

If anything must be done, a shaft with drives should be sunk at the 51-mile post, with an engine, from which water could be supplied down Spring Gully and Dumpling Gully, one day one way, and one day the other, the sluices being arranged one below another so as to use the water over and over again.

I have, &c.,

HARRY PAGE WOODWARD,

Government Geologist.

Albany, 25th May, 1891.

*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 Greenbushes Tinfield, and to inform you that I start for the Eastward on Friday, the 29th.

I have, &c.,

HARRY PAGE WOODWARD,

Government Geologist.

Albany, May 26th, 1891.

### THE GREENBUSHES TINFIELD.

*Proclaimed Area, 50 square miles.*

#### DISCOVERY.

In the latter part of the year 1888 Mr. D. W. Stinton found tin in a small gully near the road, about nine miles from Bridgetown, and 53 miles from Bunbury.

#### SITUATION.

The field is situated on the main Bunbury-Bridgetown Road, and extends South to the Blackwood River.

#### SHAPE OF COUNTRY.

The country about the field is very rough, with high hills and deep gullies; in fact, in the middle of the field is one of the highest peaks in the district.

#### PORT AND ITS CONNECTION WITH THE FIELD.

The nearest Port is Bunbury, from which a railway runs 18 miles on to the foot of the range, after which a good but hilly road connects it with the field. There is also a telegraph station on the field.

#### GEOLOGICAL FORMATION OF THE COUNTRY.

The rocks of the district are crystalline schists, gneissic, and granitic, with numerous dykes of diorite, granite, and veins of tourmaline, the surface being mostly covered by nodular clay-stones (gravel), sand, and ferruginous sandstone; the ferruginous sandstone capping all the ridges, whilst the sand is found in all the swampy hollows often associated with a poor earthy brown coal of recent formation. All the rocks strike in a North and South direction.

## WATER SUPPLY.

Although there is very little surface water on this field, except immediately after rain, there is no scarcity of it, as springs break out in several places, and it can always be obtained by sinking at a slight depth. This is very remarkable as the country is so high, and it seems to indicate that the deposits of drift are much more extensive than at present believed. There is a very large rainfall here (33 inches) which, falling on these swamps, is held for a long time, only gradually sinking away into the solid rocks below. If the trees were killed on this area the water supply would be considerably increased. The deepest shafts sunk on high ground have always struck water at from 50 to 70 feet.

During the greater part of the year the quantity of water is the great obstruction in the way of working; but if these claims were properly worked this should be taken advantage of, by raising dirt during the dry season and washing it during the wet.

## CLAIMS AT WORK.

At the present time all the claims at work are situated at the Northern end of the field, near the 50-mile post, and a little to the West of the 51-mile post in Spring Gully.

*The Dundee* (Areas marked J. M. Ferguson, Hay & Co., and D. A. Hay), the property of Mr. David Hay, of Bunbury, is being worked on tribute by Mr. Stinton and others.

This claim is situated on an elevated flat on the North side of Dumpling Gully. There seems to be no defined lead or gutter, but the tin-wash is equally spread over the surface of the rock, and is 3ft. in thickness, consisting of a sandy pipe-clay with quartz, carrying about 5oz. of tin to the dish. This wash is overlaid by from 3ft. 6in. to 4ft. of gravel (nodular clay-stones); but neither in this nor the wash is there any indication of the action of running water, the tin often being found in perfect crystals.

There is a good supply of water on this claim at about 25ft. from the surface.

The rock is a decomposed granite, very similar to the dykes worked for China clay in Cornwall, and here, as there, carries a little tin.

This claim, although not very rich, should pay well the way it is being worked.

*J. Austin.*—This area is worked by Williams and Austin, and is situated on the same flat to the North and West of the last mentioned claim.

It has been worked by means of a large *paddock*, from which 3ft. of gravel had to be removed before the wash could be worked. The wash here, which is from 3 to 4ft. in thickness, seems to be very good, yielding about 1lb. of tin to the dish; but owing to its cemented nature it is more troublesome to work, as it has either to be crushed, burnt, or allowed to weather before it can be washed. It consists of ferruginous sandstone and clay, which often contains a good deal of tourmaline and mica, with here and there pockets of sand, which are generally very rich in tin.

The tin is of a coarse and generally crystalline nature, resting on a mullocky bottom which contains a little tin.

*Cullinan & Co. and Gilbert & Co.*—Worked by Williams and Hillier. On this area the wash is overlaid by from 3 to 5ft. of yellow sand, with brown earthy coal seams overlaying from 2 to 3ft. of ferruginous sandstone, under which there is about 1ft. 6in. of wash, which carries about  $\frac{1}{2}$ lb. of tin to the dish.

The bed rock is a decomposed feldspar, with tourmaline and quartz, and it has been found easier to work in this under the wash than to strip the surface.

*R. Williams.*—This claim is situated close to the road on the South side of Dumpling Gully. It is about the best worked, and has put out more tin than any other area on the field; this is due to the fact that the owner is working it himself. The greater part of the work has been done by stripping the 4ft. of gravel which overlay the wash; but, latterly, at the Eastern end of the workings a good deal of driving has been done, as there is a good solid bed of ferruginous sandstone over the wash.

The wash varies from 1ft. to 3ft., and is often coated on the top by a black manganese stain. In this wash sandstone nodules are often met with, which are very rich in tin, and are probably derived from some older wash in the locality.

This wash runs in a line North-East and South-West, and has probably been deposited by a stream, as the lead is more or less defined.

The tin is not so coarse or crystalline generally as the previously mentioned claims, but the wash is richer and the tin more water-worn, and about the size of wheat grains. Some of the wash contains a large quantity of mica, often in large pieces but in a highly decomposed state.

The bed rock is a decomposed granite, being now a sandy pipe-clay with quartz veins. About 95 tons of tin have been raised. There is a good water supply at 7ft. from the surface.

*G. F. Moore.*—Worked by Mr. J. Greaves.—On this area, which is probably the extension of the same lead as worked on Williams', the wash is overlaid by 4ft. to 5ft. of yellow sand, consisting itself of from 3ft. to 4ft. of a mullocky wash carrying about 3oz. of tin to the dish. There is also a good deal of ferruginous sandstone, very rich in tin, but this would have to be crushed before it could be washed. The best wash follows along the North side of an ironstone ridge.

The bed rock here is a white indurated clay-slate.

*Bishop Gibney's.*—The most extensive workings on this area, and from which most tin was raised, are situated about the middle of the area on the South side of a swamp, where close to an ironstone ridge a gravelly wash carries about  $\frac{1}{2}$ lb. of tin to the dish. Further into the swamp there is about 6ft. of sand, which carries about 1oz. of fine tin to the dish. This latter should pay well to work during the wet season, as there would be no trouble in either raising or washing it, and although not rich, a great quantity could be put through in so short a time.

Further to the Westward, in a little gully, a gutter about 15ft. wide is being worked by a series of shafts and drives.

In the sinking there is from 5ft. to 6ft. of gravel, which is cemented above the wash, and here is from 1ft. to 1ft. 6in. in thickness, often containing pieces of ferruginous sandstone, very rich in tin, the whole wash yielding close upon 1lb. to the dish.

The bottom here is a sandy pipe-clay, with decomposed intrusive granite dykes.

*A. W. Newman.*—This is situated at the head of a small gully to the South of the last-mentioned, and has been worked by the means of a large paddock from which 7ft. of sand had to be removed from across the wash, which here was about 3ft. in thickness, carrying about  $\frac{1}{2}$ lb. of tin to the dish. The bottom is a decomposed granite, in which a large supply of water was struck at 50ft. from the surface.

*A. Brown & Co. (Milligan).*—This area is situated to the South and East of Newman's, on the side of the hill where a defined lead or gutter has been found under a heavy ferruginous sandstone and claystone cap, 9ft. in thickness. The wash is from 15 inches to 3ft. in thickness, on a bottom of decomposed mica rock dipping to the Westward.

The richness of this wash varies considerably, it being richest where the wash is thinnest, when it often carries 15lbs. of tin to the dish. 14 tons have been washed. This claim is being well worked, a tramway connecting the shafts and drives with the sluice.

*E. Holiday* (Hughes & Jackson).—This area is further to the South and nearer to Spring Gully. There is a nice little defined gutter, the best defined on the field, in which a nice wash is met with about 1ft. in thickness which carries about 5lbs. to the dish. It has been worked from a paddock by a drive into the side of the hill, and the dirt stacked until the creeks begin running. Washing operations will commence shortly, when a nice lot of tin will be sent in from this claim.

The bottom here is a decomposed granite, and water is at no great depth from the surface. Last winter 16 tons of tin were sent away.

*Hart, Caporn, and Sinclair*.—This area is situated in Spring Gully, to the South and West of the last-mentioned claims, the tin being probably derived from the lead which crosses Newman's, Brown's, and Holiday's blocks.

The wash occurs in the bed of the gully, and is from 1 to 3ft. in thickness, and about 20 yards in width, carrying about 1lb. of tin to the dish. In some places in the bed of the gully, very rich pockets of wash are met with, from 6 to 10ft. in depth. The wash is overlaid by surface soil, about 8 inches in depth, and is partly free sandy wash and partly clayey; this latter has to be puddled.

Water is plentiful a few feet from the surface; the creek also runs for a good part of the year.

Up to the present about 50 tons of tin have been sent away, and about as much more will be washed out this winter.

It is a wonderfully rich claim, and about the easiest to work on the whole field.

*Spring Gully Tin Mining Co.*—This area is situated to the East, and higher up the gullies; it is not being worked at present. The tin was finer, and not in such quantities as in the last-mentioned.

*D. W. Stinton & Co.*—(The Bunbury Tin Mining Co.)—This was the first discovered on the field, and is situated at the South end of the field, a little to the North of the township; when it was first opened the wash was very rich and of great thickness, but in spite of this it has never been made to pay. Tin was first found at the Northern edge of this claim, or almost at the highest point on it; work was started here, but as it was found that there was too much water to contend with in sinking, a tunnel was driven South a distance of 1,000ft., to the gullies, at a depth near the workings of 22ft. from the surface, several shafts being sunk along it to facilitate the work, and the whole being timbered.

A dam was also constructed on the top of the workings, so that it will be impossible to follow the lead of wash quite to the Northern boundary without destroying this dam.

In the large excavation worked, from which 33 tons of tin have been sent away, there is a fine wash exposed, about 20 feet in thickness, but this of course varies very greatly in richness, and is so clayey that it needs puddling; this does not seem to have been done, and the tailings would pay well to wash over again.

The best wash, which is under a false bottom of a grey clay, does not seem to have been worked, this clay evidently being taken for the bottom.

It seems to be generally believed that the first find was only a pocket, but it is nothing of the sort, but a good well defined lead which has never been traced; the tunnel to drain the workings being taken clean over the wash, which has never been prospected.

This lead comes down from the N.W., through Mr. Hay's block, under the dam, takes a sweep into the S.E., then turns away to the S.W. through a low sandy rise towards Hester's Troughs.

A good deal of prospecting has been done in a half-hearted way, without any system, and shafts have been rarely bottomed on this area.

This claim, in spite of the apparent failures, will yet prove to be one of the richest on the field.

#### PROSPECT OF THE FIELD.

Up to the end of February about 350 tons of tin ore had been sent away from this field, and it is highly probable that as much will be sent away this winter, as the claims are now being worked in a more systematic manner, and a large quantity of dirt is stacked ready for washing.

The field is quite in its infancy as yet, but nothing much will be done until more of the areas are forfeited or worked by their owners. Companies will never pay on this field, yet a handsome profit will be made by anyone who will work his own claim. This is proved beyond a doubt by all the companies closing up, whilst private individuals are doing very well, even when they have to pay a large tribute to the lessee of the area.

The best tin occurs along the lines of decomposed granite, which lines seem to run a little East of North, one line extending from Hay's and Austin's areas, on the North side of Dumping Gully, to Spring Gully, and the other from the Greenbushes well to the township; but how much further these extend it is impossible to say until the surface gravel is removed.

The tin is probably derived from networks and strings of small leaders through this mass of decomposed granite rock, large portions of which will probably pay to work. One patch of these leaders must exist near Mr. J. Austin's claim.

This field will probably keep a good many men in work for many years, and when these veins, from which the stream tin is derived, are found, will probably become an important mining centre.

#### EXTENT OF TIN-BEARING COUNTRY.

The line of tin-bearing country extends in a North and South direction, and it has been found in places across the country as far North as the Preston River, and South beyond Bridgetown.

#### GENERAL REMARKS.

This field will never do much under the present mining regulations, as land having to be taken up in Perth stops all prospecting, for should a man be supposed to have discovered anything it is at once taken up before he can get his application in. In the next place land is allowed to be held without any labor conditions as long as the rent is paid; this, it is true, means revenue, but it is a shortsighted way of looking at it.

Stream tinfields should be worked the same as alluvial goldfields, that is, the holder of a miner's right should be able to peg out an area or claim (say) of 20 acres, which he must work, and where companies take up land they should be compelled to put on labor at the same rate.

This field has been simply killed by land-grabbing syndicates and persons who will not work themselves or let anyone else, and until they are made to realise that taking up land means liability, this will go on.

What is the use in trying to persuade outside capitalists that we have rich mineral deposits. They naturally say, "If these things are so good, how is it that your tinfields are not doing more after being worked two years"—for tin, like alluvial gold, requires scarcely any capital.

It is, pure and simple, a poor man's field, and companies will never pay; but many a poor man, if he get a chance and work hard, will not be poor any longer, as these deposits are some of the easiest to work that have ever been found, and the fine rainfall—33 inches—and the moderate depth of water from the surface, all help to make work here as easy as possible.

HARRY PAGE WOODWARD,  
Government Geologist.

25-5-91.

### THE DARLING RANGE.

This range presents a bold escarpment to the coastal plains, and is composed of very hard crystalline and granitic rocks, striking North and South. At their base, on the Western side, here and there, softer rocks—such as clay-slate and sandstone—out-crop; and wherever they are met with, they contain quartz and other mineral veins.

The quartz, as a rule, contains iron pyrites in larger or less quantities, and on assay these have all proved to carry gold, but in no case rich enough to pay to work; but as only a few samples were taken, this is no test—only proving that the stone here does carry gold; and, where gold is, there is no saying when very rich “patches” may be found.

The samples collected and assayed were taken from different points between Kelmscott and the Harvey River. There are also several old lead mines along this line of country, but the galena was too “patchy” and too poor in silver to pay to work. On some of these old mines a great deal of work has been done.

The galena is associated with zinc blend and a little copper, and would require a great deal of dressing before it could be shipped.

### MICA.

For many years a great deal has been said about mica being found near Bunbury. This, at last, has taken the definite form of several claims being taken up and prospected.

They are situated on a small branch of the Collie called Bussell's Brook, on the old Albany Road. These areas are taken up by Messrs. Caporn and Timperley, who have sunk several holes a few feet, but although some fairly large mica was found at the surface this was not found in depth. This is due to the fact that the mica is contained in a granite dyke which does not go down vertically, and this must carefully be traced if this mica is to be worked.

These dykes run in a North and South direction, and are about in the same line as those on the tinfield. Near the surface, as a rule, they are much decomposed, the mica being valueless; but, in one or two places, hard masses outcrop where the mica is of a very good quality, but the rock would be too hard to work. This is probably what will be met with in depth.

As a whole this discovery is of no value without something much better is found, as the quality and quantity are not sufficiently good; but mica is so patchy that a few feet from one of the existing holes some of a very good size and quality might be found, but it is a very risky thing to put money into without there is a much better surface show.