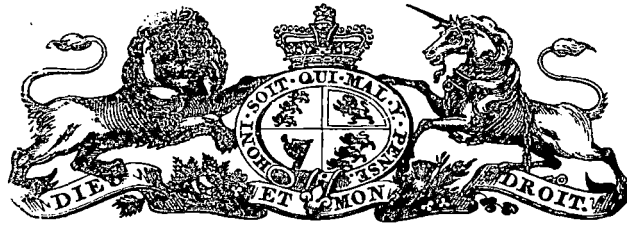


(No. 140.)



1891.

PARLIAMENT OF TASMANIA.

MOLE CREEK AND ZEEHAN RAILWAY :

REPORT OF THE SURVEYOR IN CHARGE.

(Return to an Order of the Legislative Council. (Mr. Adye Douglas.)

Ordered by the Legislative Council to be printed, October 27, 1891.



TASMANIAN GOVERNMENT RAILWAYS.

MOLE CREEK TO MOUNT ZEEHAN RAILWAY SURVEY.

Hobart, 19th October, 1891.

SIR,

ACTING at once on your instructions to stop this survey for the present, I had the camps lifted, those at Zeehan end being removed to Zeehan, and at the Mole Creek end to Hobart, excepting a portion of the equipment, which was left at Mount Pelion when I left that camp in April. To have packed this down would have cost more than their worth, and I have suggested that they be offered at a reasonable price to one or other of the prospecting associations. The Waratah-Zeehan syndicate are taking over the Zeehan camps. A detailed statement of the equipment has been furnished.

I have now the honor to report with reference to the survey as follows:—

PRELIMINARY EXPLORATIONS.

Having arrived at Mole Creek in the latter end of November, 1890, I at once proceeded to explore several ways out of Mole Creek Station, situated as it is on very low ground, surrounded on the west and south by the Barren Tier and the Western Tier, and on the north by the River Mersey and Mount Roland. The first difficulty was to get through the Barren Tier, and I explored two routes—one by way of the Sassafras Creek—to get on to the foot of the Western Tier. This creek, however, has its source underground, and the hills heading it being so high, and the ground so broken, rendered this route, if not impracticable, at least a very costly one. The only other way through the Barren Tier was by a gorge opposite the Circular Ponds Farm, which completely cuts the range in two, in the same way as is done by the Mersey River. This gorge forms the overflow from the Circular Ponds Creek when the orifices through which the creek finds its way underneath are unable to take the flood-water; in summer it is quite dry. Having explored this gorge along its bed, which presents a series of falls, and huge precipices on each side, it looked impossible to bring the line through; but, having returned through the gorge on a higher level, the difficulties disappeared, and, so far, I decided on this route. I then proceeded to explore the crossing of the Mersey, two miles above Liena, and the western slope of the Mersey to the Arm River. The route was good enough as far as the proposed Mersey crossing, but the western slope of the Mersey presented insuperable difficulties in the shape of numerous precipices running right into the river, continuous 45° slopes, and several gullies of moving stone several chains wide. I then set an intelligent man to blaze a track on the eastern slope as far as the Fisher River, and proceeded to explore a line *via* the Roland Gap, crossing the Mersey close to Mole Creek, and found that a line could be got, but that a tunnel of considerable length would be required through the Gap, and that the line would be a long one.

On my return to camp, Johnson, the man I had sent up the Mersey, reported favourably of the eastern slope, and on examination had the satisfaction of seeing my way out of Mole Creek, and, later on, to Mount Pelion.

With the object of obtaining a junction with the proposed Ouse-Zeehan Railway at the nearest possible point—*viz.*, Lake St. Clair—I examined a route *via* Lake Julia, but found that lake to be at an elevation of 2500 feet, and surrounded on all sides by high hills, and was obliged to abandon the idea.

At the beginning of December the first camp was fixed two miles south of Liena, on the western bank of the Mersey, which proved unfortunate, as our work lay now entirely on the eastern side of the river, and, on account of floods and the constant losses of our temporary bridges thereby, made our walks to and from the work long and fatiguing. From this camp, with the help of flying camps, the line was located to within two miles of the Fisher River. The camp was then moved to the River Arm by means of a sleigh pulled up Gad's Hill, 1800 feet above the bridge, and down the Bare Hill 1100 feet, to the Arm River, along a very rough track, which was very much improved by the men who accompanied the sleigh. The next camp was at Howell's hut, situated at the foot of extensive grazing plains on the River Mersey, owned by the Messrs. Field. The next and third camp was on the Wurragara River, on the edge of the Upper Paddocks, which give good grazing to numerous "wild" cattle. In April the camp was then moved to Mount Pelion, which, at the end of the same month, I had to abandon, in consequence of the utter break-down of the packing arrangements and the consequent want of supplies. I then left to begin work at the Zeehan end, where the men arrived on the 20th May. The first camp from this end was pitched three miles from Zeehan, on the Little Henty; the second at seven miles from Zeehan, and the third at twelve miles from Zeehan. We were within a week of moving to camp No. 4 on Lake Rolleston when recalled.

The Engineer following up with the permanent work (Mr. W. H. Scott) pitched his first camp three miles from Mole Creek, his second at nine miles, his third at 14 miles, his fourth at 18 miles 27 chains on the Fisher River; and the permanent work of the next $6\frac{1}{2}$ miles having been done by my camp assistant, Mr. Roehricht, Mr. Scott's next camp was at Howell's hut. On account of the Fisher River and the Mersey River being in flood, great difficulty was experienced in getting his camp equipment across, which was finally accomplished by means of a wire rope and pulley. His sixth camp was at the paddocks, his seventh on the west branch of the Wurragara River, and his last on the River Forth (first branch), when he was recalled at the end of September.

TRACKS.

Between Mole Creek and Liena, a distance of 11 miles, is a good cart road, which crosses the Mersey by a handsome and substantial bridge, built a few years ago after the old one was burned down. From the bridge there are two tracks up Gad's Hill to the plains—the old and the new—the old one being the V.D.L. Co.'s track, and the new one constructed by the Public Works Department, and mounts in three and a-half miles with a fair grade to 1800 feet above the bridge. This track, if widened, and the boggy places corduroyed, could, I think, be used for bullock drays. From Gad's Hill the track keeps the watershed between the Mersey and the Forth, running south along the big plain for about nine miles, then turning to south-east it descends to the Arm River, 1400 feet, along the south bank of which it traverses for three miles on steep sideling to the Mersey River 30 chains south of the junction of the Arm with the Mersey. From thence it keeps the west bank of the Mersey to the Paddocks, and striking due west from the Paddocks heads the two branches of the Forth and skirts the hillsides to Mount Pelion.

As far as the Paddocks the track was an old one, but has been widened by us for packing and otherwise much improved. The Arm River is very dangerous in flood, has been bridged substantially, and all boggy places and creeks corduroyed. A better, shorter, and much more level track to Mount Pelion could, by a few weeks' work, be got by continuing it along the watershed from the point, the present one descends to the Arm to the Plains between the Wurragara River and the Forth, striking these Plains at Lake Ayr. To enable Mr. Scott to pack on to the Fisher River, it was found necessary to cut a new track from Fenton's Road along the east side of the River Mersey for 10 miles, and for the convenience of both parties to cut a track to the Arm River in continuation. This forms a comparatively level and good track, and is 11 miles shorter than that by Gad's Hill; but in consequence of having to cross both the Fisher and Mersey Rivers it can only be used when the water is at summer level. Trees were left across both rivers for foot passengers, but these may be washed away at any time.

Huts have been built at the Arm River, Wurragara River, and at Mount Pelion, which will last some years, and Howell's hut is available also as a traveller's resting-house.

From Zeehan a pack track has been cut for 15 miles, and a foot track in continuation four miles towards Lake Rolleston which forms one of several lakes in that district. On account of the boggy nature of the ground a considerable length had to be corduroyed and the creeks bridged. In wet weather, which we had nearly all the time from the end of May to September, this track is very muddy, and, although costing about £20 per mile, is very hard on the pack horses. It would not cost a large sum to connect this track with Mount Tyndal. Already the track is largely used by miners and prospectors, who have taken up what are considered good mineral blocks still further east than the track goes. Mount Pelion can be clearly seen from Lake Rolleston, as are Mounts Dundas, Read, and Murchison from the base of Mount Pelion.

TIMBER.

The principal timbers along the line to Branch No. 2 of the Forth consist of Stringy Bark, White Gums, Peppermint, Myrtle, Sassafras, Celery Top Pine, Silver Wattle, and, towards the head of the Forth, King William and other pines. The largest and best Stringy Barks are found from nine miles to the Little Fisher River, 16 miles, and in the neighbourhood of the Gad's Hill new track.

After passing Howell's hut at 28 miles from Mole Creek, Myrtle, Sassafras, and Silver Wattle are more common, and here the first small King William Pine was noted. As the land rises these trees become more numerous and larger, until they attain a great height and girth on the slopes of the Wurragara Valley and beyond that to the Forth. The trees grow very straight and have a handsome appearance, and the timber is of a useful character and easily split. The sapwood is white and the heart red. It is straight-grained, very light, easily worked, and not unlike cedar in appearance. The timber does not appear to be well known, and seems to merit some attention. At the foot of Mount Pelion is a Pencil Pine forest, and, excepting the beautiful flowering Cabbage-tree, there is no other tree growth at that level.

The timber at the Zeehan end consists principally of Sassafras, Myrtle, small Gums of various kinds, the undergrowth being very dense.

MINERALS.

Limestone forms the prevailing rock formation as far as Liena, extending between the Western and the Barren Tiers from south to north, and is of the same quality as the famous Chudleigh Line. From Liena to the Wurragara River, laminated schists, shales, and micaceous mudstone with conglomerate prevail. The cliffs are formed of conglomerate trap and sandstone. The schist which is of a very hard quality, covers the ground, broken up ready for ballast. At about 15 miles from Mole Creek near the Little Fisher River, a lode or outcrop of specular iron was crossed by the line. It appears to run in a nearly westerly direction from the extreme Western Bluff to the River Mersey. It was thought by experts to be a silver lode, or to denote one, but on analysis was found to be iron. The only other indication of the more valuable minerals observed was a black substance found in some of the creeks near Mount Pelion supposed to contain manganese, and specimens of ruby sand were found in the creeks. Shell fossils are very numerous on the west slope of the Wurragara Valley, and fire-clay occasionally crops out on the same ridge.

The minerals at the Zeehan end are too well known to need any description from me.

LAND.

The first two and a-half miles is through rich agricultural land, cleared and under cultivation, and all the land lying between the Barren Tier and nearly to the top of the Western Tier is also good land and partly under cultivation, and so on as far as the 14 mile. The slopes of the Barren Tier are as the name denotes, as are also the steep slopes of the Mersey Valley.

On the western side of the Mersey, and for two miles up, there are alluvial flats under cultivation in part, and from the Fisher River to the head of the Mersey there are also extensive alluvial flats growing grass, which affords good grazing in summer, but which is very poor in winter: the numerous "wild" cattle, it is said, are fat in summer (this I have seen), but lean in winter. Beyond the Wurragara River narrow button-grass plains extend to Mount Pelion (intercepted by the two Forth branches), and a considerable distance beyond, and the beautiful Lake Ayr lies between these plains and the Oakleigh Range, at an elevation of about 2500 feet.

The Big Plains, extending from Gad's Hill Hut to the Bare Hill, and lying between the Mersey and the Forth, afford grazing ground for numerous cattle. Here there is a stock-yard, as is also the case near Howell's Hut, which is undergoing decay.

The bush land at the Zeehan end, if drained, would, it appears to me, be suitable for agricultural purposes, the good soil lying about 15 inches deep on yellow clay subsoil.

LINE LOCATION.

For the purposes of description, the line may be divided into sections as follows:—

0m. 0ch. to 2m. 20ch.,

Within one chain of and parallel to the road leading from Mole Creek to Liena, is practically level, the deepest cutting being 13ft. and 5ch. long, and the deepest embankment being Mole Creek, 19ft., requiring three 12ft. timber spans. The sharpest curve is 7ch. radius.

2m. 20ch. to 7m. 24ch.,

Being the Grunter incline, starting at the Sassafras Creek (720ft. above the sea) and ending at the Grunter Gap (1243ft. above the sea), a rise of 523ft. in 5m. 24ch.; the ruling gradients being 1 in 40 and 1 in 44, with frequent level portions introduced. The total length of curves having a radius of 5ch. is 47ch., and of straight, 3m. 46ch. The remainder of the curves are easy. With the exception of the Sensation Gorge, from 4m. to 4m. 50ch., and the cutting through the Grunter Gad at 7m. 24ch., the earthworks are very light, and these exceptions do not entail any very extraordinary heavy works or engineering difficulties; a bridge, 66ft. span with natural abutments, a retaining wall 4ch. long, a low bridge having five 11ft. spans, a tunnel 55yds. in length, and the largest cutting containing about 10,000 cubic yards. The waterways are few and small.

7m. 24ch. to 10m. 0ch.,

Across the flats (1240ft. high) from the Grunter Gap to the Mersey Range (1300ft. high). The earthworks on this section are also very light, the only earthwork of any consequence—at 7m. 44ch.—being 7yds. deep, and containing about 18,000 cubic yards, and the cutting at the Mersey Gap, 30ft. deep, containing about 9000 cubic yards; the only bridge being seven 11ft. timber spans, and the waterways few and small.

10M. 0CH. TO 18M. 27CH.,

Extending from the Mersey Gap (1300ft. high) to the Fisher River (1125ft. high). On this portion of the line the ground is very broken, entailing a series of short cuttings and embankments—the largest cutting being 40ft. deep and 6ch. long, containing about 15,000 cubic yards; the largest embankment being 35ft. deep, and containing about 22,000 cubic yards. The bridges on this section are as follows:—Timber bridge, five 11ft. spans, over Fenton's Road and Creek; timber bridge, seven 15ft. spans, over Creek at 14m. 74ch.; and bridge over Little Fisher River, 66yds. long. From 10m. to 14m. all the gullies, although so numerous, are quite dry, even after heavy rain. This is caused, I believe, by the drainage from the Western Tier finding its way underground, although at some earlier period a large lake must have existed between the Western Bluff and the Mersey Range, fed by a river of considerable size which flows down the south side of the Western Range, and is lost sight of before reaching the site of the old lake, the soil of which is good, but very dry, and on this account, has not been taken up. The orifice blocked up, this large extent of valuable ground might again receive the benefit of the river running through it. A tunnel 154yds. long, has been found necessary at 16m. 54ch., through a sharp spur 150ft. deep, the gullies being numerous, although the running creeks are few on this section of the line, entails a large number of culverts, and some of these of considerable length. With the exception of two 1-in-40 grades 30ch. long, one falling and the other rising, with 40ch. of level between, the next steepest grade is 1 in 66, and the prevailing gradient 1 in 100, with considerable level lengths. On this section there are 2m. 58ch. of curves, having radii of 5ch., whilst there is 3m. 67ch. of straight, the remaining curves being easy.

18M. 27CH. TO 24M. 43CH.,

Extends from the north bank of the Fisher River (1125ft. high) to the foot of the Wurragara incline (1409ft. high), being a distance of 6m. 16ch.; the rise being 284ft. It crosses the Fisher River at 18m. 29ch., the Mersey at 18m. 34ch. 50lks. (thus getting on to the western bank), the Gad's River at 21m. 1ch. 50lks., and the Arm River at 21m. 74ch. 50lks. The Fisher and Mersey Rivers will be crossed by one continuous bridge consisting of four 66ft. spans and 132yds. of low timber bridge, the Gad's River with seven 11ft. spans, and the Arm River with one 66ft. span and seventeen 11ft. spans.

In other respects the work is light, the only cutting of any consequence being on the Mersey River at 18m. 50ch., and containing about 18,000 cubic yards, but the half of this can be saved by a short deviation of the line. Although there are several 1-in-40 grades on this section they are for the most part compensating. The total length of curves having 5ch. radius is 25ch., whilst there is of straight 4m. 14ch.

24M. 43CH. TO 37M. 37CH.,

Extending from the foot of the Wurragara incline (1409ft. high) to the top of the same (2800ft. high), reaching the button-grass plains at the head of the Wurragara River near the foot of Mount Pillinger (2800ft. high).

The incline is broken up into a series of grades of 1 in 44, with level portions introduced as aids to the locomotive. There are 1m. 13ch. of curves having radii of 5ch., the remainder being straight, with easy curves. That portion of this section from 24m. 43ch. to 30m. 67ch. runs along a good even sideling, and the works do not exceed in magnitude the average of those already described; but from 30m. 67ch. to the top of the incline, the slope of the ground is steeper, and several precipices occur, which have been dealt with as follows—the minor ones by keeping the centre line so near the face as to allow of securing a formation, and the principal one by means of a tunnel 16ch. long well into the solid rock.

I have adopted the tunnel in preference to taking the line round the face of the precipice or anywhere below it, in consequence of the loose nature of the rock in the cliff, which is much fractured, and liable at any time to slip in huge quantities. The face of the cliff is sheer, and about 500ft. high. The only river crossed in this section is the Wurragara, with nine 15ft. timber spans, and the tributary of the same river with six 15ft. spans.

37M. 37CH. TO 42M. 0CH.,

Extends from the top of the Wurragara incline (2800ft. high) to the River Forth (No. 1 Branch, 2750ft. high), traverses Button Grass Plains, and skirts Lake Ayr. The work, gradients, and curves are very light. Mr. Scott reached the Forth with the permanent work at the end of September, when he was recalled.

42M. 0CH. TO 50M. 0CH.,

Extending from No. 1 Branch of the Forth (2750ft. high) to the base of Mount Pelion (3300ft. high). For the first six miles the line runs along even sideling, rounding the head of Branch No. 2 of the Forth River, and, skirting the south, east, and north sides of the mountains, reaches the lowest part of the Great Dividing Range at an elevation of 3300ft. The two last miles traverse dry button-grass flats. Both branches of the Forth are about 20ft. wide where crossed, and will only require small bridges. The earthworks and culverts are very light on this section. Lake Augusta, on the Eldon Range, is at the same level as the saddle at Mount Pelion.

From the foot of Mount Pelion forward towards Zeehan the button-grass plains extend for many miles, and the northern slopes of the Eldon Range, the positions of Lake Rolleston, Mounts Dundas, Read, and Murchison are clearly seen; and although only a few miles of the thirty between

Mount Pelion and Lake Rolleston have been explored by me, from the Pelion end, the features of the country appear to be well adapted for railways, and the engineer who lays out the line will have comparatively clear ground to work on.

ZEEHAN END.

0m. 0ch. to 15m.

The line traverses for the first three miles button-grass plains, then crosses the Little Henty into dense bush and broken ground. Zeehan is about 600 feet above the sea level, and the gap in Mount Dundas main spur, through which the railway either to Mole Creek or the Ouse must pass, is 1800 feet, the Lake Rolleston gap being also 1800 feet. The Little Henty would be crossed by twelve 15 feet spans, the South Nevada Creek twice by seven 15 feet spans each, and the Deep Creek, which is 85 feet below formation, by twelve 15 feet spans.

The spurs and gorges are numerous, deep, and narrow. Two short tunnels are required through sharp high saddles, each $4\frac{1}{2}$ chs. long.

PERMANENT WORK.

Forty-two miles of permanent work has been done on the line, which consisted of laying out the tangent lines and curves from the large contour plan prepared from the traverse lines and cross sections. Pegs have been put in at every 10chs., also a peg and three pilot pegs at each tangent point, a large peg, 4in. by 4in., at each intersection, and a 2in. by 2in. peg at each secant. The numbers of the intersections are either cut in the pegs or on trees facing the intersection pegs. The centre line has been cleared of all scrub and trees for a width of from 6 to 8 feet. Trees and saplings have been blazed on both sides of the line so as to be distinctly visible one from the other. Substantial benchmarks have been left at every half-mile all along the line, and a list of these, with the heights and location, has been prepared.

Besides fixing the location of the line, this survey will be of value in showing the correct positions of many mountain peaks which are only marked approximately on existing maps.

Bearings were taken to all the principal peaks whenever they could be obtained, and angles of elevation were observed in several cases, so as to determine the heights of the peaks. Several peaks and rivers, and one lake, hitherto not noted on the maps, can now be located with accuracy, and the various rivers crossed by the line—viz., the Little Fisher, Gad's River, and the Arm, where they join the Mersey—are also now accurately determined. The various maps show them several miles out of position.

The following is a summary of field work done in the preliminary exploration, and in locating the line for the engineer who followed me up with the permanent work :—

	Miles.
Preliminary explorations	149
Traverses (blazed only)	47
Levels (barometer)	125
Trial surveys	83
Levels	78
Check levels.....	10.30
Cross sections	78
Pack track (exclusive of contractors')	31
Large scale contour plan.....	56

The permanent work done is 42 miles, $6\frac{1}{2}$ of which was done from my camp, and the remainder, of $35\frac{1}{2}$ miles, done by Mr. Scott.

The preliminary works above stated, and $6\frac{1}{2}$ miles of permanent work, cost in wages and salaries, alone, from November, 1890, to September, 1891, £1637 5s. 11d. The permanent work done by Mr. Scott cost in wages and salaries, from December, 1890, to September, 1891, £1616 18s. 4d. Mr. Scott paid to the store at Chudleigh and the butcher, £250, and my camp mess bills amounted to £354 1s. The excess of my camp expenses over Mr. Scott's is largely due to the few months Zeehan charges.

The following shows the cost of mess in the various months in my camp :—

	£	s.	d.
December, 1890, per man	2	8	$3\frac{1}{2}$
January, 1891, ditto	3	5	8
February, 1891, ditto	1	13	$6\frac{1}{2}$
March, 1891, ditto	2	1	$10\frac{1}{2}$
April, 1891, ditto.....	2	11	0
May, 1891, (only a part of the month in camp)	0	19	3
June, 1891, at Zeehan, per man	3	13	9
July, 1891, ditto	3	6	10
August, 1891, ditto.....	3	18	3
September, 1891, ditto	2	15	8

The accompanying sketch map, to which I have added the District of Mole Creek, and upon which I have laid down the line as laid out, shows also the tracks which have been made. The new

portion of the map in brown may be taken as approximately accurate in the near neighbourhood of the line.

The difficulties attending this survey would have been very much obviated had there been a good system of packing, and, if this had been so, there would have been no necessity for abandoning my camp at Mount Pelion. The object of this line being to connect Launceston with the Zeehan and Dundas Silver Fields, a further purpose will be served by the opening out of new mineral fields in the neighbourhood of the Lakes and the large extent of grazing land lying between the Mersey and the Forth.

I have the honor to be,

Sir,

Your most obedient Servant,

ALLAN STEWART, *Engineer-in-Charge.*

The Engineer-in-Chief.

