

All the country between here and the tinfield is nice looking mineral country, and tin will be probably found in many places; also between the tinfield and Jayes and Scott's, after which there is a belt of country very similar to the Collie coal and Fly Brook country, and it probably connects the two. On the Franklin River, by Yeriminup, there is another nice belt of mineral country for a few miles, after which is another belt of coal country, extending nearly to Kendenup.

25th May, 1891.

HARRY PAGE WOODWARD,
Government Geologist.

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

SIR,—

I have the honor, herewith, to forward you my Report on the country examined since I last reported from Albany.

And have much pleasure in stating that I had no idea that we had either such an extent of first-class agricultural land, or that such promising mineral country existed between Albany and Perth.

The main rivers crossed deserve more attention, therefore I would suggest for your consideration that at no very distant date I be instructed to traverse these streams, both up and down, as far as I consider necessary, as there is not the least doubt in my mind that there is a large extent of tin-bearing country; and whilst upon this I might map in, roughly, the extent of the coal-bearing country which is now being tested on the Collie.

I have, &c.,

HARRY PAGE WOODWARD,
22nd July, 1891. Government Geologist.

*Report on the Country passed over between Albany and
Perth, including the Stirling Range, Jerramungup, the
Gordon and Pallinup Rivers, by Harry Page Wood-
ward, Government Geologist.*

THE ROAD FROM ALBANY TO PERTH.

On leaving Albany, with its bold granite hills, a belt of sandy and swampy country has to be crossed, between 20 to 30 miles wide. In this belt in several places poor brown coals have been met with, but as these are of no value, and no indication of true coal, they are not worth further consideration.

Near Mt. Barker the country suddenly changes, the sand giving place to loamy and gravelly soil, with outcrops of Metamorphic rocks, of which Mt. Barker and Mt. Barrow are composed.

A little to the South-Eastward of these hills are the bold peaks of the Porongorups, which run in an Easterly and Westerly direction, and are composed mostly of granitic rocks. From Mt. Barker to Kendenup, which is situated at the head of the Kalgan River, these highly altered rocks outcrop here and there in the water-courses; but, as a rule, on the higher ground, they are covered with ironstone gravel. This is all mineral country, and two or three mines were opened some years ago, as there are both gold and plumbago, as well as iron.

Between the Kalgan and the Gordon Rivers the country is very similar, with the exception of that between Lake Matilda and the Round Swamp, where a patch of more sandy and swampy country is crossed.

On approaching the Gordon the country opens out into large sand and clayey plains, which follow the river valley and extend across, North of the Stirling Range, to the Pallinup. To the West, rising from this plain, is Warriup Hill, and to the Eastward Sukey's Hill, and the Stirling Range with large open swampy plains to the North-East.

THE STIRLING RANGE.

This Range is situated in the South of this Colony, between 40 and 50 miles North of Albany, King George's Sound.

It consists of a bold range mass, running E. and W. for a distance of about 50 miles; its Western end, Sukey's Hill, being near Cranbrooke Station on the Great Southern Railway, whilst it ends abruptly at its Eastern end in one of the highest points of the range, called Ellen's Peak.

It is a striking range, seen from a distance, as it rises abruptly from a level plain, which is only about 500 or 600 ft. above the sea level at the base of these hills, some peaks of which attain an elevation of over 3,000 ft.

The range itself is a rough broken belt of country, the surface mostly being covered with stone; but, here and there, there are small alluvial flats, which are mostly sandy or gravelly.

It is intersected by numerous large deep valleys and water-courses, in which springs break out here and there, which flow so strongly during a great portion of the year as to make these streams run. But although these large streams are flooded after heavy rains, they are completely lost soon after they emerge from the hills on to the sandy plains. The geological formation is not so ancient or so highly altered as the mineral-bearing formation of this Colony, and although they have been highly folded and contorted in many places, they seem to be entirely destitute of any mineral veins or trap dykes; and although large quantities of quartz are often met with, this is of the barren nature, such as is commonly found in sandstone country, where all the small cracks have been filled in with silica in solution by the action of infiltrating water.

At the Western end of the range, near Mondinup, the rocks have been highly contorted, being folded into three sharp anticlinal and synclinal folds, in a distance N. & S. of about 10 miles, being due to the lateral compression from the Southward, where the great masses of granite seen at the Porongorup and on the South coast were intruded; but towards the Eastern end of the range the rocks have been very little disturbed, remaining in a nearly horizontal position.

The rocks here consist of a series of sandstones, more or less flaggy, often much ripple-marked, with here and there beds of a more slaty nature, and fragments of clay slate; these rocks extend from one end of the range to the other at the Western end, dipping below the surface, and appearing again; whilst at the Eastern end they are seen in one complete section of some 2,000 or 3,000 ft. It is

quite impossible to determine the age of these rocks, as up to the present no fossils have been found, but it is highly probable, from their lithological character, that they are either Devonian or Upper Silurian. At the Western end of the range, on the South side, the country suddenly changes, the underlying Metamorphic rocks with quartz reefs and dykes making their appearance; and as at several points along the Southern face of the range the surface of the plains is strewn with quartz of a very different class to that met with in the range, it is highly probable that these Metamorphic rocks extend along the South side of the range, but are mostly covered by deposits of alluvial.

The mineral prospects of the range are very slight, but in the country South of Sukey's Hill and down the Young River, and also at two or three points along the South side of the range, as far as Chester's Pass, there are good enough indications to tempt prospectors to spend both a little time and money—gold or tin being the most likely metal, but silver, copper, or lead may also occur.

As a whole this range, leaving its grand appearance out of the question, is one of the most uninteresting and useless patches in the whole Colony, as there is neither prospect of minerals being found, nor is the country of any use for any purpose whatever, as it would be difficult to find a patch of good land of more than 100 acres in extent, and as there is so much poison plant it is comparatively useless as a sheep run, whilst the timber is so small that it is of no commercial value.

THE COUNTRY TO THE NORTH AND NORTH-EAST OF THE STIRLING RANGE.

To the North of the Stirling Range, between the Pallinup and Gordon Rivers, is a large sandy flat with numerous salt lakes and swamps, most of which drain into the Pallinup or Salt River.

The Pallinup itself has cut its way through these soft overlying beds, exposing the crystalline schists and dykes. These are also met with in all the branch creeks crossed on approaching the river. On the higher ground, between these creeks, are level clay flats, thickly grown with marlock (malley), so dense in places that it is almost impossible to force one's way through on foot. In these malley thickets there are, here and there, perfectly clear grassy patches (often of several acres in extent), called, locally, paddocks. Here the productiveness of the soil can be judged by the fine crop of grass, and, if the malley were only destroyed in the manner adopted in South Australia, this would make fine wheat-growing land. At Magitup the country changes, here fine light and heavy red loam overlying Metamorphic rock, wooded with myall (jam), is met with, but unfortunately for this belt of country the water is more or less brackish.

To the Eastward of Magitup, up the Peenebup, this belt of light loamy country extends, with here and there, in the bed of the creek, bold outcrops of granite and other dykes. The pools in this creek are all more or less salt, but the rock water-holes are fresh. The most remarkable of these is called the "Night Well," from the fact that, when it is quite dry on a hot summer day, water can always be obtained at night. It is simply a large fissure in a granite dyke, and its intermittent nature must be due to the expansion and contraction of the rock, for, in the day time, when the surface becomes heated, the rocks would expand, closing the small crack or fissure up which the water rises, whilst when these rocks again contract, when the temperature is lowered at night, the water would again rise.

Between the head of this gully and the Gardner River is a high sandy table-land, cut here and there by deep stream beds in which the older rocks are often exposed. In one of these some stone was found which, on assay, proved to be very rich in gold, but owing to the small size, irregular course of the veins, and hardness of the rock this would scarcely pay to work. This rock is a large diorite dyke, with small veins of a greenish quartz containing a little iron pyrites intersecting it, the largest of which is only a few inches in thickness; but one thing,

gold is there, and when gold is once found it is worth further prospecting, as it is not as if only a trace had been found, for the stone that was assayed yielded oz. of gold to the ton.

This belt of country would be also worth prospecting for tin, as the rocks and wash are both very similar to the tin-bearing country in other places.

At Jerramungup, on the Gardner River, there are large outcrops of granite, which is evidently the Southern extension of the great line of dykes which extend as far North as the Murchison River.

To the Northward of this country stretches the great sandy table-land of the interior, with its salt lakes or clay-pans, and isolated bare granite hills, whilst to the South are sand-plains, through which the rivers have cut large deep valleys bounded by sandstone cliffs exposing the underlying Metamorphic rock in these beds, where often large quantities of quartz are met with which should be prospected.

THE GORDON RIVER BETWEEN THE ALBANY ROAD AND YERIMINUP.

For twenty miles down the Gordon River from the bridge the river flows over large alluvial plains, mostly of a clayey nature, with a series of large permanent pools or water-holes in its bed. But, from a little below Wonerup on to its junction with the Frankland River, the country suddenly changes, the Metamorphic rocks suddenly outcropping and closing in upon the river.

The rocks are gneissic and granitic, with numerous reefs and dykes; and it is, in fact, a typical patch of mineral country, although much of the surface on the higher ground is covered by limestone gravel. This is often of no great thickness, especially in the gullies, where all prospecting operations should commence.

The land about the junction of this river, and down the Frankland, amongst the hills, is very good, consisting of a rich red loam, sometimes a little gravelly, highly suited to vine and fruit growing, as seen at Mr. Warburton's, where some of the finest fruit ever grown in this colony is produced.

About 5 miles to the South of the Gordon a belt of Metamorphic runs in a South-Easterly direction towards Warinup Hill, which is probably the Western extension of the country seen at the head of the Young River, which crosses the railway line near the Round Swamp.

This country is a good deal covered by gravel and other surface deposits, but would be worth prospecting, as also would the country along the Frankland River, as it is very similar to the tin-bearing country at Bridgetown.

THE GORDON RIVER TO THE NORTH-EAST.

For a few miles in a North-Easterly direction the Gordon River flows over open clay flats with swamps here and there, but higher up, where the older rocks again outcrop in its bed, the country greatly improves, these sticky clays and sands being replaced by rich loams. All the country around Etipup, which is near its head, has long been settled by farmers, as there is a great extent of land fit for agricultural purposes, but up to the present this has only been worked on a small scale owing to the expense of carting; but now that the railway passes within a few miles, this will rapidly become a great wheat-producing district.

Some little time ago a great deal of excitement was caused by the reported discovery of rich gold-bearing stone, supposed to have been found by one of the men employed in sinking a tank on Lord Brassey's estate (Coblup), but as he afterwards denied that it came from the tank, but said he would show the place if a certain sum were paid him, the matter dropped; but as several persons still believe in the truth of the statement, it was considered advisable to thoroughly examine the district to determine whether any stone of a similar character existed

there. The specimen is of a granular ironstained quartz, rich in gold, very similar to the stone found at Kimberley near the surface, but no stone of this class exists about the head of the Gordon or Pallinup Rivers, where all the quartz is whiter and much more glassy and crystalline. The rocks are highly altered with numerous granite and other trap dykes, and large masses of quartz often forming low hills or ridges across the country, but these, as a rule, are not of a promising character.

In some places, where tanks and wells have been sunk, large deposits of pipe-clay, with small quartz grit through it, have been met with. These deposits are very common in all mineral-bearing country, as the decomposition of the mineral sulphides in the lodes acts chemically upon the adjoining rocks; or in other cases, where there are coarse-grained granite dykes with tin veins, we often find the feldspars have decomposed, forming China clay, but the quartz still remaining in angular fragments intermixed.

This country would be certainly worth prospecting, both for tin and gold; for, although the specimens brought in were not found there, reefs of a different character carrying gold may be found.

THE HEAD OF THE PALLINUP RIVER.

The country at the head of the Pallinup River is very similar in character to that at the head of the Gordon, but if anything is rather better; but then it has the drawback of not having such a good rainfall. This, all along, has been the drawback to settling this country, for, as a rule, wherever wells have been sunk they have proved to be brackish, the exceptions to this rule being one or two small surface soakages which were long ago taken up as small blocks, such as Nigalup. The rocks are mostly crystalline, with dykes of granite and diorite, and in some of the tanks sunk on Martinup, decomposed (mullocky) granite, identical with the tin wash at Bridgetown, and very similar to that in Cornwall, has been struck. This country would be richly worth prospecting for tin, as it has every appearance of being a tin-bearing country.

The question of Artesian water has been raised for this district, but this is quite out of the question, for where these highly broken Metamorphic rocks outcrop, if there were an underground water supply, under sufficient pressure to rise to the surface up a bore, it would find its way to the surface now by means of the fissures which exist in the rock.

The best thing is to sink tanks and ring the trees, and if hard bars of granite cross the water-courses, wells may be tried on the higher side of these, but neither the supply nor the quality can be depended on.

THE GORDON TO KOJONUP.

The road crosses the low ridge between the Gordon and Slab Hut Gully, which latter stream it follows up, crossing the water-shed between it and the Balgarup, which is a tributary of the Blackwood River. This is all promising mineral country, and in several places very nice quartz reefs are visible.

Between Kojonup and the Beaufort River there is a poor sandy patch of land, but, on approaching the river, good land is again met with. This river and the Arthur are the main branches of the Blackwood River, and wherever rock outcrops, which it always does in the valleys, it is of a most promising mineral character.

THE WILLIAMS AND HOTHAM.

These are the two main branches of the Murray River, and along their valleys there is a large extent of good land, with outcrops of Metamorphic rocks, with mineral veins and dykes. Near the Williams a deposit of Manganese is reported to have been found, but, up to the present, although the country richly deserves it, very little prospecting has been done.

THE HOTHAM TO NARROGIN.

This portion of the road passes over the Darling Range, where the hard crystalline rocks, similar to those met with throughout the entire length of this range, are met with. They are, in most places, on the high ridges, capped with ironstone gravel and conglomerate, and where the rocks do outcrop in the water-courses they are not of a mineral-bearing character. The land is mostly poor, being thickly covered by jarrah, with some patches of red-gum in the small flats.

NARROGIN TO PERTH.

Near Narrogin there are some small but rich flats in the valleys, and the rocks, as a rule, along this Western face of the range, are less hard, slate outcropping in places with quartz veins, which carry a good deal of mundic, and more or less gold. It was near here that a small mine called the "Two Wonders" was opened up some years ago, but the stone was not found rich enough to work; but the fact still remains that gold is there, and there is not the least doubt that richer deposits will be found when the country is more systematically prospected.

The land at the foot of the range, and up these small creeks, is wonderfully suited for garden and orchard purposes, as the soil is rich, water plentiful, and there is no frost to speak of.

From Narrogin to the Northward, the road follows the Canning River, passing over large clay flats, but after crossing the bridge it ascends the low sandy spur which separates this valley from the Swan.

CONCLUSION.

As a whole, throughout this trip, it is surprising how much good land there is both for mineral and agricultural purposes; and one cannot be far wrong in predicting that, before many years, a large farming and mining population will be settled along all the main valleys between Albany and Perth.

HARRY PAGE WOODWARD,

Government Geologist.

Perth, 22-7-91.