

REPORT ON THE BALFOUR AND INTERVIEW RIVER TIN FIELDS1. Introduction.

During the months of February and March, early last year, a geological survey of the tin deposits, in the vicinity of Balfour was undertaken with the object of ascertaining if they were suitable for working by individuals and small parties.

Owing to the exceptionally dry spell during, and for some months prior to my visit, field operations were considerably hampered through lack of water. No detailed examination of the tin deposits in this area has been made previously by an officer of the Geological Survey, although Ward (1911) was primarily concerned with a survey of the copper lodes, he refers briefly to the tin and tungsten lodes and deals with the genetic relationship of the two types at greater length.

2. Location and Access

Balfour can be reached by means of the old Main Coast road, a distance of approximately 44 miles from Marrawah, the nearest railhead. A fairly good motor road runs from Marrawah to the north side of the Arthur River, about a half mile from the mouth, a distance of 12 miles.

At present the Government ferry has been condemned for any but the very lightest of traffic; it being necessary now, to provide teams on both sides of the river and tranship the loads in small lots by row-boat, but it is intended to place a new ferry in commission in the near future. From the Arthur River ferry to Temma, approximately sixteen miles, the grade is good, but the almost universal distribution of peat and the absence of made roads soon renders it unfit for heavy traffic. As weather permits, the five mile stretch of beach south to Sundown Pt. is used. A well graded, though rough road, connects Balfour with Temma, better known as Whales Head, which in the past served as the port for the district, although at the present time the pier is in such a bad state of repair, that it cannot be used with safety. Continuing south along the coast for about 3 miles, crossing the small streams south of Temma in rapid succession, then, following the slope of the coastal plain, the road turns eastward at a point where there is a gap in the coastal belt of timber.

Balfour can also be reached from Roger River West, which is connected to Smithton by a good motor road, by means of the back track, a distance of approximately twenty miles from the Arthur River timber mill. This track, however, is impassable to any but foot traffic, and even then only with great difficulty, owing to fallen timber, overgrowth etc. The destruction by fire of the Frankland River Bridge some few years ago, renders the crossing of this stream both arduous and dangerous. A light cage exists about three quarters of a mile east of the bridge, but is of little use owing to the absence of light hauling rope; the approach on the north bank is ill-defined and precipitous. The Arthur River bridge is also in an unsafe condition.

The Interview River tin field is actually situated north of the river and extends for some miles in a northerly direction, and can be reached by following coastal stock route south from Temma, a distance of approximately twenty

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eight miles; weather conditions govern the choice of the coastal or inland fords for crossing the several large rivers. The field can also be reached from the Pieman River ferry, near the Heads, by means of the old staked Balfour-Pieman track, which crosses the Interview River about two miles inland.

At the time of the visit of the writer there were no certain means of taking a pack horse loaded with stores from Balfour to the Interview River.

3. Previous Literature

(a) Report on some wolfram sections near Pieman Heads, G.A. Waller, 1901.

(b) Geological Survey Report No. 1 Preliminary Geological Report upon the Mt. Balfour Mining Field - L.K. Ward, 1910.

(c) Geological Survey Bulletin No. 10. The Mt. Balfour Mining Field - L.K. Ward, 1911.

4. Physiography

General Description

(a) Balfour Area

The area under review is one of relatively low relief, embracing a portion of coastal peneplain which extends from the Arthur to Pieman River, and is broken by deep ravines and gorges. In the vicinity of the township of Balfour there are many small hills which are isolated portions of the peneplain itself, and noticeable only because of the deep dissection of the latter. To the west, Mt. Balfour (formerly known as Lyons) and to the south, Mt. Frankland rise abruptly to a considerable height above the general level of the peneplain and represent isolated residual fragments of the northern end of the Norfolk Range.

The greater portion of the district examined is drained wholly by Tin Creek and its tributaries. The creek rises by means of numerous branches in the low divide between Mountains Balfour and Frankland. It has a general north westerly course for about three miles and then turns abruptly to the south-east and enters the Frankland River.

The only other stream of consequence is an affluent of the Frankland River, Emmetts Creek, which rises just north of the old Copper Reward Mine, and flows northward.

(b) Interview River Area.

This area is portion of the western extremity of the coastal peneplain, situated within one and a half miles of the coast, and is of comparatively low relief, being little more than 200 feet above sea-level.

The small streams, Hunter and Chimney Creeks etc., that take their rise on the western front of the Norfolk Range are regular, consequent streams, which convey the drainage to the coast by paths which are markedly direct as far as the scarp of the old peneplain. There they are in several instances, deflected to the south-ward by coast dunes.

5. General Geology

(a) Sedimentary Rocks

The rocks occupying almost the whole of the area which is under review belong to a great sedimentary group, to which Ward, 1911, assigned tentatively, the name "Balfour slates and sandstones" and gave their age as probably Cambro-Ordovician, although no definite fossils were found upon which to base this assumption.

The slate and sandstone members of the group are much more abundant, and are usually found in mutual association. The slate is almost always banded, the different bands varying in colour from very dark-grey to white and frequently green, and in thickness from very small fractions of an inch up to several inches. The sandstones are typically white to grey in colour, and variable in constitution to a high degree, ranging from extremely fine, almost slate-like to rather coarse, grit-like in grain size. The slates and sandstones have, in many places, become indurated by silicification and thus converted into quartzites of varying degrees of purity.

Strikes and dips vary between wide extremes due to crustal movements which have subjected this group of sedimentary rocks to great compressional stresses resulting in dislocations of notable magnitude and also an intricate and minute crumpling with consequent development of the slaty cleavage so characteristic of this great group. Augmenting this development of cleavage there is quite commonly some degree of contortion by folding and faulting.

For reasons which cannot be elaborated here, and notwithstanding the complete lack of palaeontological evidence to justify the determination, the opinion is expressed that the "Balfour Slates and Sandstones" are more correctly referable to the Silurian than Cambro-Ordovician System. However, the strong lithological resemblance, and also the field evidence tends to support the above view which is tentatively brought forward pending further field work in adjacent districts.

(b) Pre-Miocene Clays and Gravels

Only one exposure of pre-Miocene sediments occurs in this area, underlying the basalt, just north of the township of Balfour in mineral section 4273/M, where tin sluicing operations have exposed a good section which is as follows:-

Decomposed basalt	- 6 feet
White pipe clay	-12 "
Wash	-10 "
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Total	-28 feet
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The pipe clay contains considerable quantities of sand and, although typically white, is superficially stained with oxides of iron leached from the basalt above, and contains root fibres of recent origin.

The wash is composed chiefly of sub-angular to well water worn, milk white quartz pebbles, more or less

loosely cemented in a yellowish iron stained matrix. In places, the cement has been completely replaced by limonite. Organic material forms a big proportion in some parts. The wash is reported to be tin-bearing, and has been worked in the past.

(c) Quaternary and Recent

Deposits of gravels and drift occupying valley floors and the beds and banks of streams, some tin-bearing, constitute the whole of the formation of these ages.

(d) Igneous Rocks

The only igneous rock occurring in the immediate vicinity of Balfour is a dense, compact in texture, olivine-bearing variety of basalt. Two small residual portions of a single basaltic lava, separated only by denudation, cap the high ground on which, quite naturally, the site of the township was selected. In the hand specimen blebs of olivine and lath-shaped crystals of felspar stand out in a dark coloured groundmass. It weathers into a deep-red soil and the fresh rock only occurs as small kernels below the deep cover of completely weathered material. To the north the basalt overlies some clays and gravels referred to above. There is no reason to believe the basalt is of different age from the other developments of similar material in north-western Tasmania, notably Marrawah, and is therefore regarded as of pre-Miocene age.

The Interview River area lies ^s entirely within the granite massif, which extends from Sandy Cape to the Pieman River, a full description of which is given by L.K. Ward, 1910, Geological Survey Bulletin No. 10. There is practically no soil above any of the granite. The rock is entirely covered for very large areas by the peat covering which is itself shallow and almost wholly composed of vegetable matter.

6. Economic Geology

(1) General Statement

In the neighbourhood of Balfour, the tin and wolfram lodes occur, in the limits of a well defined area, within the boundaries of the Balfour slates and sandstones, and while the absence of granite is noteworthy it is not without parallel. At the Interview River the lodes in which wolfram predominates, are enclosed entirely within the granite massif. The most striking difference in mineralogical composition is the tourmaline content being entirely absent in the former and fairly abundant in the latter. In the northern area, the cassiterite predominates, and is crystallised usually in complex groups and has in almost all cases a resinous appearance, although frequently it is nearly black. At one place, on the western slope of Specimen Hill, tin and wolfram appear to be present in equal proportion. Quartz constitutes the chief gangue mineral and is common to both fields, Wolfram predominates in the lodes in the southern area, no cassiterite being visible, but it can be traced up to the outcrops.

On account of the difficulty that would be experienced

in maintaining sufficient output from the narrow, short and widely scattered lodes, to keep even a small mill working, no serious effort has been made to treat the lode material and lode-mining has been restricted almost wholly to sluicing the easily disintegrated cappings of the veins in the large stock work; mining operations ceasing as soon as the pyrites made its appearance.

The mineralogical and geological features and genesis of the lodes have been fully described by Ward (1911) Geological Survey Bulletin No. 10, and for the sake of brevity need not be further elaborated here.

Owing to the narrowness of the lodes, widths of nine to ten inches being exceptional, and their very limited length - the longest one observed being not longer than 20 feet - it is impossible to do more than merely indicate where the greatest crowding of the numerous small lodes and veins takes place.

(2) Productive Operations

The only locality where lode mining in the restricted sense has taken place to any extent is Specimen Hill. The principal alluvial workings are to be found in the valley of Tin Creek. Other places where notable amounts of tin ore have been won are the various flats known by the following names:- Brickys, Skinner's, Wanderer's and Looney's, which for the sake of simplicity in description, will be described under those headings.

Tinville Area

The area known as Tinville, includes the worked ground on the old Copper Reward lease, about six chains east of the north-eastern corner of the big dam 2615/W. Although alluvial tin ore was known to exist in the low lying part of the Reward section through which Tin Creek flows, it was avoided by the prospectors in the early days owing to the liability of the ground to flooding.

Prior to 1915, little tin mining had been done on the Reward section, but in that year preparations were made for working the tin ground by means of large scale operations. Seven acres of button grass were ploughed, worked up and scooped into the sluicing races with horses and the necessary puddling achieved with horses and harrows. By this means it was expected to prove whether the remaining surface areas could be worked at a profit or not. Already the richest patches had been worked by old miners.

The following year work was intermittent owing to the irregularity of the water supply, which led to a programme of dam construction for water conservation; these were not completed until the succeeding year. In 1918, a ten head stamper battery was brought to the mine but operations ceased before its erection was completed.

The ground worked occupies an area of about seven acres and is very shallow, maximum depth of the deposit being only eighteen inches; the wash itself representing but a few inches and is frequently absent entirely. The wash consists chiefly of rounded, waterworn and angular fragments of quartz, whitish quartzite and grey sandstone, ranging in size from $\frac{1}{8}$ to 5 or 6 inches. The covering consists of a black, peaty loam typical of Button Grass

Plains. The rock bottom consists of slate with the characteristic banded structure, ranging in colour from grey to light brown, with occasional bands of green in the nature of lenses, and, although the rock is extremely hard when first exposed, it weathers readily on exposure. A striking feature is the irregularity of the bottom due to the upturned edges of the slate, which is dipping at a high angle; numerous pot holes add to the unevenness. This condition made the satisfactory cleaning up of the bottom extremely difficult.

Generally, the cassiterite is black in colour, but contains a fair percentage of ruby tin and is present in small, angular to partly rounded grains not exceeding, as a general rule, one sixteenth of an inch in maximum diameter. When concentrated from the detritus and dressed, the cassiterite is very free from associated minerals and gives high assay returns. The distribution through the wash is uneven and may exist from grass-roots to bottom or may be absent entirely. The stripping of this area revealed the presence of a number of short, narrow lodes, 8 to 10 inches wide and anything up to 10 feet in length, from which the upper or tin and wolfram zone has been denuded, leaving the sulphide zone consisting, in this part of the area, of pyrite, containing only a small percentage of cassiterite, not associated chemically. A bulk sample of pyrites taken from the lodes exposed by the sluicing operations gave an assay return of only 1.45% tin. In view of the narrowness and limited length of the lodes, coupled with the scattered distribution, the economical exploitation of them does not seem a possibility.

Half a chain east of the above workings, a small paddock has been stripped in an endeavour to locate payable detritus, without success, and numerous dish prospects fail to reveal any tin ground to the south of the above workings.

Bayley's Claim

An application for a ten acre section was made by E.J. Bayley on the 26th January, 1934, on portion of the old Copper Reward section 9086/M - 72 acres, and the posted notice on south east corner was located some 12 to 15 chains north of the Timville sluiced area, but was subsequently withdrawn in April of the same year.

A considerable amount of work has been done on this section in the past and many leaders and lodes have been exposed; several of the largest have been worked by underhand stoping until the sulphide zone was reached and then work ceased, the deepest being about 6 feet. One occurrence worthy of note is that exposed in a trench about half a chain long and 2 feet wide, north of the Temma-Balfour tramline, approximately 5 chains east of the north eastern corner of section 10245/M - 40 acres which differs from the more usual type observed on the field, in that the tin is not limited to the veins but is impregnating the country rock also.

To the south east, about one chain from the above workings, the "Wash" is reduced to about one inch deep while the "stripping", black, loamy soil, reaches a depth of approximately three feet, the deepest observed on this part of the field.

An improvised "battery" arrangement operated by hand was erected to treat the "specimens" but was rather inefficient and tedious.

Tin Creek Workings

Owing to the exceptionally dry season from about October, 1933 to the time of the writer's visit, practically no water was available for working the higher ground, with the result that, almost wholly operations were confined to working the creek bed, a course possible only when the level of the creek becomes sufficiently low.

Messrs. E.J. Bayley and W. Gale were working in a bend, just south of the north east angle of A.E. Cartledge's 10 acre section, 10332/M. There was seven feet of sandy loam, overlying about two feet of "wash", which consisted of boulders of varying diameters up to two feet and fine gravels. The tin, where found, occurred in "pockets" etc., where conditions had made concentration possible.

Emerton and party were working about a quarter of a mile North from McLeod's 5 acre section 10321/M the wash was typical of that found elsewhere along the creek.

The wash being treated represents recent accumulations and it has been reported that during the last twenty years, the creek has been worked over many times during similar dry periods. Good prospects were obtainable south from these workings.

The most northerly workings were on the old section 7655/M, in the vicinity of the old "Puzzle" workings, where H. Griffiths was working in a deep hole under about three feet of water. The wash was typical of that found along the creek bed, the maximum size of boulders being less than found further south. A very good class of tin was obtained here, consisting of coarse, well water-worn grains; it was confined to the creek channel and no runs of tin could be located under the grey sandy loam banks which are five to six feet deep.

The only attempt being made to work the deep ground north of the Tin Creek bridge is by M. McLeod on the five acre section 10321/M, where two shafts have been sunk; owing to the shafts being filled with water it was impossible to verify the following statement by McLeod, given here verbatim:-

"The maximum depth nine to ten feet, the bottom 2 ft. 6 ins. only, being tin bearing. The tin was restricted to a narrow gutter about eight feet wide and two feet six inches deep. The section revealed by the shafts is black peaty soil, two feet, wash eight feet. It is estimated that the inflow of water is at least 500 to 600 gallons per hour, and this will be considerably increased during a normal season."

The shafts are not properly timbered and have been undermined in attempts to locate tin, and in view of the nature of the "ground", are undoubtedly unsafe.

Skinner's Flat

This is an area on the western side of Specimen

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Hill, being restricted to a narrow gorge near the north-west corner of section 10252/M and extending for about thirty chains south, being ten chains wide at its greatest width. This flat has been thoroughly prospected by means of pot holes, and one "paddock", near the centre of the flat was worked by Messrs. Cruickshank and Hudson who state that it was owing to the shallow depth of wash, the flatness of the area and the inadequate supply of water, together with the consequent difficulty in handling the tailing that the proposition was a non-paying one, and operations ceased. The rising ground west of Skinner's Flat has been worked as far south as Cigar Hill, a low ridge just south of the south west corner of the 28 acre section 10252/M, with varying results. Towards the south there was very heavy quartz rubble of considerable depth to be removed before reaching the tin-bearing wash which was only a few inches deep, and had to be comparatively rich to make it payable, but as elsewhere on the field it was extremely patchy.

Looney's Flat

This area is situated about five chains north of the township and is drained by a small creek which flows northward to join the Frankland River. It has been worked in a more or less perfunctory manner over a number of years. Owing to the poorness of the ground and the scarcity of water, only the relatively rich ground could be worked and it was necessary to locate this ground by means of sinking "pot-holes", a matter presenting no great difficulty owing to the shallowness of the detrital material. The tin is apparently confined to a small terrace in the south-west corner of the flat, on the western side of the creek. Portion of the creek bed has used as a "tin-race" while storm water dams, allowing only intermittent sluicing were utilised in working other claims; the water problem was undoubtedly a serious one. The concentrate contained a large percentage of cubical pyrites, not less than 20 to 30%, and E.J. Bayley reports that a fair amount of gold had been obtained during recent operations, one piece weighing about a half pennyweight. No gold was observed in the prospects washed during the writer's visit. Notwithstanding rather intensive prospecting by means of the shallow pot-holes, neither lodes nor any extent of payable deposits of detrital material have been located.

The "Red Face" Workings

These workings are situated on the eighty acre section 4273/M several chains west of the Cemetery Reserve where several attempts have been made to work, by hydraulicking, the remnants of older river gravels in which some tin-ore occurs, preserved beneath the plateau basalt. Originally three 20 acre sections were taken up by Messrs. Jackson and Grubb in 1893. The following year the sections were transferred to the Whales Head Tin Prospecting Association N.L., and as operations were unprofitable, the leases were abandoned in 1897. The deposits were held under lease again in 1909, when G.B. Young took up the 80 acre section 4273/M, and once more worked without success, the lease being cancelled in 1911. Considerable work has been done on these deposits; the working face is about 100 to 150 feet long and up to 25 and 30 feet deep. A deep tail race has been cut some

few chains north to Looney's Flat and a large dam was constructed on a portion of the flat which later became the town reserve. The wash is composed chiefly of sub-angular to well water-worn, milk-white quartz pebbles, more or less loosely cemented in a yellowish, iron-stained matrix. In some places the matrix has been replaced by limonite and in others organic material forms a big proportion. The main gutter is filled with a coarser wash with boulders up to nine and ten inches in diameter. No tin could be observed in the prospects washed at the time of the present investigation.

Emmett Creek

A good deal of work has been done in the past at the head of this creek but at the time of the writer's visit only one claim, just north of the Balfour-Temma Road, was being worked by W.H. Williams. Situated high on the northern side of the divide between Emmett's and Tin Creeks, great difficulty has been experienced in getting water on the claim and is only possible when excess water is available from Emmerton's high level race. Recent operations have revealed several lodes similar in nature to that met elsewhere on the field, which explains the apparent anomaly referred to by Ward (1911) page 69.

Emmerton's Claim

This is situated near the northern boundary of the old Copper Reward section, on the southern side of the divide mentioned above and included within the bend of the Balfour-Temma road just west of the Copper Reward Mine's dump. There is a small dam supplied by the old race 645/W, to which has been added an old pipe line supported on a high, light spar trestling in order to maintain sufficient elevation to reach the workings. At the time of the writer's visit there was not available sufficient water for continuous operations. At that time Emmerton and Party were working the detrital material west of the road where there is a foot of wash overlain by about six inches of stripping. A paddock has been stripped and the wash is being trucked to the wall of the dam, a distance of about a chain, and tipped ready for streaming. Relatively good prospects were obtained in the few test holes sunk on the flat about one to two chains south of the dam, averaging about 1 oz. to the dish. The wash was shallow and the covering peaty soil becoming deeper to the south.

Specimen Hill

It was on this part of the area that a tin reward claim was granted to John Dally in March, 1889. It will be seen that this area includes the greater part of sections 10252/M, 10322/M and 10323/M. The principal work on the veinlets has been done round the base of this hill. Above the 700 feet contour, practically no work has been done on account of the difficulty in getting water on to the ground. Beyond the slopes of this hill, the staminiferous ground extends north to the slaughter yard site in section 8071/M, east to Copper Reward section, south into section 10324/M and west to the western side of Skinner's Flat.

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The most recent work of any extent was undertaken in 1928 by a Syndicate which had purchased certain rights to section 10252/M, taken up by D. Cruickshank in 1927. A tramline of approximately 200 to 300 yards in length was constructed; this was brought in several feet below the proposed workings which made it necessary to build an ore chute. A rich vein, eight inches wide, striking at S 10° W, was followed to a depth of about eight feet by means of an open cut, over a length of approximately 15 feet, and operations ceased when the pyrite was met. The detrital material, which consisted of about a foot of angular quartz and quartzite with a covering of about six inches of peat, was also stripped and barrowed to the ore chute. The ore was then trammed by means of a heavy truck tipped, and afterwards streamed in a sluice box. It is reported that approximately two tons of tin oxide were recovered during operations.

Another small but rich vein, with an almost north and south strike, has been worked down to the unoxidised or pyrite zone by H. Williams.

On the western slope of Specimen Hill, a water race was constructed at the 700 feet contour approximately, and most of the detrital material below this was worked by means of ground sluicing. One of the richest patches on the field, it is reported, was worked here by McInerny, when he recovered 22 bags of tin-ore in 23 days. The slopes to the north and east have been worked extensively also by means of ground sluicing.

The ore that has been exposed by the work already done does not appear to offer much inducement to exploit the lodes in a more systematic manner.

Interview River

The tin ore is confined to the short coastal streams and does not extend far west below the outcrop of the wolfram lodes to which the tin ore can be undoubtedly traced. The tin is fine, even grain size, no coarse material being observed, and very poor prospects were obtained where prospecting was possible. The most work on the tin deposits appears to have been done in a small deeply entrenched creek, about a mile and a half north of the Interview River where the wash was very coarse, and required considerable man-handling.

The creeks are heavily overgrown with peppermint, cutting grass etc. and there is an almost universal covering of peat, making prospecting very difficult. It is quite apparent that the field has not received any attention since L.K. Ward's investigation - 1910, who then reported that practically nothing had been done since G.A. Waller's visit - 1901.

(3) Production

from The following figures of production have been obtained/ various departmental sources, including annual reports, quarterly statistics etc. It is apparent that the total output of tin ore from the field is not definitely known, nor can it be accurately ascertained. Ward - 1910 - states "Small parcels have been filtering away for the past 20 years, and it is estimated that thus some 300 tons of tin ore have been sent to the smelters". For even the approximate accuracy of this estimate the writer cannot vouch; yet he is of the opinion that it is not unreasonable. This would make the total recorded production less than 500 tons. No records

are available prior to 1913 and, although first mentioned in Secretary for Mines Annual Report in 1905, no figures of production are given. The next year, 1906, records vigorous attention to tin mining with a decline the following year. No further mention is made until 1913 and the recorded production for that and subsequent years is given below:-

1913 - 29.20	1921 - .06	1928)	included
1914 - 30.50	1922 - 2.41	1929)	in
1915 - 4.50	1923 - 1.00	1930)	sundries
1916 - 26.93	1924 - 2.48	1931)	
1917 - 6.98	1925 - 4.54	1932)	
1918 - 11.70	1926 - 6.00	1933 -	2.39
1919 - 6.25	1927 - 1.87		
1920 - 2.52		Total	<u>-137.47 tons</u>

The production has been almost wholly derived from alluvial and detrital deposits, picked "specimens", lode material representing only a small percentage. No lode-mining in the true sense has been carried on but the sluicing of the easily disintegrated capping of the lodes maintained a small yet regular output for some years.

(4) Water Supply

The annual rainfall is approximately 90 inches which represents a fairly high rainfall. The rain is not evenly distributed throughout the year but is essentially a winter rainfall; the months of January, February and March being the driest. The water necessary for the sluicing of the detrital deposits is said to fail in the dry season, as was the case at the time of the writer's visit.

Although, in the past, advantage has been taken of the topography which is favourable for the construction of dams and water races, little or no water is now under control. The retaining walls of dams have been washed away, flumings have collapsed, and races have fallen into a general state of disrepair.

The highest race on Specimen Hill is at the seven hundred feet level approximately, but considerable expenditure would be necessary to recondition and make ready for use at the present time.

Difficulty would be experienced in getting water on to the tin deposits at the Interview River.

(5) Conclusions and Recommendations

The geological examination of the tin deposits in the vicinity of Balfour and Interview Rivers described above, was carried out with the object of determining if they were suitable for working by small parties and individuals. The alluvial deposits at Balfour are invariably shallow, a depth of seven feet being unusual in most of the workings. The tin ore is not evenly distributed, the richer patches being found in pot-holes and gutters in the creek beds, and bedrock, underlying the detrital material. The tin ore of the wash is in almost all cases very pure, but in the neighbourhood of the lodes there are numerous "specimens" subangular fragments of quartz with associated cassiterite.

In view of the limited extent of the area, the shallowness of the deposits and nature of the bottom, together with the inadequate water supply, the prospects are distinctly discouraging. Furthermore, it is apparent that the potential tin-ore supply is almost depleted, and despite vigorous and extensive prospecting at various times, over a long period, no deposits of any economic importance have been located which would give the much needed fillip to tin mining in this district. It can be seen from production figures given above that the field has never been a large producer of tin, even in its best years, not exceeding 30 tons per annum, and now reduced to less than 3 tons per annum. Therefore, no favourable recommendation can be made and future development of the area must depend upon the discovery of new deposits.

With regard to the Back Track to Balfour, via Roger River, as the prospects are not sufficiently encouraging to warrant the re-opening of this route, the expenditure necessary to put it in order, as well as to re-condition the Arthur River bridge and construct a new one over the Frankland River, is not justified at present.

At the Interview River, very little work has been done, none apparently for the last 40 years, and, although the conditions are not exceptionally favourable, there are possibilities, and much detailed prospecting still remains to be done.

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