and are highly prized for yard building and fencing purposes.

Several trees—Leichardt pine (*Sarcocephalus cordatus*), chestnut (*Terminalia platyphylla*), freshwater mangrove (*Tristania suaveolens*), cadjeput (*Melaleuca leucadendron*) and occasional fig trees (*Ficus glomerata*) which are to be found growing along the banks of watercourses, all yield very valuable timbers; but have no commercial value, as they do not grow in sufficient quantities, and are too scattered.

Sandstone Areas.—The principal timbers of the sandstone areas are woollybutt (*Eucalyptus miniata*), messmate (*Eucalyptus tetrodonta*), quinine (*Petalostigma quadriloculare*), and cypress pine (*Callitris verrucosa*).

Open Prairie Lands.

The woollybutt and messmate usually attain a height of about forty feet, and a diameter of about twelve inches, but have no commercial value.

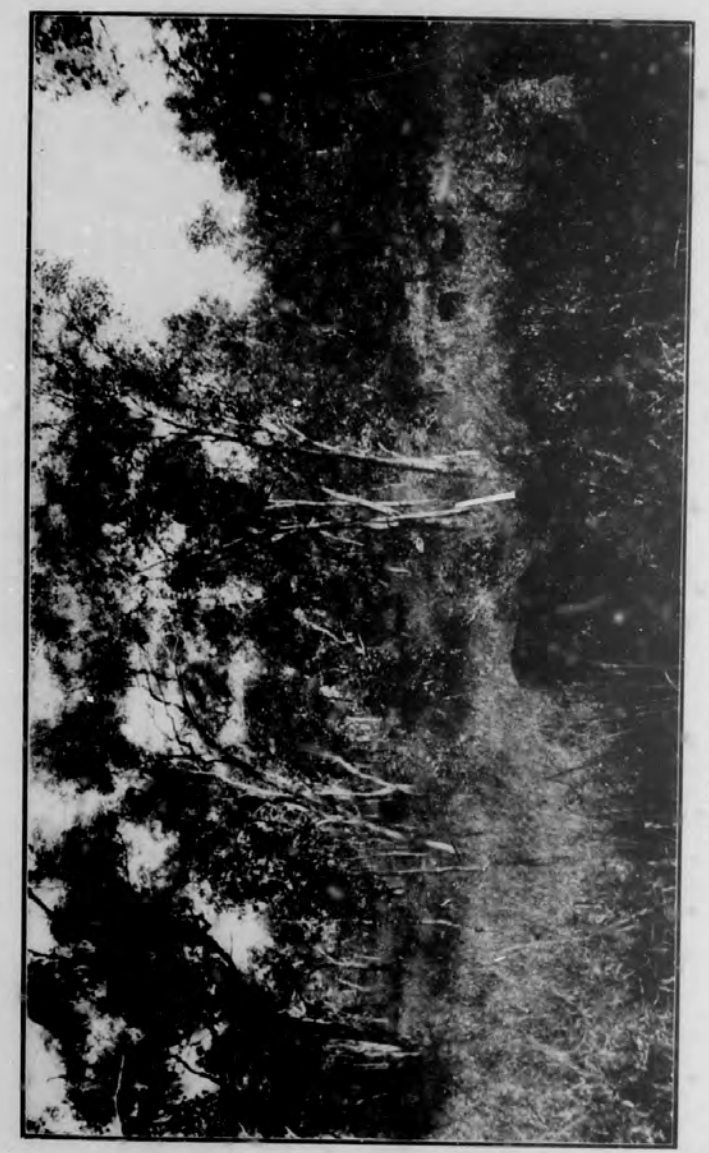
The cypress pine occurs in scattered patches throughout the sandstone areas. It generally attains a height of about fifty feet and a diameter of fourteen inches, and yields a valuble timber.

Along the creeks and in springy sandstone country, the principal timbers are white gum (*Eucalyptus Houseana*), swamp banksia (*Banksia dentata*), and *Grevillea Chrysodendron*. Several poorer types of grass grow in association with the above timbers.

The native kapok or cotton tree (*Bombax Malabaricum*) grows abundantly over most of the sandstone areas, and yields a heavy crop of pods. The pods contain a white silky fibre of very short staple, which has no marketable value.

The grasses of the sandstone areas are usually of a poor type, but numerous species of herbage, leguminous plants, soft spinifex, and shrubs help to augment the feeding value of this class of country for stock raising purposes, practically every plant being edible.

A flowering plant (*Ptilotus longistachyus*), which is very plentiful throughout the sandstone areas, is an especially favourite food with horses.



Typical Basaltic Grassland. Vicinity of Calder River.

GENERAL.

Kurrajong and baobab (*Adansonia Gregorii*) grow in isolated patches throughout both classes of country.

When the waters become still, waterlilies (*Nymphaea stellata*) of the most delicate and variegated hues, make their appearance on the surface of the creeks and billabongs. The rhizomes of the waterlily are used by the natives as a food. The presence of water is often indicated by clumps of pandanus (*P. odoratissimus*).

Wild grapes, which are very much akin to the cultivated variety, both in appearance and flavour, grow abundantly, and are much sought after by the natives.

On several occasions I have noticed heaps of broken nuts of the quinine tree (*Petalostigma quadriloculare*) from which the kernel had been extracted by natives. As the kernel is very bitter to the taste, I am led to believe that the natives use it for medicinal purposes.

Although a species of *Gastrolobium* is supposed to exist in the vicinity of Napier Broome Bay, none was found, although a keen look-out was kept.

Stream in the Edkins Range.

FAUNA.

There is an abundance of game throughout the country, in the form of kangaroos, wallabies, and numerous smaller types of marsupial.

On the basaltic grass lands, numbers of euros were met with, whilst the sandstone areas are the habitat of the smaller types.

Rock wallabies are very plentiful amongst the sandstone ledges, but are very timid. Several opossums were observed, and, judging by the markings on some of the trees, are very numerous in certain localities.

Dingoes are very numerous throughout the district, and will, no doubt, prove to be a menace to the pastoral industry for many years to come.

Myriads of flying foxes were observed along the banks of some of the watercourses, and on one occasion, in the vicinity of Walcott Inlet, a migration of these pests was witnessed. They were all flying in the one direction, and took about two hours to pass overhead. A conservative estimate would place the number at several hundred thousand.

Fording a Stream.

Most of the rivers and creeks are abundantly stocked with fish of various types, the most common being the black bream, and barramundi. Many of the larger pools contain turtles, and the long-nosed crocodile—a saurian of about five feet in length which lives on fish and is harmless to human beings.

A remarkable absence of waterfowl was noticed in certain localities, whilst in other places they were very plentiful. This may possibly be due to their migratory habits. In the vicinity of the Calder River, the billabongs and creeks were alive with several types of wild duck, geese, pelicans, ibises, cranes, brolgas, etc.

Pheasants and quail were very numerous throughout the country, but comparatively few turkeys were seen.

Several types of pigeon were very numerous throughout the sandstone areas. They were very tame and would often alight a few yards away from us; in other instances, they would watch us ride by and would refuse to fly away.

From an ornithological point of view, the North Kimberley District is very interesting, and later researches may prove it to contain many birds new to science. In addition to the birds already mentioned, numerous others were seen, among which may be mentioned several types of wren, cockatoos, parrots, kites, owls, minahs, honey-eaters, bell-birds, kingfishers, bower-birds, robins, whistling eagles, etc.

In some of the tidal estuaries the man-eating crocodile is fairly plentiful, and may be seen floating along on the surface of the water, or basking in the sun on the banks. Some of these attain a good size—one that was shot on Walcott Inlet, was 30 inches across the jaws and 17 feet long.

The coastline of this territory is rich in many kinds of marine products, such as fish, turtles, porpoises, trepang, sponges, dugong, and oysters (both pearl and edible).

NATIVES.

It is difficult to form any estimate approximating the truth of the number of natives in the North Kimberley District; but it is very evident that they are not nearly so numerous as is generally supposed. They are a nomadic race, and are continually travelling about in search of food, so that a region that may be thickly populated one day might be deserted the next. They are fairly numerous along the outskirts of civilisation, where they hang around on the off-chance of bartering from the station blacks.

Typical Aboriginal Natives.

Throughout the trip very few natives were seen, although, judging by their smoke signals and other signs, it was evident that they were watching all our movements.

They are primitive, but are far from being a degraded race, although the two terms are sometimes confused. It is primitive to travel by horses in these days of flying, but not degrading.

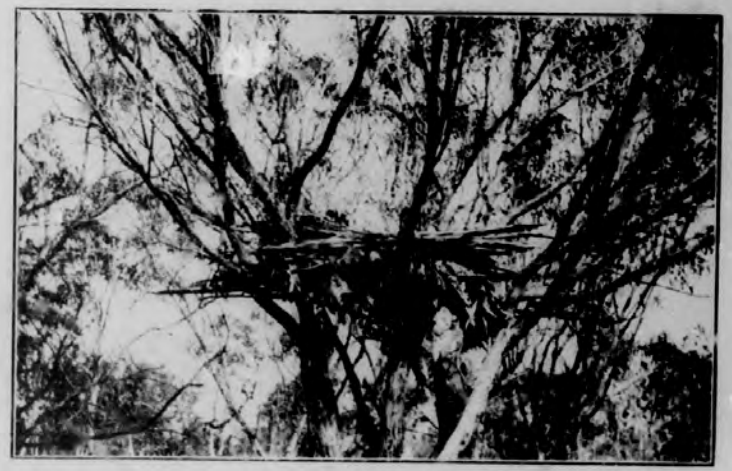
They are of a very robust type, due, no doubt, to the abundant supply of game and roots on which they live. Most of the men seen were well over 6ft. high, very muscular and well built, especially about the lower limbs. They had deep broad chests, and small, well shaped hands. Beards and moustaches were common, and they spoke with a low musical voice, rich in inflexions. Their bodies were invariably scarred with tribal markings, and most of them wore hair belts.

In camping, they seldom make an overhead shelter, but merely erect a break-wind of bark or boughs on the windward side. During the wet season they cut strips of bark from the trees, sometimes obtaining pieces about 10ft. long by about 6ft. wide, which are then bent in a semicircle with the ends struck in the ground, forming a tunnel-like structure. They generally strip long lengths of bark from the cadjeput tree, which they use as ground sheets and blankets.

Native Cave Paintings.

When large parties are camped together, they never have large common fires, but each family has a separate fire, while there are very strict rules and customs to be observed.

They seem to have certain artistic tendencies, judging by the great number of native paintings occurring throughout the sandstone areas, although the pictures reflect no great skill on the artists. The subjects are mainly human figures, snakes, and crocodiles, and it is a singular fact that none of the human figures have mouths. The paintings are generally executed in red ochre, pipeclay, and charcoal.



Native Tree Grave.

On several occasions when we surprised camps, they made off, leaving all their gear, including spears, behind. The spears were all of the same type—a quartzite spear-head attached to a heavy, hardened stick about 3ft. long, and spliced to a bamboo shaft. Each native carries about six or eight spears, a throwing-stick, and a tomahawk, which appears to be the only other weapon he uses; the absence of the boomerang being conspicuous.

The women generally carry the camp gear, which is tied up in a strip of cadjeput bark with a string which they make from wattle bark, the baobab tree, and human hair. The contents of several that were opened consisted of a supply of various kinds of roots, a stone to pound them with, quartz for spear-heads, tomahawks, kangaroo sinews to bind spears with, kangaroo bones to make spear-heads, kangaroo hair to be spun into waist belts, ornaments, fire-sticks, and dry grass, oyster shells for cutting hair, and a supply of pigments for ceremonial purposes. Some of the natives also make a bucket from cadjeput bark, which is fastened together with string, and cemented with gum.

They have an enormous variety of food to choose from, and wander about according to the type of food they are after, and the time it comes in season. The dietary varies from kangaroo to snakes, and from grubs to honey, and includes fish, oysters, shell-fish, birds, goannas, eggs, nardoo, waterlily roots, and a very large number of other types of edible plants.

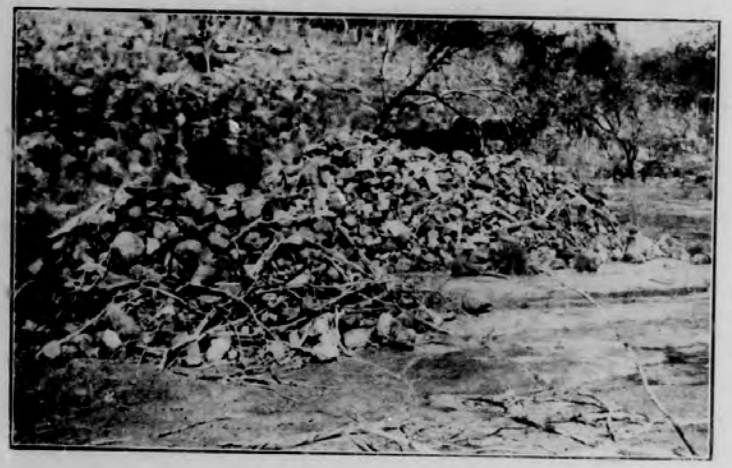
They have reduced the preparation and cooking of their food to a fine art; some of the foodstuffs requiring special methods of preparation in order to rid them of their poisonous properties.

The ingenuity displayed by the aboriginal in hunting and obtaining his food proves that he is not lacking in mentality and initiative. Some of the methods are little short of wonderful, but it is beyond the scope of this report to enter into fuller details.

They prepare a number of medicines from various plants, but most of the cures appear to be effected by faith, although some of their remedies are quite rational.

The dead are usually wrapped in bark and placed in the forks of a tree.

They are a fast-vanishing race, and I do not think that they will cause much trouble to settlers, providing they are not interfered with.



Stone Cairns, probably erected by Natives.

SUMMARY.

The North Kimberley District is pre-eminently a cattle country, and can best be developed by settlement on those lines.

The successful agricultural development of this country rests entirely with capital and labour, and it is not a question as to its suitability as a home for the white race. The climate is not too trying, but until the cost of labour is such as will enable us to grow tropical produce at a price at which we can enter into competition with other countries in the world's markets, there is little hope of success in this line.

The District may be summarised as follows:—

It is fairly rough and inaccessible, but these disadvantages are more than counterbalanced by the following facts:—

(1) The whole of the country is splendidly grassed with many valuable types of cattle feed; there is no buck spinifex, or porcupine grass.

(2) It contains no poison, and practically every plant is edible.

(3) There is an assured rainfall which varies from 30—70 inches, and the district is drought-proof.

(4) No money would ever have to be spent providing water for stock.

(5) Derby and Wyndham are both within reasonable distance of this country—Mount Hann, the centre of the district, being about 200 miles from either place by good practicable routes for stock.

The rugged Coastline of Prince Frederick Harbour.

Prince Frederick Harbour, near the mouth of the Hunter River.

As the country has been available for free selection for many years, it is desirable that it be cut up into suitable sized areas in order that each section may contain a fair proportion of each class of country; also to utilise the natural boundaries to the best advantage. This would not entail any hardship on those selecting country, as the blocks would be rented according to their value.

It is practically essential that men settling this country should have had previous experience on similar work, as there will be innumerable hardships to be borne, and much isolation. A knowledge of natives and their customs is necessary, as the natives, even if friendly disposed, would soon gain the ascendancy of an inexperienced man.

Typical Sandstone Tableland Country.

Sound financial resources are also required in order to tide over the several years which must elapse before cattle could be marketed off this country.

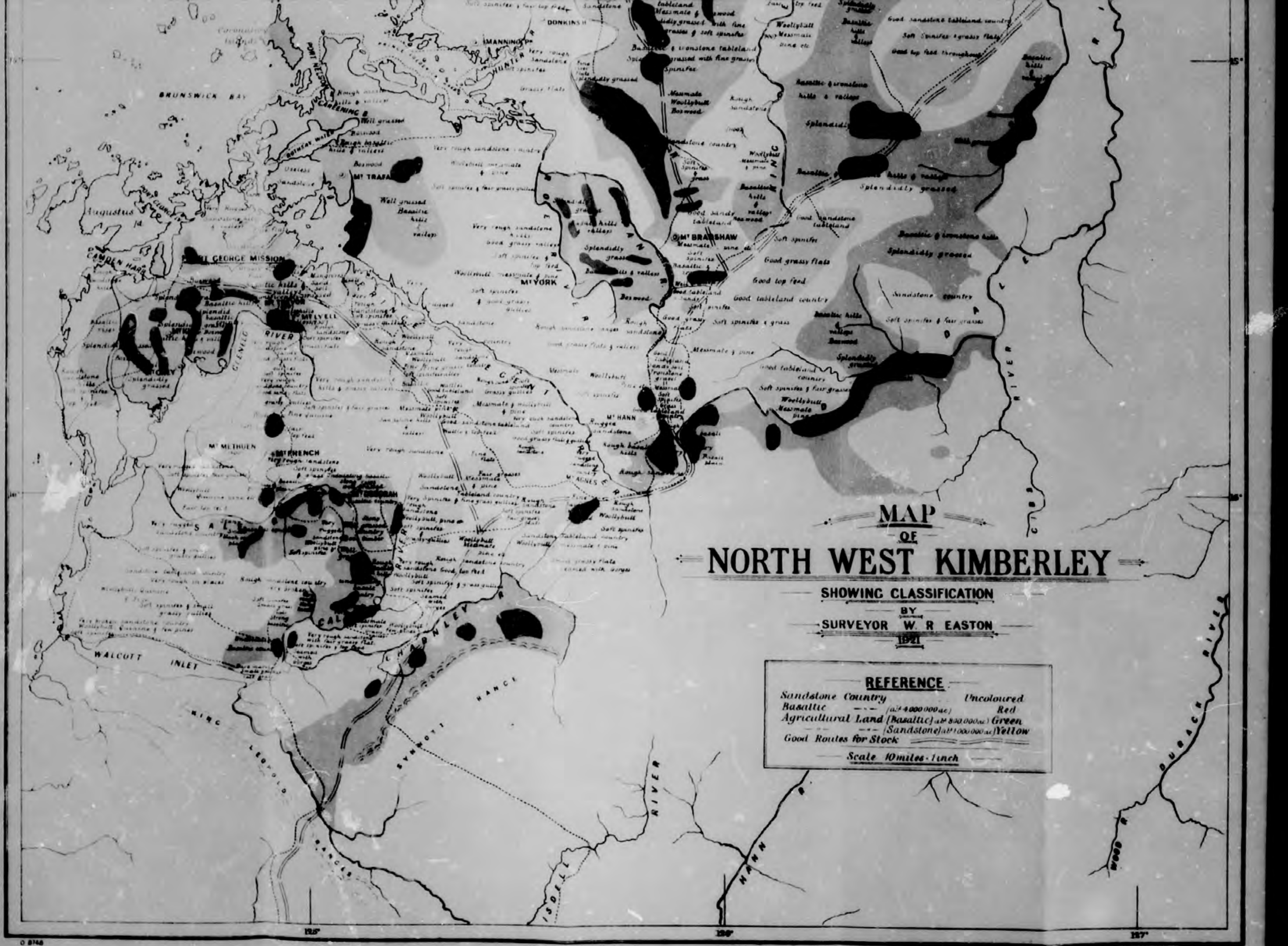
In conclusion, I would like to place on record my appreciation of, and thanks for, the loyalty and assistance rendered by the various members of the party, often under very trying conditions. More especially to Mr. S. Rea, second-in-command, who took charge of the main camp during the periods of my absence, and very ably carried out the duties entrusted to him; and to Mr. O. Siddins, who shared my hopes and fears on many lonely journeys—a true companion, and one of the whitest and gamest men it has been my fortune to meet.

W. R. EASTON,
In Command Kimberley Expedition, 1921.

Perth, January, 1922.

By Authority: Fred. Wm. Simpson, Government Printer, Perth.

125°
126°
127°
INDIAN OCEAN
KIMBERLEY
DIVISION
WESTERN
AUSTRALIA
C Londonderry
C Talbot
NAPIER BROOME BAY
VANSITTART BAY
DRYSDALE MISSION
ADMIRALTY GULF
Crystal Hd
PORT WARRENDER
Mt CONNOR
RIVER
Bigge I
DONKIN'S H
MANNING P
HUNTER R
BRUNSWICK BAY
PORT GEORGE MISSION
Augustus Id
CAMDEN HARR
Mt TRAFALGAR
Mt YORK
Mt BRADSHAW
Mt LYELL
GLENELG RIVER
Undulating basalt country
Splendidly grassed
Basaltic hills & valleys
Good tableland country
Sandy soil
Good sandstone tableland country
Soft Spinifex & grassy flats
Good top feed throughout
Basaltic & ironstone hills
Splendidly grassed
Sandstone country
Soft spinifex & fair grasses
Good grassy flats
Good top feed
Good tableland country
Soft spinifex & grass
Very rough sandstone
Well grassed Basaltic hills & valleys
Sandstone tableland country
Soft spinifex & fair grass
Messmate Woollybutt Boxwood
Basaltic & ironstone tableland


MAP
OF
NORTH WEST KIMBERLEY
SHOWING CLASSIFICATION
BY
SURVEYOR W. R EASTON
1921
REFERENCE
Sandstone Country Uncoloured
Basaltic (ab^t 4 000 000 ac) Red
Agricultural Land (Basaltic) ab^t 800 000 ac) Green
(Sandstone) ab^t 1 000 000 ac) Yellow
Good Routes for Stock
Scale 10 miles - 1 inch
BRUNSWICK BAY
Augustus Id
CAMDEN HARB
PORT GEORGE MISSION
GLENELG RIVER
M^T YORK
M^T BRADSHAW
M^T HANN
M^T AGNES
M^T METHUEN
WALCOTT INLET
CHARNLEY R
SYNNOTT RANGE
KING LEOPOLD RANGES
ISDELL RIVER
HANN R
DURACK RIVER
WOOD R
GIBB RIVER
125°
126°
127°