

1.—Report of A. Gibb Maitland, Government Geologist.

NOTES ON THE GREENBUSHES TINFIELD.

The Greenbushes Tinfield, as defined by the authorities, is situated on the comparatively lofty tableland drained by the heads of Norilup and Hester's Brook. The height of this tableland is 900 feet above sea-level, and the highest part of it is crossed by the main road from Bridgetown to Donnybrook.

In the year 1891, Mr. H. P. Woodward, then Government Geologist, reported upon the discoveries in the Greenbushes Tinfield, which was then in its infancy, having been discovered only a few years previously. What was called stream tin was then being obtained from Dumpling Spring and Bunbury Gullies.

Since 1891 mining has been carried out in a somewhat desultory fashion, and, considering all things, a fair quantity of tin has been raised, as disclosed by the records kept in the Customs House. These figures until quite recently were the only data available for arriving at the yield of the field.

The quantity of tin raised appears to have been as follows :—

Year.	Tin Exported.	Estimated Value.	Remarks.
	tons cwt.	£	
1891	204 0	10,730	The Mining Registrar at Greenbushes reports—"Of previous years there is no record either at Bunbury or Fremantle, and I believe the amount to be inconsiderable."
1892	265 9 $\frac{3}{4}$	13,843	
1893	171 10	7,664	
1894	371 5	14,325	
1895	277 3	9,703	
1896	137 5	4,338	In 1889 and 1890 72 tons 10 cwt. of tin, valued at £5,700, were exported from the Colony, which the Collector of Customs reports to be "in all probability the produce of the Greenbushes Tinfield." These figures have not been included in the table.
1897	95 11	3,275	
1898	68 2 $\frac{3}{4}$	2,760	
1899	278 8 $\frac{1}{4}$	21,138	
Total	1,868 14 $\frac{3}{4}$	87,346	

The salient geological features were described by Mr. Woodward in his report, and depicted in the geological sketch map with which it was accompanied. I mapped the geological features of the field in somewhat greater detail than was possible, owing to the lack of adequate topographical maps at the time the district was examined by Mr. Woodward. My examination of the tinfield, however, showed that the descriptions given by Mr. Woodward would need to be but little if at all modified by the recent developments, though perhaps they may be somewhat expanded.

In its geological features the field consists for the most part of crystalline rocks (of the age of which the district affords no clue), alluvial deposits, and ferruginous conglomerate which covers by far the larger portion of the tinfield.

This conglomerate, which forms one of the most noticeable features in the structure of the field, has been accurately delineated upon the geological map Plate I., with which these notes are accompanied. In its mode of occurrence the conglomerate presents one important feature, viz., that it does not form a horizontal tableland, but occurs at different elevations, and seems to have adapted itself to the original contour of the ground upon which it originated. The conglomerate covered a much larger area than it at present occupies, and denudation has gone on to a large extent since it formed part of one continuous formation. The thickness of the conglomerate is nowhere very great, operations having showed that it rarely, if ever, exceeds 20 feet. The conglomerate is not of sedimentary origin, but has apparently been formed by the alteration *in situ*, and subsequent cementation of the underlying rocks. In some portions of the field this conglomerate (as is only to be expected from its mode of origin) carries a certain quantity of tin. The ore, however, is not evenly distributed throughout, but seems to be concentrated in certain comparatively isolated patches. The tin from this conglomerate cannot be extracted by the ordinary process of washing without milling. Where the tin proves most concentrated in the conglomerate is doubtless due to the fact that in close proximity the tin-bearing granite occurs. It, however, by no means follows that the granite must of necessity be exceptionally rich in tin, for the reasons that such minerals as tin, etc., not being readily acted upon by atmospheric agencies, may, owing to residual concentration, be present in far greater quantity than in the parent rock mass.

In addition to the above, a fairly large proportion of the tin ore is derived from the alluvial deposits formed in the existing valleys. These alluvial deposits do not attain very great thickness, nor, considering all things, do they cover a relatively large area of ground.

The crystalline rocks (the matrices of the tin ore) consist of micaceous granite, passing in places into a foliated and highly micaceous granite, with little or no felspar. This granite (greisen) contains tin, tourmaline, zircon, garnet, etc., as accessory constituents. In some parts of the field the tourmaline occurs in such quantity in the greisen as to give a distinctive character to the rock, and would be better described as a tourmaline-gneiss. Some specimens of this material from Caporn's Deep Shaft (now known as the "Cornwall") yield, on assay, tin to the extent of 1.79 parts per hundred.

Owing to the extremely low assay values of many consignments of what were apparently perfectly clean tin ore, which had been shipped to Melbourne, Mr. J. J. East, of the South Australian School of Mines, was induced to undertake a mineralogical examination of the ore. Amongst the ore was a mineral varying from a dirty greenish white to a dark flesh colour, having about the same specific gravity as cassiterite, rendering it impossible to separate the two mechanically. Qualitative tests proved the mineral to be one of the ores of antimony, which, on chemical analysis at the hands of Mr. G. A. Goyder, the Government Analyst, showed it to contain oxide of antimony, bismuth, nickel, niobium, tantalum, together with a trace of iron oxide; the mineral had a specific gravity approaching that of cassiterite, so that no concentration would separate the two minerals.

Having this in view Mr. E. S. Simpson was instructed to investigate this point, and furnished me with the preliminary memorandum, which will be found on a later page in his own report.

DUMPLING GULLY AND ITS TRIBUTARIES.

Dumpling Gully rises at an altitude of about 850 feet above sea level, and after a Westerly course of about a couple of miles it trends gradually to the Southward, when it is joined by Spring Gully and its tributaries, after which the watercourse is then known as Norrilup Brook.

Dumpling Gully receives several tributaries from the South. These flow over crystalline rocks in a narrow valley, the sides of which are formed by the extensive deposit of ferruginous conglomerate. The banks of the gully are skirted by a narrow width of alluvium, which, at the head waters of Dumpling Gully, spreads out into sandy flats or swamps of some considerable extent.

About three chains West of the Railway Station are a series of tin workings on the Eastern face of a gentle slope, which dips gradually in the direction of Dumpling Gully. The section shows about two or three feet of conglomerate passing almost insensibly into sand, which in its turn gradually gives place to granite. The granite sand yielded good prospects of very angular tin (1281),* which must have had a local origin.

About three chains to the South of this is a vertical shaft, 15 feet in depth, showing the following section:—Conglomerate five feet, passing insensibly into sand (wash?) of five feet in thickness, succeeded by a clay, into which the sand gradually passes, without any well-defined line of demarcation. A fair prospect of somewhat angular tin was obtained from the sand (wash?).

On what was originally M.L. 82/519 two vertical shafts, 10 feet in depth, expose about five feet of conglomerate, which passes gradually into a coarse micaceous granitic rock which carries sharp angular tin.

About 10 chains due South of the last-named locality three vertical shafts of unknown depth bottomed on cement, beneath which was eight feet of sand (decomposed granite) carrying very ragged tin.

To the West of the main road, from Bridgetown to Donnybrook, a fairly well marked gully, heading in Location 290, enters Dumpling Gully from the South. Adjoining the Northern boundary of this location, a series of shallow workings, only about 12 feet in depth, have bottomed on micaceous granite, traversed by thin quartz veins. At the bottom of the excavations, the rock is very friable, owing to decomposition, though it has lost neither its individuality nor its geological identity; this material gradually passes upward into sand, which finally gives place to soil forming the surface of the ground. This decomposed granite yields in places fairly coarse subangular tin, and titanitic iron. So far as operations have at present been carried, the tin ore seems to be concentrated at the bottom of that portion of the deposit which has undergone most decomposition. On either side of the sandy flat which forms the watercourse, conglomerate of the usual type prevails, and in some cases it covers the wash (?) last-mentioned. This conglomerate is in some cases stanniferous, which is only what would be expected, seeing that the formation beneath it is tin-bearing.

An important tributary (Gibney's Gully) rising in Location 289, enters Dumpling Gully about a mile and a-quarter below Reserve 2687. The swampy flat at the head of the gully has yielded fair quantities of surface tin, derived no doubt from the underlying granite, which is exposed in the shallow shafts at the South-East corner of Location 289. About five chains West of the Western boundary of Location 289, and near the South-East corner, a vertical shaft has been sunk to a depth of 20 feet, through granite of the prevailing type, but, so far as I am aware, no tin was obtained. Eight chains West from this a very shallow shaft has been sunk, through the conglomerate to the granite.

Down Gibney's Gully, the width of the alluvium in the valley is not very great, but forms a narrow strip on either side of the watercourse.

At the junction of the gully with the main watercourse, Dumpling Gully, the country rock has changed and the granite is succeeded by vertical schistose rocks, which trend North-East and South-West. The schists are intersected by a dyke of garnetiferous pegmatite (1243).*

About 18 chains further down Dumpling Gully schistose rocks are exposed on both banks of the stream, they are inclined at a high angle to the West and trend generally North and South.

* The figures in parenthesis refer to the Departmental Collection Numbers.

SPRING GULLY AND ITS TRIBUTARIES.

The head waters of Spring Gully take their rise at an altitude of about 700 feet above sea level, and with the exception of three branches, two of which rise to the South of Bishop Gibney's Freeholds, and the other to the North of the Three C's Leases, flows generally to the Westward, with a fall of about 200 feet to the mile.

A great deal of work has been accomplished in Spring Gully, and more especially on the tributaries entering it from the North.

An important branch, named Mulligan's Gully, takes its rise at the South-East corner of Location 289, and traverses granitic rocks and their *débris* for the whole of its length. Just on the North side of the gully, and adjoining the North-West corner of an old lease (Peg 82/264), a good deal of surface work has been carried out upon a decomposed granite. In places this granite is covered with a shallow coating of what may be called rain wash, formed by the disintegration of the underlying granite. This zone of decomposition is in places phenomenally rich in tin, and has been extensively worked in Mulligan's Gully, but the official figures, however, do not disclose the quantity of black tin raised from this gully.

Close to the Western boundary of an old abandoned lease (82/298), just below the outcrop of the ferruginous conglomerate, and on the Eastern side of Mulligan's Gully, four shallow shafts have been put down, to depths varying from 8 to 30 feet, through a typical granite decomposing in the direction of kaolin. There is no record, however, of tin having been found in any quantity in these shafts.

A good deal of surface work has been done in previous years on the ground traversed by Mulligan's Gully, and a fair quantity of tin seems to have been obtained. The tin-bearing granite, underlying the shallow surface deposits, is exposed in several of the old head races.

The head of Spring Gully is on an old lease (82/244). A vertical shaft on Captain May's ground, 16 feet in depth, shows a "tin floor" dipping at a low angle to the North-East. This floor had been followed, at the date of my visit, to the rise for a distance of about 30 feet to the South-East. The tin, which is associated with tourmaline, quartz, and a little mica, is confined to a zone of about one foot thick, met with at the bottom of the shaft. The tin-bearing matrix is a decomposed granite.

A great many old workings are situated on the ground lying between Mulligan's Gully and the main head of Spring Gully, but by far the larger majority were inaccessible, but a few modern prospecting shafts enabled me to ascertain something of the nature of the deposits in the vicinity. The surface of the ground is covered with the ferruginous conglomerate which itself carries (as is only to be expected from its mode of origin) a certain quantity of tin, which, however, is not evenly distributed throughout, but seems to be concentrated in certain isolated patches.

A shaft (Keleher's), 20 feet in vertical depth, was being sunk on an old lease (82/283) alongside the Northern boundary of 82/237. The first five feet of sinking was through conglomerate, and thence through a decomposed granite, which at the bottom of the shaft was found to be traversed with small quartz veins.

About two chains to the South of this a similar section is exposed in Love's shaft, which had attained a depth of 17 feet.

Two and a-half chains further South are two shafts on Sugar's ground. The Northernmost shaft was about 16 feet in depth, and exposed little else than rain wash, which yielded very good prospects of tin. The Southernmost shaft has been carried down to a vertical depth of 13 feet through rain wash and decomposed granite. Thin seams of tin occurred just where the granite appeared to be least decomposed.

A shaft was being put down by Captain Keleher, to the West of these last mentioned, on an old lease (82/256), with the object of intersecting one of those "tin floors" which previous observations have shown to occur in the granite of this neighbourhood. The shaft had been carried down to a depth of 20 feet vertically below the surface, through a friable decomposed granitic rock. The "wash" consists of subangular fragments of the constituents of the granite, and fragments of tourmaline crystals.

In addition to the above a good deal of tin is being derived from a deposit formed in the existing valley of Spring Gully. The deposit consists of two distinct portions:—

- (a.) An upper or "free dirt," i.e., loose gravel; and
- (b.) A lower stiff "clayey dirt," containing irregular bands of detrital tin.

The free dirt, which varied from one to three feet in thickness and about 18 to 20 yards in width, proved exceptionally rich in tin. Apparently the previous holders of the ground never touched the lower wash.

This portion of Spring Gully has proved exceptionally rich, and no small portion of the stream tin has been derived from the denudation of the tin-bearing granite occurring in Location 289 and the ground to the South. From the fact that Spring Gully, just at the junction of Mulligan's Gully, traverses the Southern continuation of this granitic belt, and has cut down into it to some considerable depth, it is not at all unreasonable to expect that a system of judicious prospecting would lead to the discovery of tin veins or lodes in the granite itself. The physical character of some of the tin shows that it can only have been realised from the parent rock, in close proximity to where it is at present found.

COWAN BROOK AND ITS TRIBUTARIES.

The headwaters of Cowan Brook, rising a little to the West of Bunbury Gully, at an altitude of about 700 feet above sea-level, drains country which has proved to be tin-bearing, although at the date of my visit to Greenbushes very little work was in progress.

Granitic rocks are exposed on the Northern bank of the Brook, emerging from beneath the ubiquitous conglomerate, which almost entirely conceals the whole country.

The headwaters of Cowan Brook traverse a very sandy flat, portions of which have proved to be tin-bearing; the whitish sand is due to the decomposition of a granite which is in all probability the Southern continuation of that which has proved so rich in Bishop Gibney's ground some distance to the North.

BUNBURY GULLY AND ITS TRIBUTARIES.

Bunbury Gully rises to the North of the Greenbushes Well, and flows gradually to the Southward. It is flanked on either side by the ironstone conglomerate, and where not concealed by alluvial deposits the granitic rocks make their appearance beneath it.

The country will be best described by taking the sections exposed in the various claims in geographical order from North to South.

On the summit of the saddle which divides the waters of Bunbury Gully from those falling into Salt Water Creek, two shafts had been put down on Messrs. Brook & Barrat's claim. The depth of the shafts was about 10 feet; the section in the shafts show first about two feet of ironstone conglomerate, succeeded by a cement composed of rounded and subangular pebbles, quartz, tourmaline, and other decomposed products of a granitic rock. The cement rests on a fairly defined clayey floor. The component pebbles of the cement do not possess those characters which point to their having been mechanically rounded by water; the deposit would seem to be talus or cliff *débris*. The cement is tin-bearing, the ore being probably derived from the disintegration of the tin-bearing granite in the vicinity.

At the actual head of Bunbury Gully, two other vertical shafts have been sunk to about a depth of 11 feet vertically below the surface, on what is known as McDonald's claim. Both shafts penetrated a variable thickness of ferruginous conglomerate, which forms a superficial covering to the ground. The so-called wash is nothing but decomposed granite which yielded fair prospects of tin.

The ground known as Gibley's lies just near the head of Bunbury Gully. The section in the main shaft shows about six feet of the ubiquitous conglomerate beneath which a decomposing granitic rock continues to the bottom of the shaft. At a depth of 14 feet from the surface is a band of rubble, containing partially rounded boulders and pebbles of tourmaline and quartz. This rubble or wash, which contains tin disseminated through it, rests, without any very distinct boundary, upon a clayey bottom, evidently granite decomposing *in situ*.

Gold has been found associated with the tin, both by the previous and present holders of the ground.

Several old workings exist upon the ground, but, owing to their inaccessibility, very little information in connection with them is available. An old shaft lying about 13 feet to the East of what is known as Selborne's old shaft, shows that the wash is only about three or four feet from the surface. The section in this and Gibley's shaft shows that the "wash" is not a wash within the usual acceptation of the term, but would be best described by the term "rain wash" rather than genuine alluvium. The deposit owes its preservation to being covered with a later formation.

Adjoining the North-East corner of Reserve 1381, a shaft has been put down to a depth of about 12 feet. The sinking exposed four feet of modern alluvium, and the remainder a kaolinic rock with white mica and tourmaline; the rock is evidently a decomposing granite. A few yards to the West, on the lower slopes of the valley, a nine-feet shaft encloses an ironstone rubble of about four feet in thickness, resting upon decomposing granite.

Hamel and Smith's Claim.—Some distance lower down Bunbury Gully, and on the Southern wall of the valley, a series of shafts have been put down to varying depths. These shafts disclose the underground structure of the country. Two vertical shafts of about 30 feet in depth are connected underground.

In the workings a well marked "tin floor" underlies at a comparatively low angle to the West. The material forming the "floor," locally spoken of as "wash," is about 2ft. 6in. in thickness, and consists of mica, quartz, a little tourmaline and tin. The deposit in all probability represents the decomposed portion of one of those tin-bearing veins by which the granite is reticulated. The most Southerly shaft on the claim, at a slightly lower altitude, has a depth of about 20 feet, and the "wash" only about one foot in thickness.

Some little distance to the South seven other shafts have worked a similar deposit.

On Krammer's Claim a vertical shaft, 34 feet in depth, intersected a decomposed "tin floor" of from three to four feet in thickness. The floor has a gradual dip to the South-West. The deposit ("wash") is very rich in tin, the ore being often rounded or subangular (1823).^{*} In that portion of the property which lies close to the bank of the gully, very sharp, bright, angular tin (1284) occurs at a very short distance below the surface. The ore must have been released from its parent source not far from where it is at present found.

On the Western bank of Bunbury Gully, and opposite Bench Mark XXIII., is a water shaft some 30 or 40 feet in depth. The shaft was inaccessible to me, but, judging from the material lying at grass, the sinking was through a very decomposed micaceous granite.

Further to the South-West, and on the Western bank of the gully, three shallow shafts have been put down. The most Northerly of the three shafts, about 10 feet in vertical depth, showed a few feet of cement rubble, partially consolidated, succeeded by about three feet of "wash" containing a high percentage of tourmaline. The most Westerly of the group was about 20 feet in depth, and passed through no wash, but merely pierced a clayey decomposition product of a granite.

^{*} The figures in parenthesis refer to the Departmental Collection numbers.

On the Eastern side of the main road to Bridgetown, on what was originally M.L. 82/76, a shaft had been put down to a shallow depth upon a tourmaline dyke, which was met with beneath the conglomerate at a depth of about five feet below the surface. The overlying conglomerate contains detrital tourmaline, which led to the discovery of the dyke. As exposed in the workings, the width of the dyke is about 2 feet 6 inches. The strike of the dyke is generally North-West, with an underlie to the South-West at angle of about 70 degrees. The tourmaline is enclosed in a ferruginous clayey matrix, which contains occasional patches of quartzose material. Evidently the dyke will prove to be one of the felsitic family. The dyke yielded a small quantity of very angular tin, associated with large quantities of titanium. An assay of a sample (1376) yielded in the official laboratory 1.97 parts per hundred of metallic tin. The tourmaline carries a small proportion of tin. The dyke is known as the Amanda Lode.

What is apparently a parallel lode is exposed some little distance to the North, on what was known as Messrs. Parish & Armstrong's Claim, beneath a cover of about three feet of cement.

A bore was put down to a depth of 59 feet in the alluvial flat, on the banks of Bunbury Gully, to the East of the Amanda. No record appears to have been kept of the strata pierced, except that a very hard rock was met with when operations ceased. From the general features of the district it is quite evident that the alluvium cannot be very thick, but that the greater portion of the material lying above the hard rock is merely the decomposition product of the rocks beneath. Some chains further down the gully another bore, known as "Webb's," was carried down to a depth of 39 feet below the surface. It is stated that alluvial deposits of 17 feet in thickness rested directly upon a bottom of decomposed country. No further particulars are available with reference to the bore.

An important tributary, Elliott's Gully, enters the main channel of the Bunbury to the South of the bore hole just alluded to. A good deal of prospecting has been carried out along the course of the gully.

The walls of the watercourse are hemmed in by the ferruginous conglomerate which forms the bulk of the watershed.

The ground held by Messrs. Portwood & Burnet, near the mouth of the valley, has been exploited by two shafts about 40 feet in vertical depth. The Northernmost shaft exposed a series of cemented gravels, forming a true conglomerate in places, resting upon an uneven floor, which dips at an angle of about five degrees to the South-East. The bottom upon which the deposit rests is very clayey, and is derived from the disintegration of a very argillaceous rock. A very ferruginous sandstone or conglomerate rests directly upon the clay, and is covered with a whitish tourmaline-bearing wash, which at the bottom is about six inches in thickness. The most Southerly shaft, 40 feet in vertical depth, exposes a somewhat similar section. The floor upon which the deposit rests, dips at a low angle to the North-East, and evidently forms the Southern bank of the watercourse. Above the conglomerate, at the bottom of the shaft, is a few feet of very white gritty sand, covered by about five or six feet of ironstone rubble, derived from the denudation and subsequent partial consolidation of the ironstone conglomerate which forms the bulk of the surface of the ground.

The adjoining ground higher up the gully is held by Mr. Elliott. A great deal of work has apparently been carried out upon the property at different times. The main working shaft is situated near the Northern bank of the gully, and has been carried down to a vertical depth of slightly over 50 feet. To the top of the "wash" is 50 feet. The "wash" is a very coarse conglomerate with a very large proportion of flat-sided boulders, cemented together in part with oxide of iron (1240). Tin shows freely in the different portions of the conglomerate. The average thickness of the deposit is about two feet. The conglomerate rests upon the upturned edges of a decomposed clay slate, which is vertical and which strikes South-East. The floor upon which the deposit rests, dips at a low angle to the South-East. Directly overlying the conglomerate, is, in places, a fairly extensive deposit of white gritty sand which contains detrital tourmaline. The main shaft is connected with a series of old workings, which expose a somewhat similar section.

To the South of Elliott's an open cast, just on the edge of the flat, six feet in depth, discloses the following section:—

	ft.	in.
Yellow Surface Sand	2	0
Ferruginous Cement	3	0
Coarse "Wash"	1	0 to 1ft. 6in.

Some little distance to the West of Elliott's a bore has been put down to a depth of 65 feet; the bore was sunk with the object of prospecting for what may be called Elliott's Lead, but the location of the bore site proved to be too far to the North, and out of the track of the old watercourse. After passing through about six feet of ferruginous rubble, derived from the disintegration of the conglomerate which forms the Northern edge of the gully, the boring tool entered a clay, almost identical in character with that underlying the wash in Elliott's main shaft. The bore was evidently carried through decomposing clay slate. The material at grass at a disused shaft to the West of Elliott's, and in the trend of the old watercourse, showed that the deposit was of a similar nature to that to the East.

North-West of this, on Smith's Claim, two shafts have been sunk. The Easternmost of the two had a vertical depth of 42 feet. The bottom of the shaft exposed a conglomerate wash, 18 inches in thickness, resting upon a floor of a decomposing clayey rock, which dips generally to the East at an angle of about 10 degrees. The clayey rock is traversed by a small quartz vein. The wash, which had been followed up on the rise for a distance of about 43 feet from the shaft, showed tin freely. The second shaft, some little distance to the West, had been carried down for a vertical distance of 33 feet with the apparent object of intersecting the wash in the adjacent working. The shaft passed through a very clayey deposit, in all probability resulting from the disintegration *in situ* of a very argillaceous rock. At a depth of about 23 feet, a "tin floor" made its appearance, but no steps had been taken at the date of my visit to exploit it.

Upon the ground lying at the head of the gully, a good deal of desultory work had been carried out. Upon Nuttal's Claim the most Northerly of the shafts disclosed a tin-bearing wash of 12 inches in thickness, covered by a gritty sand, carrying a fair proportion of tourmaline. This sandy bed occurred about 18 inches above the bottom wash, but only reached a thickness of six inches. From the mouth of the shaft the first eight or nine feet consisted of detrital ironstone conglomerate. The floor or bottom upon which these deposits rest is a decomposing clayey rock, probably a clay slate. The adjoining shaft to the South had been carried down to a vertical depth of 15 feet. The sinking showed detrital conglomerate, five feet; sharp gritty sand, nine feet; tin-bearing wash, one foot. The bottom has a slight underlie to the North-East. Five other shafts in close proximity show a practically identical section.

On the conglomerate tableland in the angle formed by the gully taking its rise near Hester's Troughs, and joining the main watercourse to the South of the 39ft. borehole, are several excavations which disclose the nature of the strata beneath the conglomerate. These show that the cover of conglomerate and residuary gravels is not very great, attaining as much as three feet in places. The conglomerate passes gradually into a tourmaline-bearing granite or gneiss, very rich in mica in places. Not far from the South-West corner of what was originally M.L. 82/43, there is 16 feet of wash reposing directly upon a decomposing clayey rock. At the bottom the wash contained, in addition to the tin, a large proportion of deleterious constituents, titanium, etc.

The vicinity of Hester's Troughs has been the scene of vigorous prospecting. The higher ground to the South of the Troughs is covered with the ferruginous conglomerate, which forms a fairly well marked outcrop to the East and West. This deposit prevents an examination being made of the underlying rocks, a difficulty which, however, has been partially overcome by the prospecting operations. What is known as Wright's Shaft, on the Northern slopes of the rising ground to the South of the Troughs, had been carried down to a depth of 28 feet vertically below the surface. The sinking showed detrital conglomerate, five feet; sharp gritty sand, nine feet; tin-bearing wash, one foot. The bottom has a slight underlie to the North-East. Five other shafts in close proximity show a practically identical section. The sinking showed nothing but a clayey rock, which had a dip to the South-East at an angle of about 45 degrees. In the vicinity of the shaft several very large pieces of angular tin, one weighing about 3lbs., have been discovered. From their distinctive characters it is quite evident that the tin cannot have travelled far from its parent source. On the flat ground to the North several excavations have been made, and they all unite in giving what is practically a uniform section, which consists of from two to three feet of peaty soil, succeeded by a very variable thickness of white gritty sand, carrying varying proportions of mica and tourmaline. This deposit results from the residual decomposition of a granite rock, although operations have hardly been carried sufficiently far to reach the sound rock.

A. GIBB MAITLAND,

Government Geologist,

20th October 1899.

The Hon. the Minister of Mines.