

(No. 22.)



1874.

TASMANIA.

LEGISLATIVE COUNCIL.

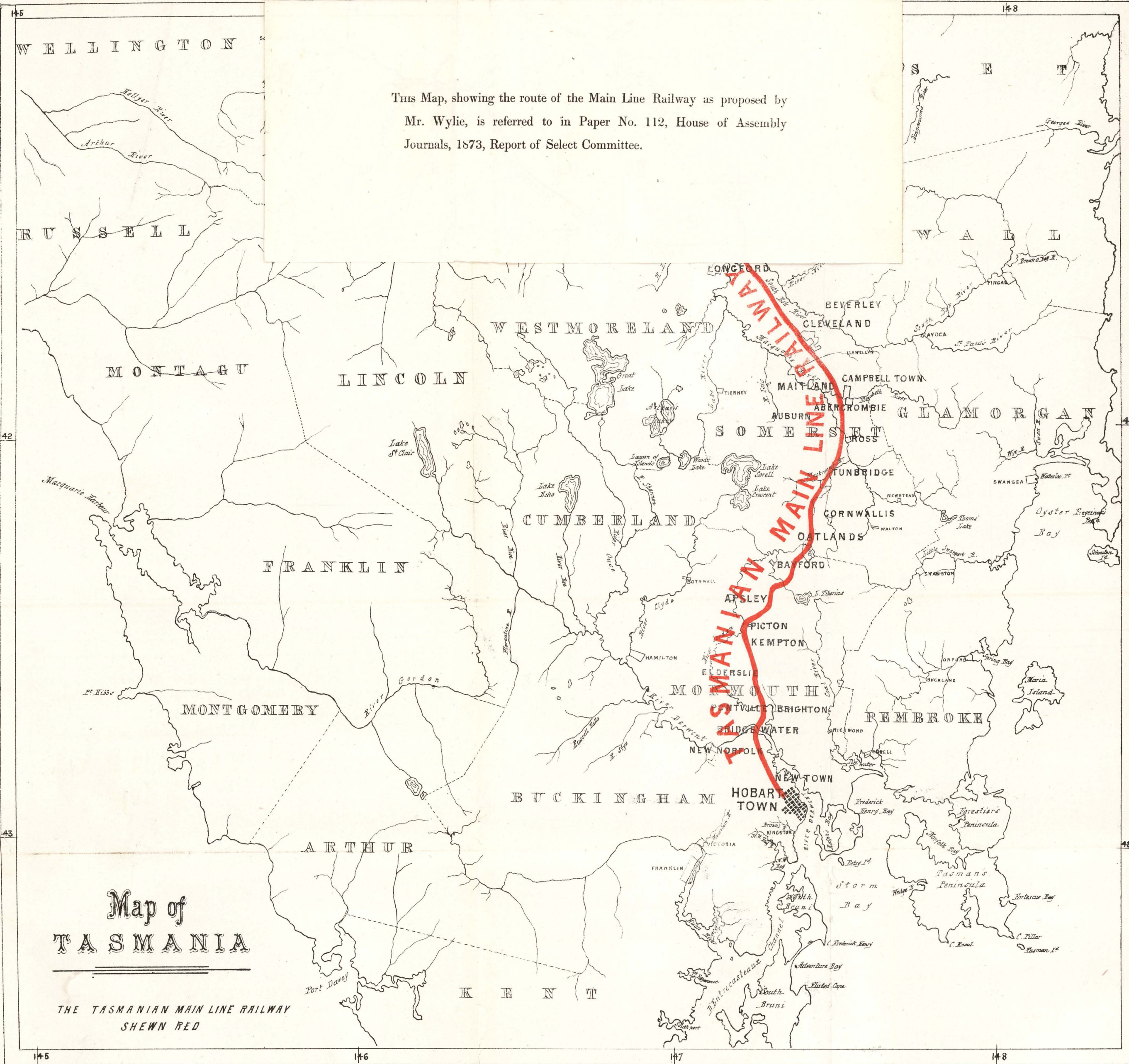
MAIN LINE RAILWAY.

CORRESPONDENCE.

Laid upon the Table by Mr. Chapman, and ordered by the Council to be printed,
July 21, 1874.

THE TASMANIAN MAIN LINE RAILWAY

This Map, showing the route of the Main Line Railway as proposed by Mr. Wylie, is referred to in Paper No. 112, House of Assembly Journals, 1873, Report of Select Committee.



Map of
TASMANIA

THE TASMANIAN MAIN LINE RAILWAY
SHOWN RED

THE TASMANIAN MAIN LINE RAILWAY





MAIN LINE RAILWAY CORRESPONDENCE.

Colonial Secretary's Office, 6th November, 1873.

SIR,

I HAD the honor of receiving, in due course, your letter of the 17th ultimo, which was laid before Parliament, with other correspondence, for the information of the Select Committee of the House of Assembly appointed to enquire as to the progress made by the Main Line Railway Company in their work.

On looking over the report from the Select Committee I do not find any reference to the request you made to be allowed to substitute cattle guards in the place of gates, at the several road crossings on the line of Railway; and, as many members of the Legislature during the recent Session of Parliament expressed their opinion that it would not be advisable to dispense with gates at the several road crossings on the line of Railway, the Government did not deem it expedient to introduce a Bill for the consideration of Parliament authorising any alteration of the law in that respect.

The Executive Government, therefore, are unable to comply with your request.

I have, &c.,

(Signed) THOS. D. CHAPMAN.

C. H. GRANT, *Esq.*, *Engineer Main Line Railway.*

*Tasmanian Main Line Railway Company, Limited, Engineer's Office,
Hobart Town, Tasmania, 28th May, 1874.*

SIR,

On the 6th November last I had the honor of receiving from you a letter in which it was stated that the Government were unable to comply with my request to be allowed to substitute cattle guards for gates at the points where the Railway crosses public roads, because the Legislature had not sanctioned such a deviation from the law.

Having a strong conviction that cattle guards are in every respect the most suitable for all our level road crossings, and that their adoption would be of great advantage to the Railway, and much economise the cost of working it,—thereby inducing a benefit in which the Government and country are directly interested,—I desire to urge the expediency of sanctioning their use for all but the Main Road crossings, and for these I will not ask an alteration until the advantage of cattle guards in bye-road crossings has been fully appreciated by the public.

The neighbouring Colonies of New Zealand and South Australia have adopted cattle guards in place of gates throughout their Railway system.

I have therefore to request that the Government would be pleased to introduce and support a Bill in Parliament, authorising the Company to use cattle guards at all road crossings, (other than those of the Main Road), provided that such are made to their approval.

Were the matter a trivial one I would not trouble you thereon, but as there are sixty road crossings on the Main Line Railway, independently of those of the Main Road, I need not dilate on the importance of the question at issue in a financial point of view, especially as you have experience of the cost of ordinary crossings on the Launceston and Western Railway.

I have, &c.,

(Signed) CHAS. H. GRANT, *Engineer.*

*The Hon. T. D. CHAPMAN, M.L.C.,
Colonial Secretary.*

*Tasmanian Main Line Railway Company, Limited, Engineer's Office,
Hobart Town, Tasmania, 12th December, 1873.*

SIR,

I HAVE the honor to send you, herewith, the plans of the proposed Station Sites on the Main Line Railway, except those for Hobart Town and Launceston, which are too well defined already to be of any interest to you.

I may mention,—as not being shown on the plans,—that the Station for Brighton will be on the old township, and not at Pontville; the Richmond Station is on the Estate of Campania, and about four miles distant from the village; the Oatlands Station will be near Hilly Park House, and four miles from the village; and that the Evandale Station is just below the church.

In selecting the positions of the stations the public convenience has always received the most careful consideration, and the opinion of the resident population has first been obtained.

Although the exigencies of construction—more especially in reference to gradients—must to a great extent govern the position of the stations, I am happy to state that we have been able to locate them in positions which are generally approved, and will, I think, be found to give every reasonable accommodation.

I have, &c.,

(Signed) CHARLES H. GRANT, *Engineer.*

The Hon. the Colonial Secretary.

Wilderness, Green Ponds, 10th December, 1873.

SIR,

As Chairman of the Association for investigating the practicability of Wylie's Main Line route, I have the honor to forward to the Government Mr. Daniel Climie's survey, with an estimate from that gentleman of the cost of staking out the said line, as required by the Government.

Having expended a considerable sum by employing an Engineer to survey this route, and the preparation of sectional drawings, and having ascertained from the Government that it will be necessary that the line should be staked, which will involve additional expense, we confidently rely upon Government for the sum required to meet this renewed outlay. The cost will be Twenty Pounds per mile for fifty-two miles. In view of the expense already incurred by the gentlemen of the Association, they entertain no doubt the Government will supply this sum; and I, as Chairman of the Association, undertake to forward all vouchers of the expenditure of this survey to the Government.

I have, &c.,

(Signed) THOS. GORRINGE, *Chairman.*

The Hon. T. D. CHAPMAN.





To THOMAS GORRINGE, Esq., Chairman of the Deputation of the Railway Association, Green Ponds.

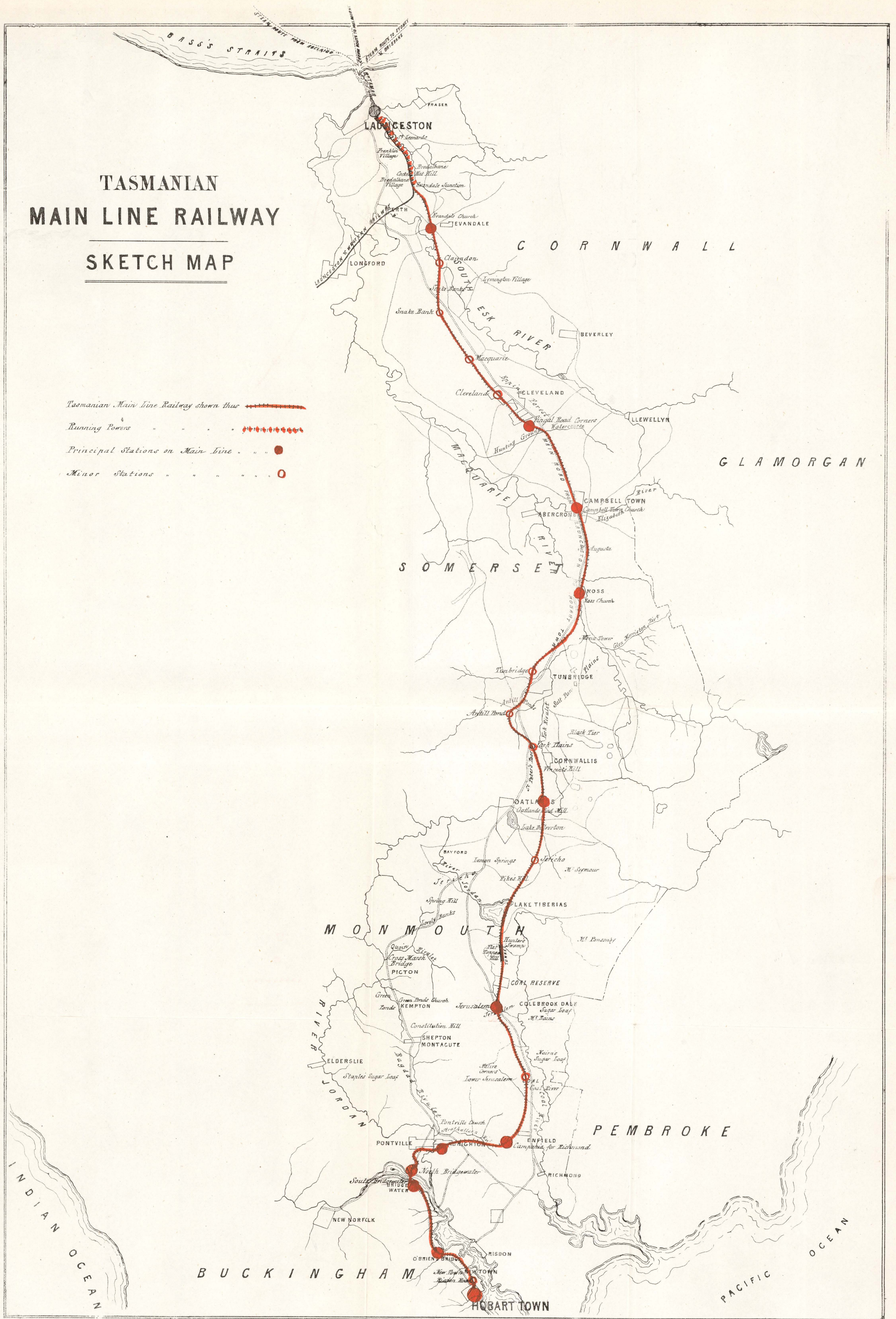
SIR,

HAVING been requested by the Government to give an estimate of the cost to stake out the line from Bridgewater to York Plains, and prepare a plan and section of the route recommended by the late Mr. Wylie, showing the curves and gradients proposed to be used in constructing the Railway, I beg to say I am willing to undertake the work referred to, and complete the whole in a correct and professional-like manner, for the sum of £20 per mile. This price includes all labour, instruments, poles, stakes, and stationery that may be required in carrying out the work.

In marking out the line a stake to be driven into the ground at a distance not exceeding two chains in all curves from five to ten chains radius; and in all curves from ten to twenty chains radius a stake at the distance of every five chains; and for all curves above twenty chains radius, and straight parts, a stake to be driven into the ground at the distance of every ten chains along the whole course of the line.

TASMANIAN MAIN LINE RAILWAY SKETCH MAP

- Tasmanian Main Line Railway shown thus 
- Running Powers " " 
- Principal Stations on Main Line " " 
- Minor Stations " " 



The plan and section to be drawn to the same scales, and to be of a similar character to the plan and section furnished to the Government by Messrs. Doyne and Co.

I have, &c.,
(Signed) DANL. CLIMIE.

Hobart Town, December 9, 1873.

To THOMAS GORRINGE, Esq., Chairman of the Deputation of the Railway Association, Green Ponds.

SIR,

In accordance with your request I carefully examined the district between Bridgewater and York Plains, following the route recommended by the late Mr. Wylie for the Main Line of Railway. From such examination, and by ascertaining the elevation at different points, I was quite satisfied there would be no tunnelling, heavy, or expensive works required to construct a Railway by such route, with comparatively easy gradients and curves; I therefore proceeded to take levels throughout between the two places named, and of the section made from such levels I will forward you a tracing with this report.

The section commences at the centre of the Main Road, a short distance from the east end of the Causeway at Bridgewater, and from thence passes at the lower end of Wood's Cattle Yards, and, after crossing the old Cobb's Hill road, turns in a westerly direction, when it runs in nearly a straight line for the Horse Shoe Gully, which it crosses to the west of the bridge, and passing at the back of the Crooked Billet continues in nearly the same line, crossing the Broadmarsh road and the Main Road about three miles from Bridgewater; the line then crosses the River Jordan to the east of the Brighton School-house, and for some distance follows the course of the Bagdad brook, and crosses the Main Road between the church and the blacksmith's shop, when it follows the contour of the hill on the west side of the road in a northerly direction, keeping at the back of Messrs. Lord and Hayes' farm houses, until opposite Mr. Palmer's of Upper Bagdad, where it turns to the west for about half a mile, when it again runs in nearly the same northerly course, passing to the west of Mr. Stone's house to within about half a mile of Mr. Foster's of Wattle Hill, when it winds round to the east and crosses the ridge of Constitution Hill, at the point proposed to be crossed by Mr. Wylie. The course, after crossing the range, is in a westerly direction, round Forster's Basin into the Big Valley, which it follows, passing about three quarters of a mile to the west of Green Ponds, and runs in nearly a straight line to Picton Old Station, and, after crossing the Main Road, continues in nearly the same straight course, crossing Quoin Rivulet about half a mile east of Woodlands, when it turns along the side of the high ground, and runs nearly parallel with the Main Road for about a mile and a half to the north of Melton Mowbray, when it crosses and follows the course of the Main Road over the summit of Lovely Banks Hill, when it winds round to the west and runs along and follows the contour of the White Hill, passing to the west of Lovely Banks, crossing the highest point of the road leading to Hutton Park from the Main Road; the course from this place is in a north-east direction to Spring Hill, which is crossed at the point intended by Mr. Wylie, as shown on his plan. After crossing the ridge of the hill the line turns round to the west, and, passing to the east of Mr. Savage's house, runs nearly straight, passing to the east of the Post Office at Jericho, continuing the same course over the river Jordan on to the Main Road, which it crosses about half a mile to the north of Mr. Page's stables, and then runs parallel with the road up the valley to where it enters Fourteen Tree Plains, when it turns to the west, along the flat, in nearly a straight course to Lemon Springs, passing down Anstey Barton Valley to the pass in the Dulverton Rivulet, and follows the course of the stream for about half a mile to Mr. Scott's house; from this point the line takes nearly a straight course to the west end of Lake Dulverton, passing near Mr. Robert Jones' house and to the east of the English church, and after crossing the Main Road passes to the east of Mr. Weeding's house, and runs in nearly a straight line for the valley in the range opposite Mr. Fisher's house, which it follows to the lagoon, when it turns round to the west side of York Rivulet, and passing near the west side of the Rushy Lagoon, when the course is along the base of Mr. Lord's Big Hill on to near to Mr. Jillett's house, where it joins the line staked out by the Contractors. The total length from Bridgewater to this point being 52 miles and 16 chains.

With respect to the gradients you will see by the section that the steepest on the whole route is one in forty-two twenty-five (1 in 42.25); and as regards curves, without a plan of the line I cannot speak positively to the radius of the different curves, but certainly not more than from three to four miles of the line will require to be in curves of so short a radius as from five to ten chains; with this exception, the whole of the distance would be either straight, or in curves varying from 10 to 80 chains radius.

Estimate.—My estimate for the entire completion of a good substantial Railway, capable of bearing trains of ordinary weight to run over it at an average speed of 30 miles an hour, is under £5000 per mile; this sum, of course, includes rolling stock, stations, and everything necessary for working the traffic. There being no tunnels or other heavy expensive works on any part of the route between Bridgewater and York Plains,—in fact a considerable portion of the 52 miles would be a surface line,—I am therefore confident my estimate, although only an approximate one, is amply sufficient to carry out the work in a proper and substantial manner, according to the terms of the Contract.

When the line is marked out with stakes, in the way proposed by Government, and a plan and section made to correspond with such marks on the ground, any competent engineer would be able, in a few days, to test the accuracy of both gradients and curves, and prove the practicability of the whole of Mr. Wylie's route from Bridgewater to York Plains.

I have, &c.;
(Signed) DANL. CLIMIE.

Hobart Town, December 9, 1873.

Colonial Secretary's Office, 13th December, 1873.

MY DEAR SIR,

By Mr. Chapman's instructions I now forward for your inspection Mr. D. Climie's report and section of his proposed Railway route.

No plan has been furnished,—the line can only, therefore, be deduced from his written report.

Mr. Chapman would be very glad if you would have this route plotted on your plan as far as practicable.

I have, &c.,

(Signed) B. TRAVERS SOLLY.

C. H. GRANT, *Esq.*

*Tasmanian Main Line Railway Company, Limited, Engineer's Office,
Hobart Town, Tasmania, 5th November, 1873.*

SIR,

On perusing the evidence in the second Report of the Select Committee on the Main Line Railway, which I have just received, it appears to me that the Government will find some difficulty in deciding what action they should take, from the very apparent one-sided character of the examination.

You will not fail to notice that the chief engineering witness against the Railway is permitted to make and reiterate statements and criticisms that I had no knowledge whatever of, and therefore could not reply to or refute; while my evidence is necessarily very brief on most of the questions touched upon, because the examining members of the Committee strongly objected to any explanations or remarks, and repeatedly desired a simple affirmative or negative reply to their skilfully devised questions.

A great part of the time was consumed in discussing personal and *ex parte* statements, rather than in endeavouring to elicit facts from professional engineers who had been engaged in the surveys.

I propose, therefore, should this meet your approval, to place before the Government a further and more detailed report on the respective merits of the rival routes; and to request Messrs. Reeve, Human, and J. Climie—who are all first-class engineers of very great practical experience—to furnish brief reports, showing the results of their surveys of the whole country embraced in this question; which reports I shall be happy to append to my observations.

I have, &c.,

(Signed) CHARLES H. GRANT, *Engineer.*

The Hon. the Colonial Secretary.

Colonial Secretary's Office, 7th November, 1873.

SIR,

I HAVE the honor to acknowledge the receipt of your letter of the 5th instant, calling my attention to the Report of the Select Committee of the House of Assembly on the Main Line Railway, and intimating your wish to place before the Government further and more detailed reports from the engineers employed in surveying the proposed routes for the Railway.

In reply, I have the honor to inform you that the members of the Executive Government will be glad to receive every information on the subject that you can place before them.

I avail myself of the present opportunity of saying that I shall also be glad to receive the complete plans and sections of the proposed route for the Railway, which you intimated in your letter of the 28th of August last you hoped shortly to be able to furnish for the information of the Government.

I have, &c.,

(Signed) THOS. D. CHAPMAN.

C. H. GRANT, *Esq., Engineer Main Line Railway.*

*Tasmanian Main Line Railway Company, Limited, Engineer's Office,
Hobart Town, Tasmania, 24th December, 1873.*

SIR,

In accordance with the obliging permission contained in your letter of the 7th ultimo, of which I have the honor to acknowledge the due receipt, I will now make some further observations

respecting the alternative routes for the Main Line Railway, in continuation of my report of the 28th August, and to some extent in reply to the Report of the Select Committee of the House of Assembly on the Main Line Railway Contract.

To facilitate a correct understanding being arrived at on the merits of the various routes I have prepared, and send you herewith, a tracing which shows :

- 1st. In black ground line, and red gradient line, the adopted route for the Railway, *viâ* Jerusalem and Flat Topped Hill.
- 2nd. In brown ground line, and blue gradient line, the trial survey made on behalf of the contractors by Mr. J. C. Climie, over the exact route indicated by Mr. Wylie, *viâ* Constitution and Spring Hills.
- 3rd. In green ground line, and yellow gradient line, the survey made by Mr. Daniel Climie, which throughout most of its course diverges from the route known as Wylie's.

The writing and figures are shown in colours, which correspond with those of the section to which they refer.

These sections have been accurately plotted to the same datum line ; and the same scales, both horizontal and vertical, are used for all.

You will therefore see, by a simple inspection of the tracing, the relation of the different summit heights, and the character of the gradients on each section.

In comparing the gradients and line works it should be remembered that those of the adopted line exactly represent the Railway as finally constructed,—but the others only show the section on the survey lines ; and it is certain that, over those portions on very steep side-hill ground, the work would be enormously increased when the line is set out with its proper curves.

In point of fact, a longitudinal section on sidelong ground does not, without cross sections, give the least indication of the costly earthworks and works of art that would be required on the final location of the line.

The first comparison to make is that of the absolute distance between the same points, over the different routes,—which is readily obtained, since Mr. D. Climie's line starts from our permanent location at Bridgewater, and joins it again near York Plains, thus forming a loop line,—which has an increase in length of 3 miles 77 chains, and therefore involves the construction of nearly four additional miles of railway.

Looking next to the gradients, it will be noticed that Mr. D. Climie ascends Constitution Hill (from the River Jordan) to a height of 1181 feet, with an average gradient of 1 in 63—12 miles 51 chains long ; descending northwards 571 feet for 5 miles, with a gradient averaging 1 in 47.

Against this the adopted line, at the corresponding summit, rises only 392 feet in 7 miles 13 chains, on an average gradient of 1 in 96 ; and descends 266 feet in 2 miles 73 chains ; or an average gradient of 1 in 73.

Passing on to Spring Hill, and taking first the intersection of the gradients at 26 miles 24 chains on Mr. D. Climie's section, it will be seen that his line rises 846 feet in 7 miles 54 chains, the average gradient being 1 in 47 ; whereas the constructed line rises 766 feet in the corresponding distance of 18 miles 65 chains, giving an average incline of 1 in 61 ; or, taking from the foot of the severe ascending gradient at 25 miles 40 chains, in Mr. D. Climie's section, the rise is 946 feet in 8 miles 58 chains, or 1 in 48 ; but the grade indicated averages 1 in 42.89, for 8 miles 10 chains ! and is nearly continuous.

The constructed line rises 685 feet from Jerusalem Station (at 39 miles 22 chains, where all trains would stop), to the summit of Flat Topped Hill, in 6 miles 13 chains, by alternating gradients averaging 1 in 47½, but having short intervals of level in this distance.

Descending Spring Hill, Mr. Climie falls abruptly 319 feet, by a gradient 2 miles 55 chains long, averaging therefore 1 in 44 ; and then immediately rises again to nearly the same level as the constructed line, which does not descend, but continues to gain height beyond the tunnel by easy gradients.

From this point northwards, along Mr. D. Climie's route, it will be seen that his line descends 190 feet lower to Anstey Barton, and rises again 128 feet to Oatlands. Beyond this point I have no information as to Mr. D. Climie's survey, except that the total length of his line is 52 miles 16 chains ; but it is certain it must continue rising for some distance beyond Oatlands, before descending to join our permanent survey near York Plains.

The constructed line throughout this whole distance runs at a tolerably uniform level, with alternating gradients,—its descent from the summit of the line near Jericho to the point of junction being 273 feet in 8 miles 41 chains, averaging 1 in 165 of gradient.

Having shown on the section all obtainable information as to heights and gradients, I have not thought it necessary to tabulate them, to indicate the increment of rise to distance that obtains throughout each line, but it is quite evident that, in this comparison, Mr. D. Climie's work would show most unfavourably.

In my humble opinion no reasonable consideration of traffic would justify the ascent of the great altitudes he obtains, and immediately loses, at Constitution and Spring Hills, and the enormous extra cost it would permanently involve in traction power for the whole of the through traffic passing over the line. Any estimate that could be made of this expense must necessarily be incorrect and delusive; but it is certain that it would annually amount to a very large sum.

I will not now enter upon the much vexed question of speed, except to remark that if Mr. D. Climie's very positive evidence to the effect that a speed of 23 miles per hour, which he has subsequently increased to 40 miles per hour, including stoppages, can be readily obtained on his line, there need be no apprehension that the Main Line trains can run very much faster, and at a cost not so enormous in proportion to the traffic.

In regard to his very decided and oft-repeated statements that there would be no heavy work of any description on his line, I cannot reconcile this with the earthworks shown on his section, which I have carefully calculated therefrom and marked on the tracing.

Some of his cuttings exceed 30,000 cubic yards in content, and the banks 56,000 cubic yards, and on one part, about two miles long, the earthwork cubes to 67,000 yards; and there are some very heavy viaducts. If this be the case on a section, plotted along the survey lines only, I must repeat that on the steep side-hill portions of his line, when finally set out, the works would be immeasurably increased. His cuttings on the summits of Constitution, Lovely Banks, and Spring Hills would be entirely through solid bluestone rock, which we fortunately avoid. In grading his line he has not hesitated to show cuttings of two or three miles in continuous length, involving therefore a great length of time in execution, which—as also the character of his whole line—is entirely incompatible with the statement that it could all be completed in about eight to nine months.

His estimate of cost I consider to be equally incorrect with the statement that his line is eight miles shorter than ours, when it is, as stated in his report, nearly four miles longer; and if his distance first given of 59 miles 9 chains be correct, his line is no less than 10 miles 70 chains (nearly 11 miles) longer than the constructed line between the same points.

Having a knowledge of the country traversed by Mr. D. Climie's survey, I cannot doubt that the deductions I have made from his section will be more than supported if the line were set out.

The face of the hill on which he creeps up between Brighton and Constitution Hill is intersected with deep and wide stream courses, and in the upper portion by rounded spurs, which would require an excessive amount of curvature to pass round economically, if indeed this could be done, (which I much doubt), without the aid of long and costly viaducts, each of which would probably cost more than a whole mile of completed railway.

Moreover, his account of the line from Oatlands to York Plains is so different from what I, supported by other experienced engineers, opine to be the fact, that I cannot but accept his statements regarding the rest of his line, more especially the descent from Constitution Hill, the crossing of the Lovely Banks Hill, and the ascent of Spring Hill, with very great reserve. He continually asserts that his line could now be completed in less time than the Jerusalem line, which at the present time is practically made throughout, excepting only the tunnel, which will not take long to finish; and his strong advocacy of a $3\frac{1}{2}$ feet gauge, as being sufficient to allow trains to be run of the same ordinary speed as on railways of broader gauge, is certainly contrary to engineering experience, and to his own quite recent conviction.

In confirmation of my opinion on the merits of the alternative routes, I herewith enclose copy of a report received from Mr. J. C. Climie, who surveyed what is known as Wylie's line for the contractors.

The difficulty of working through a tunnel on such a steep grade as 1 in 40, appears to have very unnecessarily exercised Mr. D. Climie, since he need not have gone out of the city of London to find precedents for successfully running through tunnels on even steeper grades what is certainly the heaviest traffic in the whole world.

In modern times such unfavourable running conditions as obtained on the constructed line are by no means uncommon; I can immediately furnish examples of much worse gradients and curves, and will obtain the exact particulars of such as are affected by tunnels. Meanwhile I should wish to be considered as entirely dissenting from Mr. D. Climie's evidence on this point.

The use of the narrow gauge for railways is entirely owing to the facility with which a line can be fitted or contoured to the surface of the ground, thereby rendering heavy earthworks or costly structures unnecessary. It may fairly be stated that this is the only recommendation of the system which could justify its adoption in place of the superior and more economical working broad gauge, with reduced cost of rolling stock, and strength, simplicity, and convenience of machinery.

To complain, therefore, of the sinuosity of a narrow gauge railway, is virtually taking objection to the essence of the system; because it may reasonably be inferred that no engineer would willingly incur the great extra cost of curving, and therefore lengthening his whole line, if a direct course could as readily be obtained.

As regards gradients, they must in every case be fixed by the character of the country traversed by the railway within such very narrow limits that their determination is almost solely a matter of convenience of construction when the route has been finally decided upon.

I have, &c.,

(Signed) CHARLES H. GRANT, *Engineer.*

The Hon. the Colonial Secretary.

Tasmania,

Colonial Secretary's Office, Hobart Town, 27th November, 1873.

MY DEAR SIR,

IN a letter I had the pleasure of receiving from you some few months since, you were good enough to say that it would afford you much pleasure if at any time you could render assistance to this Government, either privately or in your official capacity: you will therefore, I feel assured, pardon my trespassing on your valuable time, and cheerfully give us the benefit of your assistance in our endeavours to secure the service of a first-class Civil Engineer, to come over to this Colony for a few months, to examine and report upon the route proposed by the late Mr. Wylie for the Main Line Railway, and also to advise the Government generally on other matters respecting the Main Line Railway now in course of construction between Hobart Town and Launceston.

We should like, if possible, to secure the services of an Engineer of high professional attainments, who has had some experience in laying out, constructing, and working Railways on the narrow gauge.

Will you kindly see what you can do for us in this matter; and if you know of a gentleman you can recommend to us to undertake the duties I have named, you would oblige us by giving him a letter of introduction to us, and suggesting to him that he had better come over by an early steamer, bringing with him his testimonials, &c., when I have no doubt we shall be able to make arrangements with him to undertake the work we require to be done.

I am, &c.,

(Signed) THOS. D. CHAPMAN.

The Hon. J. G. FRANCIS, Chief Secretary, Victoria.

Victoria,

Chief Secretary's Office, Melbourne, 3rd December, 1873.

SIR,

IN reply to your letter of the 27th ultimo, inquiring whether it is possible to obtain the services of an Engineer of high professional attainments to report and advise on the Railway Works now in progress in Tasmania, I have the honor to inform you that the demand in this Colony for the services of Engineers skilled in railway construction is so great at the present time, owing to the extension of our railway system, that the task of selecting the services of an Engineer possessing the precise qualifications required by the Government of Tasmania, and willing to accept temporary employment, is more difficult than might at first be anticipated. At the same time it will give me much pleasure to make inquiry; and if it lies in my power I shall be most happy to assist the Government of Tasmania in the direction indicated.

I have, &c.,

(Signed) J. G. FRANCIS.

The Hon. the Colonial Secretary, Tasmania.

By ELECTRIC TELEGRAPH.

Kyneton, 20th December, 1873.

I FIND it impracticable to obtain, outside Government service, services of an Engineer recognised as of competence and character fitted for the duty you require; but by concurrence of our Engineer-in-Chief of Railways, one of his staff, Mr. Greene, resident Engineer of Main Line, can do—say for three weeks—just now to examine and report; and, if needed, may possibly return, if can be spared afterwards, but now must avail of Christmas holidays if you want him. Reply by telegraph.

(Signed) J. G. FRANCIS, *Chief Secretary.*

The Hon. T. D. CHAPMAN, Colonial Secretary.

By ELECTRIC TELEGRAPH.

22nd December, 1873.

MANY thanks for your Telegram. Be good enough to give Mr. Greene a letter of introduction to me, and request him to come, if possible, by the *Tamar* to-morrow.

THOS. D. CHAPMAN, *Colonial Secretary.*

The Hon. J. G. FRANCIS, Chief Secretary, Victoria.

By ELECTRIC TELEGRAPH.

Melbourne, 22nd December, 1873.

MR. GREENE under orders to go to-morrow per *Tamar*.

(Signed) J. G. FRANCIS.

The Colonial Secretary, Hobart Town.

Victoria,

Chief Secretary's Office, Melbourne, 20th December, 1873.

SIR,

SINCE writing to you on the 3rd instant I have consulted the Engineer-in-Chief in reference to obtaining the services of a competent Engineer to examine and report upon the proposed Main Line Railway in Tasmania; but I regret to say that the result has not been so satisfactory as could be wished. Mr. Higinbotham states that he is unable to recommend an Engineer who has had experience in laying out, constructing, and working railways on the gauge adopted for the Tasmanian Main Line of Railway; nor does he know of any Engineer of experience who could go to Tasmania and spend some months in making the inquiry which your Government desire, and in advising generally on railway matters. The only suggestion he can make is, that Mr. Greene, a District Engineer of his Department, whose experience and ability render him highly qualified to advise on any questions connected with laying out, constructing, or working railways, should go over to Tasmania during the holidays, and give your Government what assistance he can afford, in a fortnight or three weeks. Beyond this time he could not be absent from his duties in the Department; but he might subsequently, at intervals, if necessary, visit Tasmania, although he could only make a very brief stay on such occasions.

I shall be glad to learn whether this arrangement, which is the best that we can offer, meets your views, in order that the necessary steps may be taken for carrying it into effect.

I have, &c.,

(Signed) J. G. FRANCIS.

The Hon. the Colonial Secretary, Tasmania.

Victoria,

Chief Secretary's Office, Melbourne, 23rd December, 1873.

SIR,

I HAVE the honor to inform you that this letter will be presented by Mr. W. H. Greene, (Resident Engineer, Main Line,) who is proceeding to Tasmania pursuant to your wish, to advise on the Tasmanian Railway Works.

I have, &c.,

(Signed) J. G. FRANCIS.

The Hon. the Colonial Secretary, Tasmania.

Hobart Town, 29th December, 1873.

SIR,

IN view of any enquiry which you may direct as to the comparative merits of the several routes which have been proposed for the Main Line of Railway, I have the honor to request that I may be supplied with the following information:—

A schedule showing the length and rate of each gradient, the length and radius of each curve, and the height of the formation at the end of each gradient, with the mileage, on the Line now being constructed between Bridgewater and York Plains.

Also the same information with regard to the western deviation proposed between those places; the mileage of each route to be taken from the same commencing point.

It will also be necessary that I should have a plan, on a scale of not less than one inch to the mile, showing the course of this deviation between the terminal points.

Should there not be a plan of this route in the possession of the Government, I venture to suggest that a tracing of the country be sent to the promoters, with the request that they will have the course of the deviation marked upon it: this can readily be done by the Engineer who took the Section Levels.

I make this communication with the hope of saving time, and in anticipation of your instructions as to the points upon which the Government will require a report from me, as the information asked for will be required in case you direct an enquiry as to the routes.

I have, &c.,

(Signed) W. H. GREENE.

The Hon. T. D. CHAPMAN, Colonial Secretary.

Colonial Secretary's Office, 29th December, 1873.

SIR,

I HAVE the honor to acknowledge the receipt of your letter of the 24th instant, transmitting the tracing of the longitudinal sections of the several routes proposed for the Main Line Railway, and I desire to thank you for the information thus conveyed to the Government.

In order further to facilitate the consideration of the questions affecting the route, I shall esteem it a favour if you will furnish the Government at your early convenience with a schedule, showing the length and rate of each gradient, the length and radius of each curve, and the height of the formation at the end of each gradient, with the mileage, on the Line now being constructed between the end of the bridge at Bridgewater and York Plains.

I have, &c.,

(Signed) T. D. CHAPMAN.

C. H. GRANT, Esq., Engineer, Main Line Railway.

*Tasmanian Main Line Railway Company, Limited,
Engineer's Office, Hobart Town, Tasmania, 29th December, 1873.*

SIR,

I HAVE the honor to acknowledge your letter of this date, in which you request to be furnished, for the information of the Government, with a schedule showing the length and rate of each gradient, the length and radius of each curve, the height of formation at the end of each gradient, with the mileage, on the Line now being constructed between Bridgewater and York Plains, which I will have prepared as rapidly as possible.

In the meantime it may be convenient I should mention that the whole of this information is given on the section already sent you, with the exception of that relating to curves, and as these are all of larger radius than the minimum specified in the Contract, none being less than 5 chains, and as Mr. D. Climie did not specify what the curves would be on his survey, I thought it unnecessary to trouble you with any details on this point.

I have, &c.,

(Signed) CHARLES H. GRANT.

The Hon. T. D. CHAPMAN, M.L.C., Colonial Secretary.

Colonial Secretary's Office, 29th December, 1873.

SIR,

IN order to facilitate the consideration of the questions affecting the route of the Main Line Railway, I shall feel obliged if you will favour the Government, at your early convenience, with a schedule showing the length and rate of each gradient, the length and radius of each curve, and the height of the formation at the end of each gradient, with the mileage, on the proposed line between Bridgewater and York Plains.

A tracing of the country will be forwarded to you as soon as possible; and I shall be obliged by your having marked upon it the line proposed by Mr. Daniel Climie.

I have, &c.,

(Signed) T. D. CHAPMAN.

T. GORRINGE, *Esq., Green Ponds.*

SIR,

IN reply to your questions affecting the route of the Main Line Railway, having consulted Mr. Climie, he states that the length and rate of each gradient are correctly marked by him in the tracing of the section furnished the Government. With respect to the curves, Mr. Climie states that it is not usual to mark upon a trial section the point where any curve commences or terminates, nor to specify the radius of the curves,—the object of a trial section being to ascertain the general levels of the District, and whether it would be practicable to construct a line on such a route, and to enable an Engineer to make out an approximate estimate of the cost. In taking the levels round the curves, Mr. Climie positively asserts that there is no tangent per chain in excess of the limit of the radius of the curves allowed in the Contract. I am also in a position to inform the Government that Mr. Climie is willing to point out the route of the line on the ground to Mr. Greene.

I have, &c.,

(Signed) THOS. GORRINGE.

The Hon. Colonial Secretary.

Colonial Secretary's Office, 31st December, 1873.

SIR,

I HAVE the honor, by direction of the Colonial Secretary, to forward by to-night's post the plan of the Railway routes from Bridgewater to York Plains, showing Mr. Wylie's line and that proposed by Mr. D. Climie,—the latter tinted yellow.

I also forward enclosed the Colonial Secretary's letter to Mr. Gorrington, and that gentleman's reply.

These documents I shall feel obliged by your returning to this office when you may no longer require them.

I shall be glad to know, by telegram, if you desire anything to be forwarded to you by *Friday's* post, and if so, to what address.

I have, &c.,

(Signed) B. TRAVERS SOLLY.

W. H. GREENE, *Esq., Melton Mowbray.*

Colonial Secretary's Office, 31st December, 1873.

SIR,

I HAVE the honor to forward to you herewith copies of the Reports recently presented to the House of Assembly by a Select Committee with regard to the Main Line Railway, and also of the evidence taken before such Committee. (H. A. Papers, 1873, Nos. 86 & 112.)

You will observe that there are two most important matters to which the Committee have directed their attention,—the one being the route now taken by the Company for the construction of the line, the other being the question of the speed likely to be attained on such a Railway as that you are now engaged in constructing.

With regard to the question of route, the Government are of opinion that the line popularly known as "Wylie's" is the one which was distinctly contemplated by the contracting parties at the time the engagement was entered into between the Governor and the Company. We have your

positive assurance that this line is an impracticable one, and that therefore the Company has been compelled to diverge from it; but against this must be set the equally emphatic assurance of Mr. Daniel Climie, an engineer who has recently been engaged upon a survey of Wylie's route, that it is perfectly practicable, and could be constructed at a less cost than the one which you are now constructing. Under these circumstances the Government have engaged a competent engineer to inspect that route, and to report to them upon its practicability; and, pending the receipt of that report, they reserve to themselves all rights of hereafter objecting to the route *viâ* Jerusalem, should it prove that you were in error in your assertion that the route originally intended was not a practicable route within the terms of the original Contract.

With regard to the question of speed, the Government are fully aware that anxiety upon this head may be deemed premature, as no portion of the line has yet been traversed by a locomotive; but they cannot ignore the fact that much of the uneasy feeling now existing in the public mind upon this all-important point is directly attributable to statements which are alleged to have been made by you, that the rate of speed contracted for would never be obtained on the line now being constructed. The Government do not desire to hold the Company bound by casual utterances which may have fallen from you in the course of what you have termed in your evidence "a bantering conversation;" but they deem it their duty to acquaint you, on behalf of the Company, that they regard the rate of speed named in the Contract as an essential condition of their engagement with the Company, and to state that they are strongly of opinion that any attempt on the part of the Company to evade the loyal fulfilment of this portion of their Contract would be fraught with the most disastrous consequences to those who have invested their money in this undertaking.

It is not to be doubted that the present or any succeeding Government will desire to fulfil in the most perfect good faith all the obligations which the Governor, on behalf of the Colony, has entered into with the Tasmanian Main Line Railway Company; but it is equally clear, as expressed in the Contract, that the fulfilment on the part of the Colony of its obligations to the Company must depend upon the honest and thorough fulfilment by the Company of the condition of the Contract into which it has entered; and I therefore desire, on the part of the Government, to tender to you, as representing the Company in Tasmania, the emphatic assurance that the line must be so constructed as to ensure the stipulated rate of speed being duly maintained in accordance with the clear and precise condition on this head which is embodied in the Contract.

I have, &c.,

(Signed) THOS. D. CHAPMAN.

C. H. GRANT, *Esq., Engineer.*

*Tasmanian Main Line Railway Company, Limited, Engineer's Office,
Hobart Town, Tasmania, 3rd January, 1874.*

SIR,

I HAVE the honor to acknowledge your letter of the 31st ultimo, enclosing copies of the Reports presented to the House of Assembly by the Select Committee on the Main Line Railway Contract, and informing me that the Government now consider the route known as Wylie's to be the contract route for the Main Line Railway, and that an Engineer has been appointed to inspect that route and ascertain its practicability, pending which the Government reserve to themselves all rights of hereafter objecting to the route *viâ* Jerusalem.

You also allude to the matter of speed, and state that the Government regard that named in the contract as an essential condition of their engagement with the Company.

On the first point I have to reply that the Main Line Railway Company are clearly of opinion that no route whatever was defined by the contract, but that, in the very plainest and most conclusive words that the language admits of, the decision as to the route was left to the Engineer of the Company under the first clause of the Schedule to the Contract. They also submit that such experienced men as the Directors of the Company, or indeed any one possessed of the least business aptitude, would not be so thoroughly insane as to undertake a blind contract for a Railway over a route of which the only information they possessed, or that was obtainable, was that it had been carefully examined by several Engineers on behalf of the Government and most positively reported against, while others who had been over it informed the Company of its total impracticability.

They further contend that, if any route could be at all defined as a Contract route, it is that surveyed by Messrs. Doyne, Major, & Willett, which passed near to quite as important centres of population as that of Wylie's, and the particulars of which survey being placed by the Government in the hands of the Company, were solely adopted as the basis of their estimates when they undertook the Contract.

Moreover, the Company are provided with positive and conclusive evidence—both of their own officers and of most intelligent inhabitants of this Colony who were, in a *quasi* official capacity, in constant communication with Mr. Wylie while he was engaged in this country—that he did not consider he had ascertained the practicability of what is called his route; but his views were strictly limited to the desire that his proposed route should be more carefully examined before the surveyed route was finally adopted. I have, therefore, most respectfully to assure the Government that they entirely misunderstood the tenor of any remarks the late Mr. Wylie may have made to them, and to express my regret if he made use of any ambiguous expressions that led to the incorrect inference.

While desiring to correct what the Company consider the misapprehension of the Government on the question of route, they opine that no serious questions can arise in the matter, since my letter of the 24th ultimo should prove that the reports of the experienced Engineers formerly employed by them are quite correct, and that for construction purposes the route known as Wylie's is quite inadmissible.

Moreover, a reference to the correspondence between the Government and the Company will show that the former have throughout been fully informed of the course of proceedings, and have repeatedly given their sanction and approval to the Jerusalem route being adopted; the late Minister of Lands and Works having, in his place in the House of Assembly, emphatically stated that it was properly selected, and was the best route for the country.

The Company, therefore, cannot concur in any re-opening of the question on any grounds whatever, more especially as the railway is nearly completed.

In regard to the question of speed, I scarcely need observe that any "casual utterances" can have no effect on the provision of a sealed contract; but as the Government are pleased to attribute some importance to what I may have remarked in private conversations, I will fully explain my personal views, premising that such are altogether outside of the contract.

A long experience in railway matters has firmly impressed on my mind the conviction of the extreme folly of working railways at an unduly high rate of speed; and, knowing the working speed of narrow-gauge lines in various parts of the world, it has always appeared to me that the advisers of the Government on the terms of the contract were entirely unacquainted with the economical working of railways, or they would not have demanded the stipulated speed, since the loss and disadvantages it entailed must fall upon the country rather than the Company.

The Government would appear to have been informed that the rate of speed attainable on a railway is under any circumstances a sure test of its character and construction, but nothing can be more fallacious, for I can quote instances in which the highest speeds are attained on the worst constructed railways, and *vice versa*. As regards construction, the Government have protected themselves in the contract by a detailed and peremptory specification under which the line is now being made; and I have already stated that we are making a far better line in every respect than the terms of the contract would necessarily require. In this case it might therefore be fairly stated, that the cost is not affected by the speed required.

The curves on the line are all easier than the prescribed minimum, but these would in any case have a scarcely appreciable influence on the speed over the whole line; the gradients are only such as the physical character of the country allows, and are by no means optional,—in these and in all other respects the line is at least equal to the terms of the contract.

I may here observe that the gradients are so much more favourable on the constructed line than on that popularly known as Wylie's, that a much higher speed can certainly be attained thereon.

The speed attainable on any line is principally governed by the gradients, and the description of rolling-stock used; but this is not yet constructed, so therefore no question on this point can have arisen.

The cost of working and maintaining a line—which I consider to be by far the most important point in the economical use of, and benefit to be derived from, railways—is almost directly as the rate of speed adopted, and at this time the efforts of Railway Managers both in Great Britain and most parts of the world are being earnestly directed to induce the public to accept a reduction in the rate of speed, which, owing to the active competition, has obtained an absurdly high pitch.

It can scarcely be assumed that this line, for some time to come, will not be a heavy burden on the colonial expenditure, and therefore the whole of the largely increased risk and cost of working and maintaining an improperly high speed must fall upon the country; which, instead of deriving any benefit therefrom, will be greatly prejudiced by the very deficient accommodation it would then afford to the local traffic, the highest development of which I should judge to be the true policy both of the Government and the Company.

I would not have intruded these remarks on your consideration had you not so pointedly alluded to my opinions; but having done so, I cannot too emphatically and positively report that the rate of speed is not a question of construction, the details of which are very properly and satisfactorily, as regards the railway, decided by the contract: but, assuming the rolling-stock to be constructed especially for the contract speed, as it can be without any extra cost, the speed should be governed by the consideration of its cost and the local accommodation to be afforded, and it should therefore be arranged between the Government (as guarantors of the interest) and the General Manager of the railway rather than be made a peremptory condition of the contract.

I feel certain that, when this point is fairly considered on its merits, no question or controversy can arise thereon. Meanwhile, I have to request that you will consider my remarks on this subject as quite unofficial; and beg to tender you the positive assurance that the Company are fully alive to all the conditions of the Contract, and will certainly fulfil them in a manner in the highest degree satisfactory to the country and honorable to themselves.

I have, &c.,

CHARLES H. GRANT, *Engineer.*

The Hon. the Colonial Secretary.

Colonial Secretary's Office, 5th January, 1874.

GENTLEMEN,

As Mr. Greene, the Engineer from Victoria engaged on behalf of the Government in examining the route for the Main Line of Railway, is about to proceed up the country, I should feel much obliged if you would furnish him with letters of introduction to your Engineers along the line now in course of construction, requesting them to afford him such information as it may be in their power to give upon questions connected with the Railway and route.

I have, &c.

(Signed)

B. TRAVERS SOLLY,
for the Colonial Secretary.

Messrs. CLARKE, PUNCHARD, & REEVE.

[J. W. Reeve to C.S., forwarding letters of introduction to J. C. Climie, Campania; J. Fincham, Perth; and J. Human, Ross.—7 Jan. '74.]

Colonial Secretary's Office, 6th January, 1874.

SIR,

As Mr. Greene is now prosecuting his examination of the route for the Main Line of Railway, he has requested that he may be furnished with a diagram showing the cross section of the Jerusalem tunnel.

If in your power, I should feel much obliged by your enabling me to comply with his request; and you will confer an additional favour if you could let me have the diagram in time for me to forward it to Oatlands by this evening's mail.

I have, &c.,

(Signed)

B. TRAVERS SOLLY,
for the Colonial Secretary.

C. H. GRANT, *Esq., Engineer-in-Chief*
Tasmanian Main Line Railway.

*Tasmanian Main Line Railway Company, Limited, Engineer's Office,
Hobart Town, Tasmania, 6th January, 1874.*

SIR,

I HAVE the honor to acknowledge your letter of this date, in which you express the wish of the Government to obtain information as to the size of the tunnel now being constructed on the Main Line Railway.

With much pleasure I comply with the request, and forward herewith a transverse section of the tunnel, of which a portion has been already completed.

I have, &c.,

(Signed)

CHARLES H. GRANT, *Engineer.*

B. T. SOLLY, *Assistant Colonial Secretary.*

Colonial Secretary's Office, 6th January, 1874.

MY DEAR SIR,

IN compliance with your request, I herewith forward to you a diagram showing the cross section of the tunnel at the Flat Top Hill:

Yours truly,

(Signed) B. TRAVERS SOLLY.

W. H. GREENE, *Esq., Oatlands.*

*Tasmanian Main Line Railway Company, Limited, Engineer's Office,
Hobart Town, Tasmania, 8th January, 1874.*

SIR,

IN compliance with the request contained in your letter of the 29th ultimo, I have the honor to forward you herewith a copy of my tabulated schedules of gradients and curves on the Main Line Railway between Bridgewater and York Plains.

I have, &c.,

(Signed) CHARLES H. GRANT, *Engineer.*

Hon. T. D. CHAPMAN, M.L.C., Colonial Secretary.

BY ELECTRIC TELEGRAPH.

9th January, 1874.

MR. GREENE wishes to see Mr. D. Climie's section between Oatlands and York Plains, known as sheet 3, but which has never been supplied to the Government. If you have it please send it to Mr. Greene, *Brisbane Hotel, Launceston.* If not, I shall feel obliged by your requesting Mr. D. Climie to forward the section to this office as soon as possible.

Any telegram from you on this subject will pass free.

(Signed) THOS. D. CHAPMAN.

THOS. GORRINGE, *Esquire, Kempton.*

BY ELECTRIC TELEGRAPH.

Green Ponds, 10th January, 1874.

SIR,

I HAVE not the section required by the Government; but I have written to Mr. D. Climie to forward a tracing of it to you as early as possible. This I have no doubt he will at once comply with.

I have, &c.,

(Signed) THOS. GORRINGE.

The Hon. the Colonial Secretary.

Wilderness, Green Ponds, 12th January, 1874.

SIR,

I HAVE the honor to forward to you by Mills' coach the tracing of Mr. D. Climie's section of Wylie's route from Oatlands to York Plains. Mr. Climie having to make a tracing, I did not receive it until to-day: I hope that it will be in time.

I have, &c.,

(Signed) THOS. GORRINGE.

The Hon. the Colonial Secretary.

Colonial Secretary's Office, 13th January, 1874.

SIR,

I AM directed by the Colonial Secretary to acknowledge and thank you for having forwarded so promptly Mr. Climie's sheet No. 3, which I this morning placed in Mr. Greene's hands.

I have, &c.,

(Signed) B. TRAVERS SOLLY.

T. GORRINGE, *Esquire, Wilderness, Green Ponds.*

Colonial Secretary's Office, 14th January, 1874.

SIR,

I SHALL feel much obliged if you will have the goodness to favour the Government, for the information of Mr. Greene, with the lengths of the Viaducts and Bridges at the under-mentioned places on the Main Line of Railway; namely,—Risdon Road, Derwent, Horse-shoe Bend, Jordan River, Strathallen Creek (2), Native Corners Creek, York Rivulet, Blackman's River, Macquarie River, Elizabeth River, South Esk at Clarendon:

I have, &c.,

(Signed) THOS. D. CHAPMAN.

C. H. GRANT, *Esq., Engineer-in-Chief, Main Line Railway.*

*Tasmanian Main Line Railway Company, Limited, Engineer's Office,
Hobart Town, Tasmania, 24th January, 1874.*

SIR,

As requested in your letter of the 14th instant, I have the honor to forward you herewith particulars of the lengths of the Viaducts and Bridges on the Main Line Railway as therein mentioned:—At Risdon Road, 85 yards; Bridgewater, 412 yards; Horse-shoe Bend, 76 yards; Jordan River, 116 yards; Strathallen Creek, No. 1, 34 yards; Strathallen Creek, No. 2, 26 yards; Native Corners Creek, 28 yards; York Rivulet, 58 yards; Blackman's River, 43 yards; Macquarie River, 230 yards; Elizabeth River, 49 yards; South Esk at Clarendon, 311 yards.

I have, &c.,

(Signed) CHAS. H. GRANT, *Engineer.*

*The Hon. T. D. CHAPMAN, M.L.C.,
Colonial Secretary.*

Colonial Secretary's Office, 28th January, 1874.

SIR,

In compliance with your request, I have the honor to forward you herewith particulars of the lengths of the Viaducts and Bridges on the Main Line Railway as furnished by Mr. Grant; namely,—At Risdon Road, 85 yards; Bridgewater, 412 yards; Horse-shoe Bend, 76 yards; Jordan River, 116 yards; Strathallen Creek, No. 1, 34 yards; Strathallen Creek, No. 2, 26 yards; Native Corners Creek, 28 yards; York Rivulet, 58 yards; Blackman's River, 43 yards; Macquarie River, 230 yards; Elizabeth River, 49 yards; South Esk at Clarendon, 311 yards.

I have, &c.,

(Signed) THOS. D. CHAPMAN.

W. H. GREENE, *Esq., Kyneton, Victoria.*

BY ELECTRIC TELEGRAPH.

Green Ponds, 23rd January, 1874.

HAS any Report from Mr. Greene on Climie's Survey of Wylie's Line been received by the Government? As the Association are desirous to ascertain its nature previous to holding a public meeting on the subject.

I have, &c.,

(Signed) THOMAS GORRINGE.

The Hon. the Colonial Secretary.

BY ELECTRIC TELEGRAPH.

23rd January, 1874.

THE Government have not yet received Mr. Greene's Report on Mr. Daniel Climie's proposed route for the Main Line Railway.

(Signed) THOS. D. CHAPMAN, *Colonial Secretary.*

THOS. GORRINGE, *Esq., Warden, Green Ponds.*

Colonial Secretary's Office, 30th January, 1874.

SIR,

HAVING been advised that, acting under instructions of Mr. Parramore, of Ross, you have taken a cross section at the Main Line Railway Crossing of the Macquarie River at Ross, would you have any objection to furnish the Government with a certificate of the sectional area of the Macquarie at such Railway Crossing, showing what provision has been made by the Company for the discharge of flood waters at that point, and what is the sectional area of the highest known flood?

The information is required by the Government in connection with a report on the Railway Works of the Main Line Company about to be furnished to the Government by an Engineer employed for that purpose, but whose stay in the Colony was too limited to enable him to ascertain the area by survey.

Any reasonable charge, say £3 3s., for this information will be paid by the Government.

I have, &c.,

(Signed) T. D. CHAPMAN

ADAM JACKSON, *Esq., Ross.*

Williamwood, Ross, 2nd February, 1874.

SIR,

I HAVE the honor to acknowledge receipt of your letter of 30th January, intimating your desire that I should furnish the Government with information in reference to the result of certain cross section surveys of the Macquarie River, effected by me for Mr. Parramore of this neighbourhood, in connection with the Main Line Railway Crossing of that river; viz.—What provision is being made by the Company for the discharge of flood waters at the Main Line Railway Crossing of the Macquarie River? What is the sectional area of the highest known flood in the Macquarie River?

In replying to these questions I take the last one first; and in reference thereto say, that I made a careful survey, following marks left on the ground by the flood of December, 1863, (the highest known by the oldest residents here), commencing at Mr. Parramore's bridge, being about 10 chains higher up the river than the Railway Crossing, and found the sectional area to be 14,882 square feet, high water mark at the bridge being 9 feet above the bank of the river.

The fall from Mr. Parramore's bridge to the Main Line Railway Crossing is only two inches, where an equally careful survey was made, commencing at a mark on the left bank of the river and extending (by crossing the river at right angles) 9 chains to a corresponding mark on the opposite side. These marks were pointed out to me as the *termini* of the proposed crossing, and the sectional area between which I find to be 4145 square feet, without making any deduction for the space taken up by piers,—and, at the same time, assuming that the water reaches the same height here that it did at the bridge, viz., nine feet.

I hereby certify that to the best of my knowledge and belief the sectional survey of the flood in the Macquarie River (at Mr. Parramore's bridge) in December, 1863, gives an area of 14,882 square feet. That the sectional area allowed for the discharge of flood waters at the Main Line Railway Crossing is not more than 4145 square feet,—assuming the whole opening between the abutments to be 9 chains in length.

I have, &c.,

(Signed) ADAM JACKSON, *Surveyor.*

The Hon. Colonial Secretary.

P. S.—In the event of your desire to have my calculations verified, I enclose Mr. Parramore's authority to Messrs. Allport, &c., to allow an inspection of my diagrams.—A. JACKSON.

Tasmania,
Colonial Secretary's Office, 7th February, 1874.

SIR,

I HAVE the honor to transmit for your information tracings of a cross section survey of the Macquarie River, made by Mr. A. Jackson for Mr. Parramore, in connection with the Main Line Railway Crossing of that river, together with a copy of Mr. Jackson's letter, dated 2nd instant.

I have, &c.,

(Signed) T. D. CHAPMAN.

W. H. GREENE, *Esq., Resident Engineer Railways,*
Kyneton, Victoria.

Colonial Secretary's Office, 14th February, 1874.

SIR,

I HAVE the honor, by direction of the Honorable the Colonial Secretary, to acknowledge the receipt on the 4th instant of your letter dated the 2nd, forwarding, at his request, certificate of the area covered by the flood in the Macquarie River at Mr. Parramore's bridge in December, 1863, and of that allowed for the discharge of flood waters at the Main Line Railway Crossing; and the further receipt, this day, of your account amounting to £3 3s. for the same.

I am now desired to enclose a cheque on the Colonial Treasury for that amount.

I have, &c.,

(Signed) E. C. NOWELL, *for Asst. Col. Secretary, absent.*

A. JACKSON, *Esq., Williamwood, Ross.*

Melbourne Bank Chambers, Queen-street, 10th March, 1874.

To THOMAS GORRINGE, Esq., Warden of Green Ponds, and the Landowners of Brighton, Bagdad, Green Ponds, Melton Mowbray, Bothwell, Oatlands, &c.

GENTLEMEN,

IN compliance with your instructions I have examined the country along the originally selected route of the Hobart Town and Launceston Main Line of Railway between Bridgewater and York Plains as projected by the late Mr. Wylie, C.E., (for some time Engineer of the said Company), and lately levelled by Mr. D. Climie on your behalf.

I also examined that portion of the Railway now in process of construction between the Half-way House and Bridgewater *via* Tin-dish Gully, York Plains, Flat-top Tunnel, Jerusalem, and Campania.

Mr. Climie, by your instructions, accompanied me on both inspections; and I premise my remarks by informing you that we walked over both routes their entire distance. Mr. Climie's presence enabled me to judge, from actual observation, of the practicability or otherwise of the Line surveyed by him, and to contrast its physical peculiarities with those of the route adopted by the Company. I beg to acknowledge receiving from him the following documents:—1. A Tracing of his Section. 2. Copies of Acts of the Tasmanian Legislature, Nos. 1 & 13, intituled "Acts for the Construction of a Main Line of Railway." 3. Copies of Evidence taken before the Tasmanian House of Assembly, dated 5th August and 28th October, 1873, together with—4. A copy of the Main Line Railway Company's Prospectus, published in certain London Journals on the 30th March, 1872.

As my instructions from you were untrammelled by conditions, and your expressed wishes to me being to obtain an impartial Report on the late Mr. Wylie's route, I entered on my enquiry with a determination to comply with your instructions to the best of my ability. I examined the two routes in the order named; and, having now stated such preliminaries as will, I imagine, enable you to follow my Report, I commence my labours by briefly traversing certain clauses of the Railway Acts, and describing the country on the route selected by the late Mr. Wylie.

The Main Line Railway Company, in their Prospectus dated London, 22nd March, 1872, (when the scheme was first launched in the Home Market), sought the aid of English Capitalists, and sold their Bonds on the faith of the Works being constructed by a certain route of the country, to wit—"A Main Line of Railway from the City of Hobart Town (the capital and chief port of Tasmania) through the centre of the Colony to the City of Launceston (the capital of the northern portion thereof)—the whole being about 125 miles in length. Starting at Hobart Town, the proposed Line will pass through Pentonville, Melton Mowbray, Spring Hill, Anstey Barton, Oatlands, Tunbridge, Ross, &c."

As the above comprised the country inspected by me, it is unnecessary to furnish additional *excerpta* from the Prospectus.

On examining Clause 3, Sub-division No. 1, 34 Vict. No. 13, it will be found the Company accepted the responsibility of constructing the Main Line by a route which "shall keep as near as may be practicable to existing centres of population."

The foregoing Acts of Parliament, Nos. 1 and 13, (endowing the Government and the Company with extraordinary powers), were, as you are aware, incorporated with a certain Contract, dated 15th August, 1871, made between the Governor and his Executive Council, of which the Hon. Sir James

Milne Wilson, M.P., was then Premier, of the one part, and the Company known as the "Tasmanian Main Line Railway Company, Limited," of the other part. By this Contract certain powers were conceded by the Government to the Company as to the mode of constructing the line, apparently with the object of grappling with and overcoming the irregular and abrupt contour of the country on the route described in the Prospectus; and when I mention that gradients of 1 in 40, and curves of 4 chains radius, were conceded by the Government as a base of construction, it will be seen that an elasticity of provision was obtained which enabled the Company to construct their railway over country not only of a mountainous character, but of an unusually formidable and difficult nature. The Contract likewise armed the Company with power to alter or vary the route "as their Engineer may advise to be necessary or advantageous, having reference to the exigencies of construction or difficulties of route or prospects of traffic,"—a power on which I purpose hereafter to comment.

I commenced my survey of Mr. Wylie's line at a point on the railway about 15 chains east of the hamlet of Bridgewater, where Mr. Climie's survey, diverging from the railway, follows the course of a leading gully to the west, and by an incline of 1 in 46 ascends to the higher ground on the north west of the main road. At two miles on the section the surveyed line approaches the railway, and for some distance crosses and recrosses it, no great difference in either scheme being apparent. The surveyed line crosses the main road at a point three and a quarter ($3\frac{1}{4}$) miles from Bridgewater. Previous to this the two lines widely diverge; the Company's line takes an almost easterly course, Mr. Wylie's route a north-easterly direction. At this point Mr. Climie's survey diverges from Mr. Wylie's line for the purpose of avoiding a tunnel and an expensive viaduct at Brighton. Mr. Climie's line bears away to the east, skirts the west bank of the River Jordan, enters the valley near its junction with Bagdad Creek, then crosses the river, and by a circuitous and rather unnecessary detour winds round the banks of the Bagdad Creek, crossing the main road about ten chains north of the English Church at Brighton. This route was apparently selected to save expense; but, inasmuch as it lengthens the line inconveniently, I considered it desirable to seek for a more direct line, which I found on the north bank of the Jordan, passing close to the English Church at Brighton, and junctioning with Mr. Climie's survey at the before-mentioned crossing of the main road.

The surveyed line then bears away gradually from the centre of the valley, and persistently follows the slope of the ranges, and by an easy and continuous incline obtains a considerable altitude above the main road.

At ten miles from Bridgewater the line abruptly diverges to the west to avoid a wide low-lying valley intercepting its course, and follows round the plateau abutting upon Sawpit Bottom, then crosses the gully at a narrow neck, and enters upon the northern ranges at an altitude greater than that obtainable by any other practicable route.

No doubt this additional height is gained at the cost of a detour in the course of the railway, but the proposal is feasible, and unobjectionable, in view of the difficulties to be met with in surmounting and crossing Constitution Hill.

From the north side of Sawpit Bottom Gully the line winds round the ranges to a point opposite Palmer's *Swan Inn*, Bagdad, at a minimum of cost.

The works are of a very light character, and till Wombat Gully is crossed there is no necessity for a lesser curve than ten chains radius. It is true the gradients are long and severe—1 in 42 to 1 in 48—but no doubt an improved section may be obtained on a permanent survey being made.

The difficulty of the route is at Wombat Gully; and certainly at first sight the necessary works appear to be of an expensive character, necessitating the use of curves of such small radii as to be objectionable. I devoted considerable time to the crossing at Wombat Gully, examining the contour of its banks, and I arrived at the conclusion that Mr. Climie's section does not sufficiently grapple with the difficult features of this gully. Mr. Climie has evidently followed the natural outline of the cliffs too closely,—his plan demanding the use of sharp curves and abrupt bends. A judicious, and at the same time moderate, expenditure on a bolder plan, embracing a curve of not less than seven (7) chains radius, and a longer viaduct than shown (the materials being to hand), would, in my judgment, be a great improvement on the surveyed route. From Wombat Gully to the crossing of the precipitous gorge known as Stinking Gully the line follows broken and sidelong ground, easily adapted to the purposes of railway making; after which nothing in the way of engineering difficulty is met with,—the course chosen is quite practicable, requiring curves of only moderate radii.

From this point to the crossing of Constitution Hill the line diverges considerably from a direct course; the earthworks, however, are light and the grades less severe than those opposite Bagdad. The summit of the railway at Constitution Hill is reached at a distance of about $17\frac{1}{2}$ miles from Bridgewater, and is crossed without any great expense; and no doubt on a permanent survey being made the course of the railway could be considerably shortened and otherwise improved.

I beg here to state that, when examining the crossings of the Railway at Sawpit Bottom, Wombat Gully, and Stinking Gully, I found lines recently pegged out by Surveyors which certainly do not represent Mr. Climie's section, and present in my opinion unnecessary and exaggerated difficulties.

I purpose now taking you back to a point in the centre of the valley about two miles south of the *Swan Inn*, Bagdad, to examine the line surveyed by the Company's Engineers, and which survey I understood led to the abandonment of this route.

It will be *à propos* to a general review of the two schemes to remark that, whereas the Company's Engineers followed in their survey the general course and centre of Bagdad Valley as a base for approaching and crossing Constitution Hill, Mr. Climie on the other hand ingeniously solved the difficulty by leaving the centre of the valley and making use of the slope of the ranges, thus obtaining a practicable track at a great altitude above the Company's surveyed line, which, following the centre of the valley, gradually forges its way into insurmountable difficulties.

At Bagdad I met a Mr. Palmer, junr., who informed me he accompanied the Company's Surveyors during their surveys. He showed me the Company's line, their stakes and bench marks, which I followed to the termination at the base of Constitution Hill. If this route was the one selected by the Company as the only feasible line to be obtained in the valley, I readily believe they considered this country impracticable. In short it was an ill-designed and badly selected line, necessitating the use of heavy works, a very long tunnel, steep inclines, and sharp curves. Contrasting the works on Climie's survey of Wylie's route with the Company's line there would be a great saving effected on the size of the culverts, as Wylie's line crossing the gullies near the apex of the water-shed reduces the risk from floods to a minimum.

From Constitution Hill Wylie's line falls rapidly towards Green Ponds. It is only by diverging from the straight course, and making use of a natural amphitheatre known as "The Basin," and winding round its wide-spread slopes, that an easy line can be found leading towards Green Ponds. This point on Wylie's line has, I understand, hitherto been regarded as one of the difficulties of the route, and it must be satisfactory to you to know that Mr. Climie's scheme provides the means for overcoming the difficulty. Previous to entering "The Basin" my attention was directed to an abrupt turn in the line where it crosses the outer edge of "The Basin:" no doubt the section has been taken around a sharp curve, but I am satisfied a curve of ten (10) chains radius can be got by slightly increasing the earthwork.

From the Basin into Green Ponds the features of the country are commonplace and simple; and if it is deemed advisable to take a Line into the Township of Green Ponds it can be done without difficulty at a slightly increased cost, which would both improve the gradients and be a great advantage to the residents of the township.

From Green Ponds through Picton, and to the crossing of the valley at Woodlands (Mr. Page's residence), the proposed line passes gently undulating ground; and to the east of Woodlands (where the line crosses the watercourse and enters upon the slope of the range at its back) is the commencement of the great incline leading up from Melton Mowbray to Spring Hill. This natural feature in the country rising abruptly out of the valley, and well adapted for its purpose, has been cleverly appropriated by Mr. Climie as the base of the Spring Hill incline, and forms, as far as I could discover, the practicable solution of the problem how to cross Spring Hill without a tunnel.

From Woodlands the line gradually climbs to the flatly sloped land opposite Blackwell's Hotel, Melton Mowbray, and by its aid attains a height of upwards of sixty (60) feet above the Main Road. Here is an excellent site for Bothwell Station, which could be built well above the road on a site having an easy approach, good foundations, and excellent building material.

From this point the line passes over undulating ground by an incline of 1 in 44 and easy curves, and crossing the Main Road and watercourse at an abrupt bend enters upon Mr. Bisdee's property, then winds along a spur of a range, runs parallel to and touches the Main Road, then leaves the road where it abruptly turns to the east towards Lovely Banks. From this point the ascent is continuous, and the course is round and over a flat-sloped spur, crossed at a saddle bisecting the range; the line then skirts the slope of the main range, and ascending by a grade of 1 in 43 runs along steep and broken ground for upwards of a mile.

A concise *resumé* of the position of the line with the peculiarities of the country, and its divergence from Mr. Wylie's route, will not be out of place. The country on Mr. Wylie's route, and also Mr. Climie's modification of his scheme, of which latter the foregoing is a brief description, enables me to submit a contrast of the merits of both lines, and leads me to the conclusion that it was the want of this high ground (obtained by Mr. Climie) that rendered Mr. Wylie's line impracticable and led to its abandonment.

Starting from Melton Mowbray Mr. Wylie selected a track through Murderer's Gully, *via* Lovely Banks, as the approach to Spring Hill. At Lovely Banks his line was little, if at all, above the Main Road, thus compelling him to the alternative of an exceedingly steep incline with a tunnel at its end, or to originate some special mechanical contrivance such as a steep incline worked by stationary engine, or to adopt what is known as the zigzag plan, as a means of accomplishing this purpose. To illustrate the difference between Mr. Wylie's scheme and Mr. Climie's, I state that opposite Lovely Banks Mr. Climie's deviation is fully three hundred feet above the Main Road, whilst Mr. Wylie's line is, as before stated, about the same level as the road; in other words, the great altitude of the route adopted by Mr. Climie solves the difficulty.

From opposite Lovely Banks, 30 miles 40 chains (on Mr. Climie's Section), the line traverses the summit of the main spur leading down from Bisdee's White Hill where the contour of the country undergoes a change, and in lieu of the continuous ascent before obtainable we have to face the difficulty of a descending grade for fully half a mile. Here Mr. Bisdee's private road from Lovely Banks to Hutton Park crosses the line; and at this the highest point on the low saddle, where the spur from the White Hill joins the long ranges leading to Spring Hill, is the point chosen by Mr. Climie for the crossing of his line: in fact it affords the only available means of doing so. No doubt this descent is in one aspect unfortunate, but by increasing the height of the embankment the evil can be lessened. Had this White Hill spur ascended to its junction with Spring Hill, a much flatter approach to the summit would have been attained. Accepting the position, unfortunate and unavoidable as it is from one point of view, it has a redeeming feature, as it effectually breaks the long ascent from Melton Mowbray to Spring Hill, and enables the locomotive to acquire an additional impetus before climbing the upper incline.

From Hutton Park road for several furlongs onwards the route is an extremely easy one, over sidelong ground of tolerably uniform surface; and although the gradient is severe (1 in 42½), no curve need be sharper than fifteen (15) chains radius. At 33 miles the line skirts the side of a broken and rather precipitous gully which it heads, then crosses a saddle in the range, and winds away to the north west round by sloping ground over short and rather deep gullies till it approaches the summit of Spring Hill. Then it bears away nearly due east, skirts a steep sidelong, passes under the road about ten chains south east of the summit of Spring Hill, and by a short cutting 45 feet in depth conquers the difficulty on this route. On carefully considering Mr. Climie's Section an improvement in the grade can be effected by raising the embankment at the Hutton Park Road, say, an additional 15 feet, and deepening the Cutting at Spring Hill, say, to a total depth of 55 to 60 feet. If this were done the gradient would be reduced from 1 in 42 to 1 in 45 to 1 in 50,—a great advantage when the length of the inclines on the north and south sides of Spring Hill are duly considered.

From the summit level (34 miles 20 chains) the line curves to the west, and forms the eccentric ring of a circle whose extrados is the main road. From this point to Jericho nothing calls for comment: the works are light, simple, and commonplace. About half a mile south of Jericho the line runs on to the main road, then recedes from it, and passes Jericho in a line parallel to but about two furlongs east of the road. At the crossing of the river Jordan the descent ceases,—the line trending to the west crosses the road and watercourse at 38 miles near a rocky bluff, then follows the west side of a rocky gully in a direction almost parallel with the road till the gully is lost in the expanse of an extensive plain near the old Convict Depôt. Here the line altogether leaves the main road and takes a north-westerly direction.

The circuitous route here chosen was to avoid a rocky cutting; but, from a cursory survey of the country at the crossing of the main road, I believe if the line had been taken across the table land in a northerly direction, a saving in its length would result at the expense of a small cutting. This deviation I recommend should be hereafter surveyed.

From 38 miles 40 chains for upwards of two miles the route of the line is northerly, its course a direct line, its gradients flat with the lightest and simplest works. It crosses the track of the old abandoned road at 39 miles 40 chains, then trending away to the east crosses a high flat ridge at 41 miles, then reverses its course to the west, skirts round the western side of a bald hill opposite Mr. John Page's residence (Lemon's Springs), and proceeds by easy curves and grades into the valley of Anstey Barton (43 miles 40 chains), or a total length of five miles of Railway of the simplest character and the lightest possible construction.

Leaving Anstey Barton, the course of line follows the rocky Pass of Dulverton Rivulet for half a mile, after which the country is open and flat to the Township of Oatlands, where an admirable site for a Station is obtainable where the line crosses the main road a quarter of a mile north west of the centre of the Town and near the overflow from Lake Dulverton.

Then diverging to the east, crossing the water-race to Lake Dulverton, and passing on the slope of the range opposite Fisher's homestead, it proceeds up the gully, crosses the range at the head of the York Rivulet, and by a small cutting winds abruptly to the north round small sidelong

spurs, then passes to the head of a swamp close to Lord's, York Plains track; follows down the side of slope of Lord's Big Hill, passes over the slope into the plain, nears the line now in process of construction, and joins the existing Railway at a point nearly opposite Jillett's Home Station on the York Plains, 52 miles 16 chains.

I have now briefly sketched the salient features of the survey of the late Mr. Wylie's route. I shall, in a concise manner, detail what I observed when examining the Company's line between Half-way House and Bridgewater.

I believe the Company profess to have adopted Mr. Doyne's route between the Half-way House and Bridgewater wherever they could do so at small outlay; but in following the Tin-dish Gully they have selected a more difficult route than that surveyed by Mr. Doyne, and one which will prove more costly in working and maintenance, and on which low speeds only can be obtained. The Tin-dish route is a complete sinuosity of five (5) chain curves, and 1 in 40 grades. These curves have been freely introduced in many instances to save a few hundred yards of earthwork, for which I can discover no reasonable justification. Beyond the Tin-dish Valley the line descends to Jillett's homestead, then crosses York Plains, over which the works are light, then finds its way through rougher country, and before reaching Jones' homestead another series of five (5) chain curves and 1 in 40 gradients are again resorted to. From this point to about two miles from the Flat-top Tunnel the works, with one or two exceptions, are comparatively light, after which the same steep grades and sharp curves are used to within a short distance of the tunnel. The Flat-top Tunnel, I understand, is being constructed on a grade of 1 in 40 for nearly its whole length (some sixty chains). At the southern entrance, and for several miles below it, the course of the line is westerly with the standard 1 in 40 gradients and a great number of standard five chain curves, till the railway line crosses a deep creek about three miles north west of Jerusalem, where it suddenly reverses its former direction, and bears away nearly due east towards Jerusalem, a small hamlet situate on the Coal River,—in fact the only township on the railway. Standing on the high ground beyond Jerusalem, and tracking back the course of the railway, its shape is that of a huge horse-shoe whose arms are several miles in length, so that to reach Jerusalem from the tunnel by the course of the railway the distance is nearly twice that of a direct line. From Jerusalem towards Campania a repetition of 1 in 40 grades and 5 chain curves mark the track of the railway; and beyond Campania it winds round hills in every conceivable direction on the parsimonious pretence of saving small cuttings, the cost of excavating which in many instances would be less than the circuitous route followed. After passing the Tea Tree, and on to the Jordan, the works are light, and need no comment. The Jordan is crossed by a long timber viaduct as yet unfinished.

From the river to within two miles from Bridgewater the works are inconsiderable; and descending to Bridgewater by steep gradients and sharp curves the railway circles round the country so freely it crosses the main road four times in about two miles. After passing the Tea Tree and entering the valley leading to the Jordan I was struck with the adaptability of this part of the country for railway making, leading me to infer that it was this open country, coupled with the information that Doyne's survey afforded, which tempted the Company's Engineers away from Wylie's line, and led them on stage by stage from Campania to Jerusalem, and from Jerusalem to the country beyond the Flat-top Tunnel.

Mr. Doyne's railway, however, was projected on an altogether different basis to that of the Company, his steepest gradient being 1 in 50, with curves not less (in extreme cases) than twenty (20) chains radius.

On this Jerusalem line Mr. Doyne provided for numerous tunnels; heavy cuttings, viaducts, and a zigzag. It will therefore be seen that the information his survey afforded was of little value for the low class of railway the Company is constructing.

I now purpose considering the peculiarities and merits of both lines. On Mr. Wylie's line there are two difficult features to overcome, viz. Constitution Hill and Spring Hill, which can both be crossed by gradients of 1 in 43 and 1 in 45: the culverts and waterways would be very small owing to the line skirting the tops of the ranges instead of following the centre of the valleys, thus limiting the watershed to a very small area. No curve on this line need be sharper than seven chains, of which about two miles will probably be necessary, and, excepting at points previously described, the sharpest curve will not be less than ten chains radius. On this route the time lost in the two ascents would be partially recovered by the increased speed obtainable on the descent to Green Ponds and Jericho, or *vice versa* to Melton Mowbray and Bagdad; and as the line abounds in suitable building stone, ballast, and timber, and has the great merit of not requiring a tunnel, its cost would necessarily be light. The chief element to be considered in estimating the value of this line is found in the settled nature of the country, the number of old established townships, the quantity of superior land, and the agricultural and commercial advantages it affords.

It has hitherto been regarded as an axiom in railway making that railways should follow population and traffic, but it is apparently reserved for antipodean experience to prove the fallacy of this

truism. The present line ignores all precedent, ignores the inland population of the Colony (which numbers several thousands), ignores the products of the soil, the fertile land from Tunbridge to Hobart Town, the trade from which several interests it can never hope to gain: hence it requires no ocular foresight to predict that, if the course of the present railway is adhered to, the proprietors of the coaches and wagons now running on the main road will as busily ply their occupations after the opening of the railway as they now do before its completion. In proof of the assertion that where railways do not accommodate population coaches continue to run, I mention the fact that a four-horse coach each way, and numerous other daily intermediate coaches, successfully compete with the railway between Melbourne and Ballarat, and wagons still ply between Ballarat and Geelong heavily laden with goods; and it was only when the Victorian Government reduced the freight of wool to a minimum that the railway obtained the Riverine traffic, which in many instances before found its way to Melbourne by horse wagons: and it must be admitted what is possible in Victoria is equally so in Tasmania; where wages and produce rule at lower rates.

I cannot discover what special advantages the Company hoped to gain by adopting the Jerusalem route. It is a country so sparsely settled, so thinly peopled, so prolific in inferior land; its fixed population may be numbered by the score, and, excepting the township of Jerusalem, the commercial centre of eastern Tasmania, which, by the way, has taken half a century to reach its present stage of development, and may be described as an aggregation of twenty dilapidated houses, the whole country is comparatively unpeopled, and revels, and will probably continue to revel, in a state of Arcadian decay.

If in a pecuniary point of view the cost of the Flat-top tunnel and approaches be subtracted from the cost of the railway, no doubt the Jerusalem route would compare favourably with Mr. Wylie's; but inasmuch as the money value of the tunnel would make upwards of twenty (20) miles of Wylie's line, all the pecuniary advantages of the contract rests with the latter. Further, when the large number of extremely objectionable curves (on very steep grades) are taken into account, I am convinced it will cost more to work the adopted line than the double inclines of Constitution Hill and Spring Hill would do.

As to the rate of speed obtainable on the adopted line, it is hopeless to expect the Company to be able to fulfil the conditions of their contract; and arguing from the fact that they have used unnecessarily sharp curves, in reprehensible violation of the spirit of their contract, I infer that they never intended to comply with its provisions.

Having now completed my description and contrast of Wylie's line with the line now constructing, I distinctly affirm that Wylie's route, as surveyed by Climie, is not only practicable but, in the majority of instances, compares favourably with the adopted line. On Mr. Wylie's line the worst gradient is 1 in 43, with a short length of seven-chain curves, which, in all probability, could be improved to ten chains radius; whereas on the Company's line the gradients are 1 in 40, with five-chain curves. I also believe Wylie's line is considerably shorter than the adopted line.

The next question to consider is the Company's justification for altering the route of the railway, which no doubt they are empowered by the Contract to do if sufficient cause can be shown. It appears to me the only justification the Company can advance in extenuation of their conduct in breaking faith with their English bondholders, (who furnished them with the money to make the line on the Company's published representations of population and traffic), is the alleged impracticability of Wylie's route. As an Engineer it seems to me the *onus* of proof rests with the Company; in fact it was their duty to furnish the Government with unquestionable proof of what they asserted, and not to shelter themselves behind allegations which may or may not be true. If Wylie's line is impracticable, as they allege it to be, why not afford the Government such information as would enable them to test the matter and put it beyond doubt? Beyond making a flying survey over unsuitable country, and which survey must necessarily have been most incomplete in its details, the Company appear to have done little beyond departing from their Contract, leaving to the Government the unpleasant alternative of considering the provisions of Clause 18 of the Contract, which the public sooner or later will force on their notice. I contend, and do so on the experience of many years, that nothing short of a most elaborate and comprehensive survey, showing in detail (longitudinally and transversely) the contour and height of the valleys, headlands, and ranges between Bagdad and Jericho, would justify any Engineer—no matter how wide his experience—in saying that Constitution and Spring Hills cannot be crossed by a practicable narrow gauge railway constructed on the basis of the Contract. The allegation is untenable: it is, moreover, opposed to fact and modern precedent.

Any person who has inspected the works on the Queensland Railways, or the Great Western Railway of New South Wales where it crosses the Blue Mountains, or the roadway in the same colony from Mount Victoria to Bowenfels, or the roadway at St. Mary's Pass (in your own colony), must admit that it is perfectly practicable to cut a safe and comparatively direct road out of the face of semi-perpendicular cliffs. The heights and grades necessary to cross Spring or Constitution Hill sink into insignificance before the greater difficulties of the Blue Mountain route; and I fearlessly

assert that the late Mr. Wylie would never have perilled his professional reputation by projecting a railway he knew to be impracticable, or allowing his Company to obtain pecuniary advances from unsuspecting British capitalists on the shadowy pretence of statements which would not bear the test of investigation.

A further objection has been made to Mr. Climie's survey of Mr. Wylie's line on the ground that its course diverges so much from a direct line as to seriously increase the distance between Bridgewater and York Plains. This objection, unfounded in fact, would be worth consideration if the railway now in process of construction was itself a direct line; but, inasmuch as it deviates at Campania and Jerusalem to a far greater extent than is necessary on Mr. Wylie's route, the objection urged is ill-founded and valueless.

In conclusion I beg to state that, as it has been alleged the levels on the surveyed line are incorrect, I tested the summit levels at Constitution Hill and Spring Hill with those furnished me from the office of the Minister of Public Works, and found them correct. I also tested each gradient as carefully as I could with an aneroid barometer with a like result. No doubt Mr. Climie's Section does not in its details show the heights and depths of the country with the definite exactness of a careful permanent survey, but I believe it gives fairly such information as a flying hurried survey would be expected to do. To condemn a railway route on such a plea would be as reasonable as would be the conduct of an Engineer condemning the quality of building stone because it could not be hewn from the quarry with a smoothly-chiselled face, or because roughly-shaped ore fresh from the mine did not take the form of bridges or rails, or those numberless useful shapes skilful craftsmen force the rough metal to assume.

I have made an estimate of the cost of the line between Bridgewater and York Plains, *via* Spring and Constitution Hills, on the basis of the Contract; viz. 12 feet formations, 40 lb. rails, on a 3 ft. 6 in. gauge,—all the bridges being of timber, and the culverts of rough hewn sandstone worked out on the plan adopted by the Victorian Railway Department,—and I feel confident the line could be constructed (inclusive of Stations and Rolling Stock) for the sum of five thousand five hundred pounds (£5500) per mile; all the iron material used being estimated at the present high rates now ruling, which no doubt will be in a short time reduced.

I am, &c.,

(Signed) W. A. ZEAL.

Tasmania,
Colonial Secretary's Office, 18th April, 1874.

MY DEAR SIR,

ON the return of Mr. Giblin from Victoria, about a fortnight since, he informed me that he had seen you in Melbourne during his visit, and that you had told him that you hoped to finish the preparation of your Report on the Tasmanian Main Line Railway during the Easter holidays, and that it would be forwarded to me by an early mail.

As we have repeated enquiries from the residents in the Midland Districts respecting your Report, and as the Members of the Government are anxious to receive the same, I hope you will endeavour to forward it to me by an early steamer.

I am, &c.,

(Signed) THOS. D. CHAPMAN.

W. H. GREENE, Esq., Kyneton, Victoria.

Colonial Secretary's Office, Hobart Town, 29th December, 1873.

SIR,

IN the interviews you had with the Members of the Government on Friday and Saturday last, in reference to the examination of the route for the Main Line Railway as proposed by the late Mr. Wylie when negotiating with this Government for the construction of the Railway, the Members of the Government fully explained to you the object they had in view, viz. to ascertain whether the route proposed for the Railway by the late Mr. Wylie from Bridgewater, *via* Constitution Hill, Green Ponds, and Melton Mowbray, and from thence over Spring Hill on to Oatlands and Antill Ponds, was a reasonably practicable route for the construction of a narrow gauge Railway, in accordance with the terms and conditions of the Contract entered into between this Government and the Tasmanian Main Line Railway Company.

As, however, the Government are desirous of having your Report on the route proposed by the late Mr. Wylie, as well as on the route adopted by the Main Line Railway Company, and on several other matters in connection with the Railway, I have the honor to forward herewith a Memorandum by which you will be enabled to gather more fully the wishes of the Government as to the several points upon which they require your opinion. I have therefore to request that you will be good enough to thoroughly examine and report on the route referred to, and that you will also report generally on the character of the works now in course of construction; and, further, that you will also be good enough to give us the benefit of your opinion and advice on all matters that may occur to you in reference to the route and construction of the Railway, and the Contract between the Government and the Main Line Railway Company.

I have, &c.,

(Signed) THOS. D. CHAPMAN, *Colonial Secretary.*

W. H. GREENE, *Esq., Ship Hotel.*

Colonial Secretary's Office, Hobart Town, 29th December, 1873.

MEMORANDUM.

THE following are the principal points upon which Mr. Greene is requested to report on for the information of the Government in reference to the Main Line Railway :—

1. A general comparison of the route proposed by the late Mr. Wylie and Mr. D. Climie *viâ* Green Ponds, and the route proposed by Messrs. Doyne, Major, and Willett, and adopted by the present Contractors, *viâ* Jerusalem.

2. The comparative character of the route adopted by the Main Line Railway Company and that proposed by Mr. D. Climie between Bridgewater and York Plains,—having special reference to the impracticability of Mr. Climie's route, and with due regard to the terms of that clause in the Contract referring to the route to be adopted.

3. The special characteristics of the route adopted by the Main Line Railway Company with reference to the clauses in the Contract fixing the rate of speed at which the Line is to be worked.

4. The character and quality of the works now completed and in course of construction on the Main Line,—classifying the works under the usual headings of earthworks, ballast, and permanent way, &c., and having reference to those clauses in the Contract with the Tasmanian Main Line Railway Company which provide for substantial works.

5. An opinion as to the sufficiency of the drainage works and the water provision, and as to the levels of the Line, with respect to flood-waters in the valleys of the principal watercourses.

6. An estimate of the cost of the Line when completed between Hobart Town and the Evandale Junction,—assuming that the unfinished works will, in respect to quality and material, be equal to those already completed: the estimate to be founded upon prices for which such works would be undertaken by contract.

7. Whether you would recommend any, and what, steps to be taken by the Government with reference to the whole subject of the Contract with the Tasmanian Main Line Railway Company?

8. All the charts, plans, and papers in connection with the Railway will be placed at your disposal; and any further information required will, if possible, be obtained. You will also have the assistance of such officers of the Government, to give you any information that you may require, as will enable you to report fully to the Government on the several matters referred to.

THOS. D. CHAPMAN, *Colonial Secretary.*

W. H. GREENE, *Esq.*

Kyneton, Victoria, 9th April, 1874.

SIR,

I HAVE the honor to acknowledge the receipt of your letter of the 29th December, enclosing a Memorandum of the points in connection with the Tasmanian Main Line Railway upon which the Government request my opinion. In reply I beg to submit the following Report, proceeding as nearly as possible with the several subjects in the order in which they are stated in your Memorandum.

Before dealing with the first series of questions, those relating to the routes, I have to point out that, as far as I have been able to learn, there are no plans, or documents, or marks in the field, by which the precise route intended by the late Mr. Wylie may be identified. It is clear, however, that he intended to follow the Upper Bagdad Valley, and tunnelling through Constitution Hill, to pass close to Green Ponds and Picton, and from thence by the Serpentine Valley, and by a tunnel through Spring Hill to reach York Plains by way of Oatlands.

In reply to your first question, as to whether Mr. Wylie's route *viâ* Green Ponds and Spring Hill was reasonably practicable within the terms of the Contract entered into between the Government and the Tasmanian Main Line Railway Company, I am of opinion that it was not, inasmuch as the very heavy works, including two tunnels, could not have been constructed within the capital of the Company stated in their prospectus. I am further of opinion that no Railway which would fulfil the conditions of the contract between the Government and the Tasmanian Main Line Railway Company can be constructed from Hobart Town to Launceston, *viâ* Green Ponds, for the sum mentioned in the memorandum of association as the capital of the Company—viz., one million pounds sterling.

Mr. Daniel Climie has taken a line of levels between Bridgewater and York Plains, *viâ* Green Ponds, in a course generally parallel to Wylie's route. His section creeps up the slope of the range on the west side of the Bagdad Valley, along Foster and Stone's Tiers at Upper Bagdad; it crosses Constitution Hill about a mile west of Shepton Montacute. Mr. Climie proposes an open cutting where Mr. Wylie evidently intended to have a long and expensive tunnel. Mr. Climie's line then follows the western slope of Foster's Basin, and crossing the Big Valley descends into Green Ponds along the western slope of the She-oak Hill; it then passes through easy country towards Picton, and from thence crossing the Quoin Rivulet it ascends Lovely Banks Hill, crossing the Main Road from Mr. Page's to Mr. Bisdee's property, and following the slopes of the White Hill Tier it crosses the road to Hutton Park on a saddle which connects the White Hill with the Spring Hill range, along which latter it runs and crosses it near the summit of the Main Road: from this point to the junction with the adopted line at York Plains there are no difficulties of a serious nature.

Mr. Climie did not set out regular curves or straight lines, but has merely followed the contour of the slopes of the hills where the levels of the ruling gradient led him. If curves and straight lines were applied to his route, and levels were taken over them, they would show much heavier works than appear from his section, which does not fairly indicate the difficulties to be met with. This I find by comparing Mr. Climie's section with the actual features of the ground which it is supposed to represent. Many of the water courses described by Mr. Climie as streams are in reality deep ravines or gorges, which would require high viaducts and heavy embanked approaches.

I allude more particularly to the gullies known as Sawpit Bottom, Clocky's, and Wombat near Upper Bagdad, and to those near Spring Hill.

I have received, among other documents, a copy of a Report from Mr. Climie to the Chairman of the Green Ponds Railway Association. I do not agree with that portion of the report in which Mr. Climie states that the line he has selected may be constructed for five thousand pounds Sterling (£5000) per mile, and would be capable of maintaining an average speed of thirty miles an hour. Mr. Climie's line could not, in my opinion, be constructed for anything like that sum per mile; and in consequence of the frequency and sharpness of the necessary curves, and the steepness of the gradients, no such speed as thirty miles an hour could be obtained upon it.

I believe, however, it is the only route *viâ* Green Ponds by which the tunnels may be avoided. I may here say that tunnels are only objectionable on the grounds of their costliness; in broken country they are useful, and in many cases necessary to avoid steep gradients or sharp curves.

As regards the comparative character of the route proposed by Mr. Climie *viâ* Green Ponds, and that adopted by the Tasmanian Main Line Company *viâ* Jerusalem, I am of opinion that they are both very objectionable from an engineering point of view.

According to the section which was furnished to me, the adopted line is four miles shorter than Mr. Climie's.

It may also be said in favour of the Company's route that the gradients on it are not so difficult.

On Mr. Climie's line there are two important difficulties, the summit of Constitution Hill being the first of them. This summit is eleven hundred and fifty-five feet above sea level, and from it the line descends rapidly into Green Ponds, a fall of five hundred feet, which has again to be recovered by the gradient to the Spring Hill summit, which is one thousand feet above Green Ponds.

On the adopted line the first important summit is at the head of Strathallern Creek, and is four hundred and ninety-three feet only above the sea. The line falls from it to the Native Corners

Creek at Campania, which is two hundred and twenty-seven feet above sea level; seventeen miles further north it crosses the Flat Top Hill at a height of thirteen hundred and ninety-four feet above sea level.

I have tabulated and analysed the steepest gradients on each route, and I find that there is a difference of at least fourteen per cent. in favour of the Company's line. It will thus be seen that this is a better route than Mr. Climie's as regards gradients; it is also certainly the less costly of the two routes; but, as regards the use of sharp curves, no line can be more objectionable than that adopted by the Company.

In this respect they have entirely sacrificed speed and efficiency in working the line to cheapness of construction, by resorting to sharp curves for the purpose of avoiding difficulties which might otherwise have been surmounted within reasonable expenditure.

It appears from a table which was furnished by the Company's Engineer, that in a length of forty-eight and a half miles there are eighteen and a half miles of curved line, upwards of four miles of which consist of curves of five chains radii. This will give some idea of the tortuous course of the line now being constructed; and whilst I am of opinion that the Coal River Valley, in an engineering point of view, affords a route better than any which may be found *viâ* Green Ponds, I have no doubt that a line constructed by Mr. Climie's route, although not fulfilling the conditions of the Contract as to speed of traffic, would give quite as satisfactory results as the line now being constructed by the Company, and although more costly, might have been constructed for less than one million pounds sterling.

The route proposed and surveyed by Messrs. Doyne, Major, & Willett, *viâ* Coal River Valley and Jerusalem, seems to me to be the best yet suggested between Bridgewater and York Plains; and bearing in mind the difficulties of the Green Ponds route, I am not surprised at the Engineer of the Main Line Company exercising the powers given to him in the 1st Clause of the Schedule of the Contract with the Tasmanian Government, and deviating from the line of population in order to find a less costly and better route in an engineering point of view, which might have been obtained by following Messrs. Doyne, Major, and Willett's line more closely than the Company have done.

The Company have not dealt with the minor difficulties of Messrs. Doyne, Major, & Willett's route, as it appears from the plans of the latter they propose doing, but have deviated to avoid some short tunnels and cuttings, making frequent use of sharp curves; and by so doing have got a very inferior class of railway to that which was evidently contemplated by the Government, and probably by the Company's Engineer when the Contract was first entered into.

I have endeavoured to deal with the question of route in as general terms and as concisely as the subject will admit, avoiding as much as possible technical details. I may state for your information that I came to the conclusions I have expressed from an inspection of the country, and from an examination of the plans, sections, and documents which were placed at my disposal. Amongst these was Mr. Climie's section, furnished to Mr. Gorringe, the Chairman of the Railway Association at Green Ponds; also the plans and sections of the Company's line, the section taken over Mr. Wylie's line, and the plans, sections, and report of Messrs. Doyne, Major, & Willett.

I have made comparative estimates from these sections; I have also had the advantage of examining a plan and section of the Main Road between Bridgewater and Spring Hill which were prepared some years ago by Mr. Innes, one of the Government Surveyors.

I personally inspected the line of Mr. Climie's Section between Bridgewater and Spring Hill. I was accompanied by Mr. John Bisdee, of Hutton Park, near Melton Mowbray, over Mr. Climie's Line from Woodlands to Spring Hill, and by Mr. Gorringe, Warden of Green Ponds, from the latter place to Upper Bagdad. I afterwards went over the remainder of the Line and made a thorough examination of the north and south approaches to Constitution Hill, checked the heights of the chief points with aneroid barometer, and had section levels taken at two or three places by Mr. Frith, Government Inspector of Works, whose services were kindly placed at my disposal by the Honorable the Minister of Lands. I afterwards went over the Company's Line from Bridgewater to Antill Ponds, and examined it particularly with respect to the comparative merits of the several routes.

The very marked features of the country on and immediately surrounding the routes assist in removing any doubts there may be as to the best line to be selected.

In dealing with the question of routes I have not alluded to the gauge, which cannot affect the subject,—the adopted line being constructed on a three feet six inches (3' 6") gauge. All comparisons are founded upon the assumption that this gauge would have been used whatever line had been adopted.

With reference to your enquiry as to the quality and character of the works now completed and in course of construction, I may inform you that my report on this matter is based upon an inspection of such of the works as were visible, as I had no opportunity of examining the covered works. I went over the railway works from Hobart Town to Evandale Junction, and was accompanied in my inspection of the line for a great part of the way by the Contractors' Engineers in charge of the line.

Earthworks.—The earthworks were in a forward state at the date of my visit; the formation width of the excavations is fourteen feet, and that of the embankments not less than twelve feet six inches, and generally fourteen feet: this width of formation is quite sufficient. Such of the cuttings, &c. as were completed were as a rule fairly trimmed and finished.

Some of the embankments in the broken country near Flat Top Hill are placed on very precipitous side-lying bases. I am assured, however, by the Engineer that proper care has been taken to bench the natural surface before constructing the embankments: if this precaution has not been sufficiently attended to, the maintenance of this part of the Railway will be attended with great difficulty and cost.

Bridges.—The bridges with stone piers or foundations between Hobart Town and Ross appear to have been fairly and substantially built, as far as could be judged from external appearances. Some of them are well finished: amongst the latter I may mention that over the Risdon Road at New Town, and several between the River Jordan and Jerusalem, including those at Strathallern and Native Corners Creek at Campania, and over the Macquarie River near Ross.

With regard to the pile-bridges, the principal of these are over the Derwent, the Jordan, and the South Esk near Clarendon.

At the time of my visit these bridges were in progress of construction, but I had no opportunity of observing the test applied to the pile-driving. If, as I was informed, the piles are submitted to a blow from a monkey one ton weight, with a fall of fifteen feet, without moving five-eighths of an inch, it may be assumed that they are sufficient for the duty required of them.

The superstructure is sound and sufficient.

The material used for piles is chiefly messmate, *i.e.*, Stringy Bark: in Victoria this timber has been found to decay rapidly when in contact with the ground.

Tunnel.—The tunnel at Flat-topped Hill is driven through freestone, a very favourable material, easily worked, and at the same time, except in one or two short lengths, sound enough to stand without lining.

The tunnel was not sufficiently far advanced to enable me to judge whether this favourable formation will be found through its entire length; but I have no reason to doubt that it will be completed at a moderate cost, and be a fair piece of workmanship.

Some allusion has been made in evidence taken before a Committee of the House of Assembly as to the difficulty and danger of working the tunnel in the adopted route.

It is stated that, because the tunnel is at the top of a steep incline, the working of the line will be attended with difficulty and danger, as the brakes will not hold, and the driving-wheels of the locomotives will slip.

I do not think there is the slightest ground for any such apprehension: as a matter of fact, the tunnel at the Flat-topped Hill will be almost the soundest portion of the whole line: it is one of the very few places on the Line between Bridgewater and York Plains where the road is straight for so long a distance (forty-seven chains). Railway tunnels as a rule are at the top of gradients, as they are made to pierce summits, which are generally approached by long inclines.

Culverts.—Most of the culverts built of freestone were sound and substantial, and many of them between Hobart Town and Oatlands were of very good workmanship; but I must say that the culverts built of bluestone between Ross and Evandale were of the most inferior description, both as regards material and workmanship: these include culverts of all sizes, and seem to have been built by persons who were not tradesmen.

Some of the smaller culverts were finished with neat freestone fronts; but the walls and soles or inverts were of boulders in their natural state, without any attempt at setting in courses, and most of them without any appearance of mortar: in many culverts material consisting of clay without any lime was used in lieu of mortar.

Two of the large culverts near Evandale show symptoms of failure, although the ballast train had not been many weeks running over them.

I had no opportunity of judging of the foundations of the culverts, but many of them had evidently not been carried down to a sufficient depth to ensure them against scour.

There are some few log culverts which are built of young undressed timber, full of sap, and therefore must soon decay.

Fencing.—I observed four classes of fencing—posts and rails, posts, wires and top rails, posts and wires without top rail, and log fencing. The posts and rails are chiefly messmate timber.

The fencing is of a very variable character: some of it is substantial enough, but a great portion of it cannot be considered so even under the most lax specification.

It was incomplete; and I was informed by the Engineer that many portions of it which were erected by sub-contract had been condemned, and would be removed.

Ballast.—There is good bluestone ballast, although of rather large size, in the Queen's Domain near the Hobart Town terminus, and there is very excellent natural quartz gravel ballast used upon about two miles of the line near Cleveland; but with these exceptions there is no good ballast on the Railway.

In several places basaltic material, in all stages of decomposition, has been brought on the line for ballast, and in some places freestone, which will not bear exposure to the weather.

Excepting the quartz ballast near Cleveland, before alluded to, the line between the Corners Station and Evandale Junction is ballasted either with fine drift sand, or with material known as ironstone gravel, which, when wet and packed under sleepers, becomes tenacious mud.

The sand and ironstone gravel used between the Corners and Snake Banks is found in the side ditches of the line; and at some parts of this District the embankments are composed of sand and the ballast of ironstone gravel, while in other parts the embankments are of gravel and the ballast of sand.

The sand will be blown away in dry weather, and the so-called ironstone gravel will perish with wet,—it will therefore be necessary to find some other material.

There is an abundance of excellent quartz gravel, which has been used only at places where it could be cast out of its natural bed on to the line; but no attempt has been made to lead it to other parts, although there appears to be an inexhaustible supply at one or two places in the neighbourhood of the line.

Sleepers.—The sleepers upon the works are chiefly messmate, and appear to be of the size specified by the Contract.

There are some half round sleepers used on the line between Clarendon and Evandale which were cut out of young timber; these will soon decay, the sap-wood being left on them.

Permanent Way.—The permanent way was laid between Clarendon and Evandale at the date of my visit. The rails are of specified weight, but the platelaying did not seem carefully done.

It is essential to a good running road that the bearing on every sleeper should be equal; and therefore, as in this case, the mixture of half round with square sleepers is objectionable.

The rails were not laid in the curves so as to bring the joints opposite each other: this is also a matter of importance in laying a good road.

The rails are laid upright without the usual cant. I am informed, however, that this method of laying the rails has been adopted to suit the rolling stock which will be imported; but at present the imported rolling stock has the usual conical tyres, which must be altered to suit the rails as they are laid.

I was informed by the Resident Engineer at Perth that it is intended to use shifting rails leading into sidings in lieu of switches: the former are seldom used for anything but temporary purposes, and would not be permitted by the Inspecting Officers of the Railway Department of the Board of Trade to be used on a passenger line.

Level Crossings.—There are some level crossings of the main road which might well have been

avoided; they have been evidently adopted to avoid interference with private property: except with such an object there is no necessity for the two crossings on the road between O'Brien's Bridge and Austin's Ferry, and for two of the crossings north of Bridgewater.

I cannot see any reason whatever for the crossings of the public road at each end of the village of Tunbridge. I think the line should have been taken to the east of the town there, and thus avoided the main road altogether.

The Company have provided cattle guards at several of the level crossings; these are not nearly so safe as gates, and if used will be in contravention of the law.

Although I am compelled to report in unfavourable terms of many of the works, it should be borne in mind that they were incomplete when I visited them; and I think it fair to state that since leaving Tasmania I have received from Mr. Grant, the Company's Engineer, a letter to which he has permitted me to refer, and in which he states that he had condemned portions of the works, especially in the middle district, and some of the ballast.

I must say, however, that if he insists upon all the inferior work being removed or amended, his condemnation will extend nearly to all the culverts, to the ballast between Ross and Evandale, and to some other works.

Drainage and water provision.—With reference to the drainage works and water provision on the Company's Line, I believe that very many of the culverts are insufficient.

This insufficiency is very apparent at the culvert over Humphrey's Rivulet at O'Brien's Bridge. The levels of the line at that place are in my opinion too low, as the storm water had been over the line very shortly before I visited it.

There are some embankments south of Flat-topped Hill in which no opening is left for drainage; but the insufficiency of the culverts is most apparent between York Plains and Snake Banks.

A more serious matter, however, appears to be the inadequacy of the water provision at the crossings of the Macquarie and Elizabeth Rivers, and the South Esk at Clarendon.

The Resident Engineer in charge of the line at the Macquarie and Elizabeth Rivers informed me that he had made inquiries as to the height which the flood had reached in the Valley of the Macquarie opposite the Horton College, and that he had fixed the levels of the line above any traces of floods: he also informed me that he believed the highest known flood had occurred the season before the railway works were commenced in that district.

I have been furnished, however, with a section of the river during a flood which occurred in the year 1863; the section was taken by Mr. Jackson, an authorised Government Surveyor, who had lived in the neighbourhood of Ross for many years.

Mr. Jackson's levels show a sectional area of water of fifteen thousand superficial feet close to the site of the railway bridge, while the water-way provided by the bridge does not exceed six thousand superficial feet, so that, making every allowance for back and dead water, there does not seem to be anything approaching sufficient provision for the stream of the Macquarie during such a flood as was experienced in the year 1863; and as the railway embankment between the bridge and Ross is very little, if at all, above the level of floods of recent occurrence, the consequences of such a flood as took place in 1863 would be very disastrous to the works.

There does not appear to me to be adequate provision for floods in the Elizabeth River at Campbell Town.

When this river is in flood, the stream will strike against the Railway embankment at the north end of the bridge; and although the slope of the embankment is pitched, yet the pitching is not, in my opinion, of the substantial character necessary to protect the bank at that place.

With regard to the crossing of the South Esk River at Clarendon, I observed that the embankment at the south of the bridge has closed one or two of the principal anabranches of the river, which are filled during high floods; and I fear that when all the flood-water is forced into the main channel it will reach the level of the permanent way.

I have also to observe that there is no opening in any of these bridges wider than twenty feet span; and the timber and drift carried down the stream will be very likely to choke the water-way and cause serious mischief.

With respect to your enquiry as to the estimated cost of the Company's line when completed,

assuming the unfinished works to be equal in workmanship and material to those already completed, and basing the estimate upon prices for which the works might be let by contract, I have made an estimate of the different classes of work; and allowing five hundred pounds sterling per mile for rolling stock, and three hundred pounds sterling per mile for purchase of land, I consider that such a line as the Contractors are constructing would be completed for four thousand five hundred pounds sterling a mile, or in round numbers *five hundred and forty thousand pounds sterling* from Hobart Town to Evandale junction.

I have allowed very full prices, and have included the cost of permanent way, material, and stations.

I am unable to recommend that any steps be taken at present by the Government in relation to the Main Line Contract. I do not see that the Government can interfere in the matter of route, as full discretion is given in the contract to the Company's engineer to deviate in consequence of the "difficulty of construction;" and although all the works are not what may be termed substantial, even under the most lax specification, there are not sufficient grounds for interfering at this stage of the contract.

I would suggest that, as soon as the permanent way is laid, an engineer be sent to check the steeper gradients and sharper curves, to determine if they are within the specification; and at the same time to ascertain the condition of the works, and to submit the bridges and works to the test provided for in the contract, and to report as to whether the requirements of the Board of Trade are complied with.

Before the line can be opened for traffic there will no doubt be ample evidence by which to judge whether the conditions of the contract have been fulfilled; in the meantime, in my opinion, it would be highly inexpedient to take any responsibility from the shoulders of the Company.

With reference to the subject of the speed with which the traffic on the line may be worked, I have already stated that the number of the sharp curves and steep gradients, which have been adopted for the purpose of economy in construction will put it out of the power of the Company to run any train at or near the Contract rate of speed, viz., twenty-three miles an hour including stoppages.

The inferior quality of the ballast will prevent any but the most moderate speed, even on the more level and straight portions of the line.

I believe, however, if better ballast is provided, and the permanent way is carefully laid, with check rails on the sharper curves, an average of fifteen miles an hour may be obtained on the through journey, so long as the line is properly maintained.

The expectation of any higher speed can only end in disappointment.

Before closing this Report it may perhaps be convenient to epitomize the conclusions arrived at in it:—

1st. That no line which would fulfil the contract obligations as to speed could be constructed by Wylie's or any other route, *via* Upper Bagdad, Constitution Hill, Green Ponds, and Spring Hill, for one million pounds sterling; and therefore this route cannot be considered as reasonably practicable in the meaning of the contract between the Government and the Tasmanian Main Line Railway Company.

2nd. That the line selected by Mr. Climie could not be worked at the contract speed, or anything approaching it; that it is longer, and more costly per mile, than the Company's adopted line by Jerusalem, but that Mr. Climie's line would give quite as satisfactory results as can be obtained from the Company's line, and might have been constructed within the capital of the Company.

3rd. That any line which would give the results stipulated for in the contract, and which could be constructed within the capital of the Company, must traverse the Coal River Valley, and keep close to the route selected by Messrs. Doyne, Major, and Willett between Bridgewater and Antill Ponds.

4th. That the Company, while following the general direction of Mr. Doyne's line between Bridgewater and York Plains, have made such deviations, introducing an unnecessary number of sharp curves and steep gradients, as to completely sacrifice speed and efficiency in working to economy in present construction.

5th. That many of the works on the Company's line, especially between Oatlands and Evandale Junction, are of the most unsubstantial character.

6th. That the culverts on the Company's line are not sufficient, either in number or size, to provide for the drainage; and that the waterway at the Macquarie, the Elizabeth, and the South Esk Rivers is not sufficient.

7th. That, considering the class of work on the Company's line, the construction of the whole Railway from Hobart Town to Evandale would be undertaken by contract for the sum of five hundred and forty thousand pounds sterling, including rolling stock, stations, and purchase of land.

8th. That the Government have no power to interfere at the present stage; and until the time fixed for the completion of the works arrive it would be impolitic and inexpedient to do so, even if they had the power, as any interference would have the effect of relieving the Company from its contract obligations.

9th. That when the contract time for the completion of the works has arrived the Government should cause an examination of the line, with a view of ascertaining whether the contract conditions have been complied with.

10th. That it will be impossible to obtain the contract rate of speed on the Company's line; and that if an average of fifteen miles an hour is accomplished by passenger trains it will be necessary to provide better ballast, and to lay the permanent way in a more careful manner than the Company have hitherto done.

In conclusion, permit me to thank you for the assistance given by the Government in furnishing for my perusal the necessary plans and documents connected with this enquiry, and in affording me facilities for visiting and inspecting the several routes.

I have, &c.,
(Signed) W. H. GREENE.

To the Hon. Colonial Secretary.

Tasmania,
Colonial Secretary Office, 27th April, 1874.

SIR,

I HAVE the honor to acknowledge the receipt of your Report on the proposed routes and works of the Tasmanian Main Line Railway, for which I desire to return my best thanks.

I have now the pleasure to enclose a Draft on the Bank of New South Wales for the sum of One hundred and twenty-six Pounds Three Shillings and Sixpence, professional fees, &c. in connection with this work; and I shall feel obliged if you will forward a receipt for this amount at your earliest convenience.

I have, &c.,
(Signed) THOS. D. CHAPMAN.

W. H. GREENE, Esq., Resident Engineer,
Victorian Railways.

Kyneton, Victoria, 24th April, 1874.

MY DEAR SIR,

THE enclosed receipt is for a parcel containing the plans, &c. connected with the Tasmanian Main Line Railway.

I have, &c.,
(Signed) W. H. GREENE.

B. TRAVERS SOLLY, Esq., Assistant Colonial Secretary,
Hobart Town.

Tasmania,
Colonial Secretary's Office, Hobart Town, 4th May, 1874.

MY DEAR SIR,

I RECEIVED your note enclosing a receipt for a parcel containing plans connected with the Tasmanian Main Line Railway, addressed to the Honorable T. D. Chapman. The plans have reached us all safe by the *Southern Cross*.

I remain, &c.,
(Signed) B. TRAVERS SOLLY.

P.S.—Your report has been received, and is with the Ministry, who are on a visit to the northern portion of the Island.

(Signed) B. T. S.

W. H. GREENE, Esquire, Kyneton, Victoria.

Hobart Town, 11th May, 1874.

SIR,

I HAVE the honor to request that you will furnish me with a copy of Mr. Greene's report on the Tasmanian Main Line Railway as soon as you conveniently can after the report is received by the Government.

I think you will allow that my clients are entitled to see the report before it appears in the public prints.

I have, &c.,
(Signed) HENRY DOBSON.

The Hon. the Colonial Secretary.

Colonial Secretary's Office, 14th May, 1874.

SIR,

IN compliance with the request contained in your letter of the 11th instant, I have the honor to forward herewith a copy of Mr. Greene's report on the several routes proposed for the Main Line of Railway, and on the works as constructed.

This document has been printed solely for the information of the Executive Government and the Members of the Legislature; but I have much pleasure in recognising the claim of your clients to a copy.

I have, &c.,
(Signed) THOS. D. CHAPMAN.

HENRY DOBSON, *Esquire, Macquarie-street.*

Colonial Secretary's Office, 14th May, 1874.

SIR,

REFERRING to my letter of the 31st December last, in which I informed you that, in consequence of the conflicting nature of the evidence laid before the Government respecting the practicable character of the route for the Main Line Railway known as "Wylie's route," the Government had engaged a competent Engineer to inspect that route, and to report to them, I have the honor to acquaint you that Mr. Greene, an Engineer of recognised ability, now engaged upon railway works in the colony of Victoria, having carefully inspected the several proposed routes, including that by Jerusalem, has forwarded his report upon this subject, embracing his observations upon the works now in progress of construction, and I beg to forward herewith a copy for your perusal and consideration.

I have, &c.,
(Signed) THOS. D. CHAPMAN.

C. H. GRANT, *Esquire, Engineer-in-Chief,
Main Line Railway Company.*

Colonial Secretary's Office, 14th May, 1874.

SIR,

IN compliance with my promise, I have the honor to forward herewith a copy of Mr. Greene's report on the several routes proposed for the Main Line of Railway, and on the works as constructed.

This document has been printed solely for the information of the Executive Government and the Members of the Legislature; but I have much pleasure in recognising your claim to a copy.

I have, &c.,
(Signed) THOS. D. CHAPMAN.

THOS. GORRINGE, *Esquire, Wilderness, Green Ponds.*

Wilderness, Green Ponds, 15th May, 1874.

SIR,

I HAVE the honor to acknowledge the receipt of your letter of the 14th May, enclosing Mr. Greene's printed report on the Main Line Railway.

I beg to offer my best thanks to the Government for the courtesy shown me as Chairman of the Railway Association.

I have, &c.,
(Signed) THOS. GORRINGE.

The Hon. the Colonial Secretary.

*Tasmanian Main Line Railway Company, Limited, Engineer's Office,
Hobart Town, Tasmania, 15th May, 1874.*

SIR,

I HAVE the honor to acknowledge your letter of the 14th instant, in which you inform me that, in consequence of the conflicting evidence respecting the practicable character of the route for the Main Line Railway known as "Wylie's," the Government had engaged Mr. Greene (an Engineer of the Victorian Railways) to examine and report upon the several proposed routes, and upon the works of construction of the adopted line.

You also enclose a copy of the report made by Mr. Greene, and desire that it should have my consideration.

In reply, I have the honor to forward herewith a letter which I had written you on seeing a copy of this report in the hands of Mr. Dobson a few hours since, and which I trust you will find to fully and satisfactorily answer all the objections made by Mr. Greene to the proceedings of the Company.

I had not troubled you with any reply to Mr. Zeal's Report to Mr. Gorringe on the question of route, not being required by you to do so; and I now think that Mr. Greene's treatment of this subject, supported by the preceding opinions of *so many unbiassed and competent Engineers*, and with only two *specially retained* advocates in its favour, must convince any reasoning partizan of the Main Road route that it is not a desirable one for the country.

I have no objection to urge against the appointment of Mr. Greene to inspect the works of the Railway, but should again remind you that Mr. Greene's experience is wholly of works of an entirely different character and cost, and executed under very different financial circumstances; for which a due allowance should be made in considering his strictures and observations.

I have, &c.,

(Signed) CHARLES H. GRANT, *Engineer.*

The Hon. T. D. CHAPMAN, M.L.C., Colonial Secretary.

*Tasmanian Main Line Railway, Engineer's Office,
Hobart Town, 15th May, 1874.*

SIR,

I HAVE the honor to acknowledge the receipt, through Mr. Dobson, of a copy of the report made to you by Mr. W. H. Greene, C.E., on the route and works of the Main Line Railway; and beg permission to be allowed to trouble you with a short reply to his strictures on the system of construction and the materials used.

It is unnecessary for me to remark on the question of route, because on this subject Mr. Greene emphatically endorses the statements I have previously had the honor to make to the Government of the time, and more especially the information given in my letters to you of the 28th August and 24th December last, with the accompanying section of the alternative routes. I must, however, take exception to his remarks that a tabulation of the steep gradients between Bridgewater and York Plains on the line proposed by Mr. D. Climie, and on that constructed, does not give a much greater difference than 14 per cent. in favour of the latter; or that this per-centage at all represents the comparative superiority of the selected route, which has its gradients in short alternating lengths in place of long continuous inclines. When, therefore, Mr. Greene states that—putting aside the question of cost—the line proposed by Mr. Climie would give as satisfactory results as that adopted, I can only assume that his great distrust of curves has biassed his judgment in respect to gradients, which have hitherto been considered the cardinal feature in a Railway.

I can well understand that an Engineer whose experience has been almost wholly of first-class lines, of unusually broad gauge, and with rolling stock not in the least adapted to traversing even ordinary curves, should view with abhorrence such curves as were contemplated in the contract between the Government and the Main Line Railway Company, or otherwise I feel sure he would state in our favour that whereas the contract was based on an allowance of curves of four chains radius, the use of which in some parts would have saved considerable cost, we have excised all such from our plans, and there is not now a curve of less than five chains radius throughout the whole line.

The modern construction of "light" or "narrow gauge" railways is based essentially upon the use of sharp curves, by which means to avoid obstacles, either physical or economical, and to follow the surface of the ground; the rolling stock is specially designed for such a railway, and provided with the necessary and costly extra mechanical appliances for properly traversing it.

The rolling stock now *en route* for this line will speedily run round curves of less than three chains radius; and the locomotive engines are guaranteed by the manufacturers to work easily round reverse curves of four chains radius, and to run at a speed of 40 miles per hour when required.

I have, therefore, no doubt that the contract speed (extremely and unprecedentedly high as it is for the working speed of any narrow gauge railway hitherto constructed) will be satisfactorily obtained, notwithstanding the curves that are objected to, and which engineers of more varied experience regard as of minor consideration.

On this subject I would further observe, that although some sharp curves on the constructed line might, as asserted, have been omitted, they would, under the specification to the contract, have been replaced by high and very costly, but perishable wood structures; which in annual repairs and renewal would entail great expense, and involve considerable risk of accident in working the line. Under such circumstances I prefer solid banks, although necessitating the use of easily traversed but sharp curves.

Mr. Greene appears to base his remarks upon the assumption that a sum of one million pounds sterling is available for the cash cost of construction of the line, independently of the necessary capital for furnishing and working it, and the large expense attendant upon the amount being raised through the medium of a public company; but I need not remind you that such is not the position of the matter as between the Government and the Company, and that the contract between them was virtually based on the understanding that a sum of £650,000 would cover expenses of every kind, of which, as you are aware, £25,000 was paid away for preliminary expenses, and £48,750 as discount on the bonds issued, before the Company commenced operations; and this independently of the great expense of forming the Company, providing extra interest during construction, direction and engineering expenses, &c., &c., &c. Had not therefore the Company made provision for a much larger capital than was contemplated, the line could not have been completed, even on Mr. Greene's estimate of its cost. This however must prove wholly fallacious, and his figures could only have been arrived at by his considering and estimating the large amount of work remaining to be done as of a much inferior character in every respect to that I am adopting. But even on this supposition, I am utterly unable to account for the great error he has made in estimating the cost of the line.

Mr. Greene considers that the exact line surveyed by Messrs. Doyne, Major, and Willett for the Government should have been adopted, but does not seem to be aware of the fact that this survey was put aside in the negotiation of the contract, because of the great cost it was known to involve, which could not reasonably be estimated at less than one and a quarter million pounds sterling, and which the Government refused to entertain. The Company therefore experience great disappointment and loss in being obliged to revert to this line so nearly as they have done.

Mr. Greene failed to perceive that the most objectionable curves are necessitated by the substitution of a continuous moderate incline for the reversing stations proposed by Messrs. Doyne & Co., which every impartial engineer must consider a vast improvement for the whole line.

It would be absurd to contend that even the most experienced and talented of engineers could rapidly pass over a line only partially constructed, and at once—without communication with the engineer—divine the proper waterway for bridges and culverts, and the style in which the works, stations, &c. will be finished, with the consequent cost; and I have previously and strongly protested against such reports as being wholly unreliable, and only calculated to mislead in every particular.

Many works that may appear objectionable are purely temporary, and put in only to facilitate the construction of the works; and those found deficient in size, workmanship, and quality would certainly be corrected before the line is opened for traffic, when alone a railway can be fully reported upon.

On this account it would be unreasonable to severely criticise Mr. Greene's report, made after a very short flying visit, and without communication with myself, who alone could explain what the short time at his disposal did not allow him to fully examine and comprehend. He was placed in a very difficult position, and so imperfectly informed on many points in which he has erred, that I will only ask that his remarks may not be taken as *ex cathedra*, and briefly reply to such of them as I consider need correction.

Culverts.

Those between north of Ross and Evandale are objected to because made of ironstone, which is the only building material that can be obtained in or near that part of the country. Though strongly built they are of rough appearance, and similar in every respect to those on the Launceston and Western Railway. Should any show signs of weakness (which I do not anticipate), they will be replaced with freestone or brick culverts, made from material conveyed along the line as it reaches these localities, but which could not be otherwise transported. Any culverts that we could leave unfinished on this portion have been, or will be, constructed with glazed earthenware pipes or brick walls and arches. We might have used timber culverts over this portion, but I much prefer what

we have. There are very few built without mortar, and these only in a short midland district; but nothing is more usual in railway construction than dry stone culverts in shallow banks. Under any circumstances these small and unimportant structures in our light banks are scarcely worth remarking upon, since they can be removed, enlarged, or repaired at any time while the line is running, and at very small cost. The culverts are mostly of excellent quality, and as regards those made of timber Mr. Greene was misled by some small outside pieces, for they are built of very large square logs, and placed in shallow banks. I never before knew timber culverts made so strong, or of such durable material; and in the position used I consider them unobjectionable.

Fencing.

I had extreme difficulty with the Sub-Contractors at first to get them to supply good material of the specification dimensions, and to properly erect it, but through most rigid inspection, and wholesale condemnation, an excellent fence is being everywhere supplied. I have before me the specification for railway fences in New South Wales, Queensland, and South Australia, which provide for a two or three rail sapling fence, made from timber growing adjacent to the line; and the fencing used in New Zealand is of a similar character. I believe that our fence is throughout far superior to most of that used on the Victorian Railways, and is certainly better than the average fence of this country. It, however, requires the closest attention and supervision to secure that. Most of those landowners along the line, who erect the railway fence through their own property by sub-contract, supply it of anything approaching the quality they bargained for.

Ballast.

I have long heard of the Victorian Railway ballast, and of the almost fabulous cost at which it was procured, and, therefore, was prepared for the objection Mr. Greene makes to everything that is not broken blue metal and sharp quartz gravel,—but out of Victoria these objections do not apply; and the invariable custom is to use such suitable materials as can be obtained within a reasonable distance, more especially for bottom ballast, which Mr. Greene alone saw. Even most important English lines were all opened and worked for years with such ballast as burnt clay, soft chalk, loam, and fine sand, compared with either of which I think that our basaltic rock (all so hard as to require quarrying with powder, and most costly to get) is really a first-class bottom ballast. Wherever gravel was procurable, at any cost, I have preferred to make use of it; and many miles of line have been thus ballasted since Mr. Greene's visit. The really important top ballast will be of gravel so long as it can possibly be obtained within 15 or 20 miles distance; but we can scarcely supply the whole line from Cleveland and complete it within (thrice) the contract time.

So far from there being any economy in the Contractors carting bottom ballast (as they have done for the sake of expedition in completing the line), it has certainly cost them three times as much as had they waited to load it in railway trucks, as suggested; but then the question remains as to where it is to come from, as we shall use up all the gravel that can be obtained.

Any bottom ballast showing symptoms of decay has been immediately removed, and none such will be allowed to remain. Notwithstanding the great difficulty and cost of procuring ballast at this end of the railway, I venture to assert that the line when completed will be better ballasted than any existing narrow gauge line, and with as good average material as can be found in these Colonies. It would be advantageous to the Government to run ballast from our line to the Launceston and Western Railway.

Sleepers.

Those objected to have borne the condemned mark from the first, and will all be removed, and improved ones substituted before the line is used for traffic; but it would be useless and unwise to do this at present.

Permanent Way.

The line was only roughly laid on bottom ballast when inspected by Mr. Greene, and has since been lifted, straightened, and put in good order. Before handed over to the Company it will be made as perfect as usual; while, for the present, we only require a "fair running top." I feel surprised that Mr. Greene should have remarked unfavourably on what was quite in proper condition under the circumstances.

Level Crossings.

I should have thought that the propriety of crossing the Main Road beyond O'Brien's Bridge must have been obvious on a most cursory inspection. Messrs. Doyne & Co. proposed the same crossing, but on a very inferior line in every respect to that we have secured. With regard to the other crossings mentioned, they were only determined on after careful surveys, and are decidedly expedient for many important reasons, which Mr. Greene would be unaware of on a rough glance over the country.

Draining and Water Provision.

In this matter I entirely dissent from Mr. Greene, and have had the advantage of gauging the various streams in wet weather, and of noticing that our culvert area is generally enormously in excess of the actual requirements. Our engineers had the very favourable opportunity of studying this question during the almost unprecedented floods that occurred after their arrival here in June, 1872.

As regards the Humphrey's Rivulet, Mr. Greene refers to the flood at the time of the land slip, which must have reached the line however constructed, and at any level. Were the storm waters to reach as high as the bridge, the stream would take an entirely different direction, and flood all the neighbouring land.

I know of no embankment south of Flat-topped Hill where water could collect on the upper side, nor of any important insufficiency of culverts between York Plains and Snake Banks.

The waterway of the Macquarie River Bridge has received much consideration; for it is extremely difficult to ascertain how much of the watercourse in extreme floods is a running stream, and how much is formed of eddies or back water.

The formation level of the Railway between the Railway bridge and Ross (2 miles) was regulated in height to 2 feet above the marks left by the flood of 1872, and this within a month of its subsidence. The entirely exceptional flood of 1863, caused by the bursting of Tooms' Lake, was, in all cases of comparison, found to have risen less than 12 inches above that of 1872.

The smallest head of water on the upper side of the bridge will (on account of the large area of waterway) enormously increase the discharge between the piers; and I feel confident that no such flood as has hitherto occurred would seriously damage the railway bridge or banks.

The waterway of the Campbell Town Railway bridge is 13 feet in excess of the road bridge immediately below it, and which has hitherto readily passed all storm waters. Mr. Greene was probably not aware of the very heavy angular stone pitching to the bank he mentions; which is four times the thickness of the vertical boulder wall, built parallel to it, that has hitherto withstood the most severe floods.

I paid particular attention to the waterway of the South Esk River bridge, and since the time of Mr. Greene's inspection have taken all necessary precautions to protect the bank across the back-water and stream channel; and to prevent drift being caught by the piers of the bridge, which is of such great length that I have no apprehension of its sufficiency to pass the most extreme floods.

The whole waters of the South Esk and Macquarie River bridges, which at the railway crossings have a waterway 1520 feet wide, are afterwards joined by the Meander, Lake, Elizabeth, and Isis Rivers, and many smaller streams, draining a vast extent of country; and the combined volume passes through the cataract bridge at Launceston of only 200 feet width of waterway.

Before the line is open for traffic there will, in all probability, be many occasions on which the three preceding bridges and all the culverts will be tested, and they will be carefully watched, and any weak points or deficiencies immediately rectified.

It should, in all fairness, be remembered that our light narrow-gauge railway has been reported upon by a Government Engineer only accustomed to the manipulation of comparatively unlimited funds, and to a most costly style of construction on the broad-gauge system. We, therefore, cannot reasonably expect that our puny efforts will escape his contempt and animadversion; and I am only surprised that his criticisms are not more general and severe. Doubtless, the whole railway appears to him a mere toy; but I feel confident that it will be found to give the inhabitants of Tasmania a perfectly easy, satisfactory, and economical mode of transport for both their persons and property, and will afford them no reason to desire the substitution of its large and costly rival. Even in the much vexed matter of excess speed they will have all that is desired, and the carriages will pass round the curves with as much facility and steadiness as on the straight running.

As regards the general character of the line, both in respect to the details of construction throughout, and the quality of material employed, I only desire that the Government would allow their Engineer to visit and inspect the narrow-gauge lines of New Zealand, Queensland, and Western Australia, which were constructed at a *much higher* cost than our capital will allow, and then to survey the (so called) cheap additions to the broad-gauge lines of Victoria and New South Wales. On his return he must honestly report that our little line will in all respects bear a most favourable comparison with the best of the others, and has been obtained for the country at no mean reduction of cost.

I have, &c.,

The Hon. the Colonial Secretary.

(Signed) CHARLES H. GRANT, *Engineer.*

Latrobe, 22nd May, 1874.

SIR,

I HAVE just seen Mr. Greene's Report on the Main Line Railway, and beg leave to make a few remarks on it, or you might be under the impression I had neglected some of the duties entailed on my inspections.

The Bridges Mr. Greene reports on their capacity for water-way,—

South Esk Bridge.—I consider the water-way quite sufficient. Had Mr. Greene gone about 30 chains higher up the river he would have seen the area occupied by the river in flood,—not more than one-half the capacity of the river arches of the Bridge. The land arches (about 36) in flood time are occupied by dead water, locked in by the high land 20 chains below the Bridge, forming a pool on the flat opposite Clarendon House.

Elizabeth River Bridge.—When this Bridge was commenced I examined the proposed in comparison with the old Bridge on the Main Road which has always been sufficient for the floods, and found the area of the water-ways greatly in excess of the old Bridge, with the further advantage of the capacity for discharge in the upper portion as great as in the lower part,—the old bridge being an arch, the higher the flood rises the less room through the arch for the excess of water. The slopes on the upper side of the Bridge approaches, now they are finished, are sufficiently protected from any damage by floods.

Macquarie Bridge.—Mr. Greene's Report states the capacity of this Bridge as insufficient. I think Mr. Greene is wrong here, and the information he received on the spot was not correctly given. Nine months ago I examined this river carefully for near two miles up, got all the verbal information I could, found some of the highest flood marks, and examined the *contour* of the ground down to the Bridge site, and came to the conclusion the water-way was sufficient, and still think so. The large area reported to Mr. Greene as being covered by the flood can only be for the greatest portion dead water,—the high land on the east side, sweeping round to where the Bridge is being built, forming a bay of still water, the stream forming but a portion of the water-way of the Bridge.

The culvert giving way near to Evandale I had not seen, as the engine had not on my inspection of it been over it,—it shows very little damage the last time I saw it.

The material used in the masonry of the culverts near to Campbell Town and the Corners is ironstone,—the only stone in the neighbourhood. The work I saw in progress was being built by good rough stonemasons, the face of the work is naturally rough but it is well put together.

The culverts being built without mortar, the inferior quality of the ballast and fencing, deficient water-ways about Ross and Campbell Town, I have in my several reports brought under your notice; the route did not come under my duties to report on; the curves and grades I could not report on till the road is laid in. When it is I shall, with my instruments, inspect and test each curve and grade, and shall then report on the matter.

I have taken the liberty to make these remarks for my own credit sake, that I have not neglected the duties you have entrusted to me. I have had to be careful in my reports not to report anything unnecessary, or to appear litigious against the Company; at the same time keeping you advised of anything against the spirit of the Contract, and myself ready to answer at the completion of the works anything Government may have against the Company.

I have, &c.,

(Signed) JOHN R. FRITH, *Inspecting Engineer.*

The Director of Public Works.

FORWARDED to the Honorable the Colonial Secretary.

WM. MOORE.
26th May, 1874.

Wilderness, Green Ponds, 1st June, 1874.

SIR,

I HAVE the honor to forward to you, for the information of the Government, Mr. Zeal's remarks upon Mr. Greene's Report on the Main Line Railway.

I have, &c.,

(Signed) THOMAS GORRINGE.

The Hon. the Colonial Secretary.

Melbourne Bank Chambers, Queen-street, 28th May, 1874.

SIR,

SINCE furnishing you with my report on Mr. D. Climie's survey of Mr. Wylie's route for the Main Line of Railway between Hobart Town and Launceston, I have read Mr. Greene's Report on that line, which I am gratified to perceive admits the practicability of Wylie's route. There are, however, some deductions made by Mr. Greene, from facts furnished to him, which I feel bound to call your attention to; as favourable circumstances appear to me to have escaped Mr. Greene's notice, or have not received that full consideration to which they are entitled.

Mr. Greene says he has "tabulated the steepest gradients on each route," i.e., Climie's and the adopted line, and he finds "there is a difference of at least fourteen per cent. in favour of the Company's line." This is not a fair inference to draw from the facts, as I will endeavour to show. Climie's survey crosses two high summit levels, viz., Constitution Hill and Spring Hill,—these summits are approached on either side by necessarily steep gradients. It must be borne in mind, when these elevations have been surmounted the line *descends* in corresponding ratio to its previous ascent; the descending gradients are therefore accelerating gradients, as contradistinguished to the retarding inclines on the opposite sides of these hills; they can be worked without steam power and at great speeds. As I pointed out in my former report, the time lost in ascending these hills will be partially regained on the descent therefrom. For example:—From Hobart Town towards Launceston the descending grades from Constitution and Spring Hills measure respectively four miles sixty chains (4 m. 60 c.), and two miles sixty chains (2 m. 60 c.), as against the incline on the Company's line from Jerusalem to Feathertop, and which has not a proportionate fall to the north. Therefore, to institute a comparison of the merits of the two lines, due weight must be given to the seven and a half miles (7 m. 40 c.) of accelerating gradients on Climie's line, which it will be seen materially affects Mr. Greene's deductions.

As this to an unprofessional man may not be as clearly explained as I could wish, I give a familiar illustration:—If these accelerating and retarding gradients are treated like a banker would his balance sheet, they will be resolved into the designation of liabilities and assets,—the retarding grade being the liability the locomotive would have to encounter, whilst the accelerating gradient would be its working asset. Therefore to add these essentially different grades together, and make them all negative quantities, would be as unreliable a proceeding as would the banker's adding his assets and liabilities together and calling them assets. The one proceeding would be as ruinous to shareholders, as Mr. Greene's deductions are unfair to Mr. Climie's section.

Mr. Greene makes a slightly unfavourable comparison of Mr. Climie's section as contrasted with the Company's. Mr. Climie's survey, it must be borne in mind, was a flying, hurried one; whilst that of the Company is the result of a permanent, careful, costly survey.

Further.—On Climie's survey the sharpest curve proposed to be used is seven chains (7 ch.) radius, and that only for very short distances; whereas on the Company's line there are upwards of four miles (4 m.) of five chain (5 ch.) curves. Comment on this fact is quite superfluous. I fail likewise to discover what Mr. Greene means when he says Wylie's line is not "reasonably practicable," when he admits "*it would give as satisfactory results as the line now being constructed by the Company.*" If this be the case, I cannot see why Wylie's line is not "reasonably practicable," and the Company's line the reverse.

Since writing you in March last I have had some weeks for reconsidering my report, and I am unable to alter the conclusions I then arrived at, or to vary my opinion in any material degree.

I have, &c.,

(Signed) W. A. ZEAL.

THOMAS GORRINGE, Esq., Warden, Green Ponds, Tasmania.

Colonial Secretary's Office, 6th June, 1874.

SIR,

I HAVE the honor to acknowledge the receipt of your letter of the 1st instant, forwarding Mr. W. A. Zeal's communication of the 28th ultimo, respecting Mr. Greene's report on the Main Line Railway, for which I desire to return my thanks.

I have, &c.,

(Signed) THOS. D. CHAPMAN.

THOS. GORRINGE, Esquire, Green Ponds.

Wilderness, Green Ponds, 17th July, 1874.

SIR,

I HAVE the honor to forward you, for the information of the Government, Mr. Daniel Climie's reply to the statements of Messrs. Grant and Greene upon Mr. Wylie's line, as surveyed by him, from Bridgewater to York Plains; also an estimate of the cost of constructing a railway, &c. by the said route from a substantial firm in Victoria. I think this fact establishes most incontestably Mr. D. Climie's statement—that a railway by Mr. Wylie's line is practicable, and can be constructed within the capital of the Company. And provided the Government are satisfied with estimate

herewith sent, and take steps to compel the Main Line Railway Company to construct the line by this route, and in the event of their failing so to do, then provided also that the Government will give the parties who have made the estimate the preference to construct this portion of the Main Line Railway from Bridgewater to York Plains, in that case I, as Chairman of the Main Line Railway Association, guarantee that the firm referred to will enter into the necessary contract, and give sufficient security for the satisfactory performance thereof, at the cost stated in the estimate.

I have, &c.,

(Signed) THOS. GORRINGE, *Chairman.*

The Hon. the Colonial Secretary.

(Copy.)

*To the Chairman and Committee of the Railway Association,
Green Ponds, Tasmania.*

GENTLEMEN,

IN accordance with your request made previous to my leaving Tasmania, that I should submit to you an estimate from experienced railway contractors willing to undertake entire completion of the line and provision of rolling-stock from Bridgewater to York Plains, by the late Mr. Wylie's recommended route, I am happy to state that I have fortunately met with contractors who, from practical experience, are well acquainted, not only with the country, but also with the cost of labour and materials in Tasmania. Having in addition been provided with the section from which to make their calculations, their figures may be taken as thoroughly reliable.

Their estimate for the entire completion of a substantial 3 feet 6 inch gauge railway from Bridgewater to York Plains, by the late Mr. Wylie's recommended route, inclusive of stations, rolling-stock, and engineering, is four thousand four hundred and ninety pounds (£4490) per mile. This sum includes a price for all the ballast, stipulated to be of good hard material, broken to size used for first-class railways. The addition of ten per cent. to this sum for contingencies would still bring the estimate under five thousand pounds (£5000) per mile; but as I consider there has been provision made for everything I do not believe there would be any great portion of this item required.

The estimated rolling stock would be sufficient to work a traffic up to Thirty Pounds (£30) per mile per week,—the locomotives being of sufficient capacity to haul a load of 130 tons over any part of the line. Considering the substantial character of the work provided for in the estimate, and the efficient nature of the rolling stock, trains may be run at from thirty or even thirty-five miles an hour, exclusive of stoppages, with quite as much safety as the speed trains generally run upon lines of any gauge. Indeed, so far as concerns the grades and curves, a much higher speed might be obtained if the increased concussion were provided for by heavier rails.

I have paid very careful attention to the cost of steam-power required for working a line with gradients of 1 in 40 and curves of 5 chains radius, compared with gradients of 1 in 43 and curves of 10 chains radius; and, after particularly considering what Mr. Greene says about the great length of the distance between Bridgewater and York Plains by the adopted route being in sharp curves, which greatly increases the cost of maintenance, and immensely adds to the wear and tear of wheels and rails—thus causing more frequent renewals of the permanent way—I find, on working the question out by the usual formula, that a line by the Jerusalem route, with the described gradients and curves, must cost at least fifteen per cent. more for working, with maintenance and renewals, than the line by Mr. Wylie's route. Long trains on sharp curves cause as much resistance to motion as heavy gradients. Mr. Greene says the tunnel is one of the very few places between Bridgewater and York Plains where the road is straight for so long a distance as 47 chains. Necessarily, therefore, nearly the whole line between the two points named must not only be considered a heavy gradient; but, from the action of the wheels in crushing and grinding round the sharp curves for so great a length, the wear and tear must be excessive. In stating fifteen per cent. as the difference in cost of working a line by the two routes, I am therefore confident that I am within the mark.

I may here repeat what I have often told you, that, with time given me to make a correct survey and to take trial sections of various portions of the District, I could select a line by Mr. Wylie's route with no gradient steeper than 1 in 44, and, in the whole distance not more than $1\frac{1}{4}$ miles in curves of a shorter radius than 10 chains; and a substantial Railway could be constructed by the indicated route at a cost not exceeding appended estimate.

In proof of this, I wish to draw your attention to the Report of Mr. Zeal, whose name stands very high in these Colonies as a civil engineer of celebrity. That gentleman made a very careful and minute inspection of the track along which the levels were taken. He tested every gradient and curve which he considered it necessary to test; and this practical survey, coupled with his high professional reputation, entitles his opinion to pre-eminent consideration. What does Mr. Zeal say? In his Report, published in the *Mercury* of June 18th instant, he remarks:—

"Having now completed my description and contrast of Mr. Wylie's line with the line now constructing, I distinctly affirm that Wylie's route, as surveyed by Mr. D. Climie, is not only practicable, but, in the majority of instances, compares favourably with the adopted line. On Mr. Wylie's line the worst gradient is 1 in 43, with a short length of seven chain curves, which in all probability could be improved to ten chains radius; whereas on the Company's line the gradients are 1 in 40, with five chain curves. I also believe Wylie's is considerably shorter than the adopted line."

This is very plain speaking; but, on further reflection, Mr. Zeal, acting in the true interests of his profession, felt called upon to supplement and give even more distinct force to his remarks. After

furnishing his official Report, he addressed a letter to Thomas Gorringe, Esq., Warden of Green Ponds, in the course of which the following remarks occur:—

“Mr. Greene’s deductions are unfair to Mr. Climie’s section. Mr. Climie’s survey, it must be borne in mind, was a flying, hurried one; whilst that of the Company’s is the result of a permanent, careful, costly survey. Further, in Mr. Climie’s survey the sharpest curve proposed to be used is seven chains radius, others only for very short distances; whereas on the Company’s line there are upwards of four miles of 5 chain curves. Comment on this fact is quite superfluous. I fail, likewise, to discover what Mr. Greene means when he says ‘Wylie’s line is not reasonably practicable,’ when he admits it would give as satisfactory results as the line now being constructed by the Company. If this be the case, I cannot see why Wylie’s line is not ‘reasonably practicable,’ and the Company’s line the reverse. Since writing you last, I have had some weeks for reconsidering my Report, and I am unable to alter the conclusions I then arrived at, or to vary my opinion in any material degree.”

It will, I think, be conceded that this unqualified expression of opinion from a gentleman of Mr. Zeal’s eminence in his profession is more than calculated to counterbalance the hasty and rash assertions of Messrs. Greene and Grant, who have, besides, written from a professedly hostile point of view to Wylie’s line. I may here remark that I have never advanced any proposition on this subject which I have not substantiated. I stated that a line could be constructed by Constitution and Spring Hills without a tunnel. I also said that a better line could be got in that manner than by Jerusalem, at a cost of under five thousand pounds (£5000) per mile. Both statements were pooh-poohed in the most cavalier manner. I need scarcely say that I have been amply corroborated since by those who have investigated the matter.

In Mr. Greene’s report to the Colonial Secretary, although he takes infinite pains to condemn Mr. Wylie’s route, he brings no substantial proof to give weight to his assertions,—although it is a strict matter of professional etiquette for engineers to do so, when called upon for an expression of opinion on important matters such as this. I trust to supply this shortcoming, and to prove by facts and figures that his deductions are very erroneous. Take, for instance, his positive assertion that the line by Green Ponds could not be constructed for five thousand pounds (£5000) per mile, nor anything like that sum. I think I can show that this, in common with his other statements, has been made in the most reckless manner. He is incorrect in saying that the course of my line generally runs parallel with Mr. Wylie’s route, inasmuch as a considerable portion of it is identical with the latter. He admits that from Spring Hill to York Plains there are no engineering difficulties. Now it happens that a portion of this route of Mr. Wylie’s—from Oatlands to York Plains—is the very spot which Mr. Grant, in a letter to the Member for Oatlands, condemns as presenting features rendering it practically impossible to construct a railway through! This is a fair specimen of the consistency of these two gentlemen’s reports. Mr. Greene’s remarks respecting the curves and straight lines not being properly set out shows that his knowledge of the subject was superficial, for he was evidently unaware that the levels were only taken for a trial section. But, although the line was not set out and marked with a stake at the distance of every chain, I may state that the curves and straight lines were ranged out sufficiently near for me to ascertain that the levels were not taken round any curve of a shorter radius than seven chains, nor was more than, at the outside, a mile and a quarter of the whole line levelled round curves of so short a radius as ten chains. Curves necessary in other portions of the line vary from 10 to 80 chains radius; most of them, however, range from 15 to 30 chains radius; and a very considerable distance from Bridgewater to York Plains is straight.

Mr. Greene says, in a highly original manner, that tunnels are only objectionable on the ground of costliness. From many years’ experience and association with the most eminent British engineers, including the late Chief Engineer for the London and North Western Railway Company, I can unhesitatingly assert that the correct theory is to avoid tunnels whenever and wherever possible. Many open cuttings have been made on English Railway lines at far greater cost than tunnels would have been, owing to this fact, for tunnels are there regarded with abhorrence as intolerable nuisances.

In reply to Mr. Greene’s adverse remark,—that Mr. Wylie’s route is four miles longer than the adopted line,—I will simply draw your attention to Mr. Zeal’s opinion, previously quoted, and to the fact that Mr. Greene states that the Company have deviated from Messrs. Doyne’s plan, taking the line round the base of the hill, instituting sharp curves in place of tunnels and cuttings, thus giving a very inferior and certainly much longer line.

Mr. Greene—I think very wisely—suggests that the gradients and curves on the adopted line should be tested. As far as I recollect, the distance from Bridgewater to York Plains, by Messrs. Doyne’s plan, is 56 miles. As there is such a discrepancy between this plan and the length Mr. Greene mentions, it would certainly be advisable to include *distance* in the testing.

Mr. Greene is all abroad in his measurements. He is many feet out in the height of Spring Hill above Green Ponds; his highest altitude of the adopted line above the sea level is only 1394 feet, leading people to imagine that is the highest point by the Company’s line, whereas between Bridgewater and York Plains (if the documents supplied to Mr. Greene were correct) the line rises fully 200 feet higher. To say the least of it, this has not a very ingenuous appearance, particularly when it is remembered that Mr. Greene has placed a fancy crest to Spring Hill many feet higher than it is in reality above Green Ponds. To this palpable miscalculation is to be attributed his gross mistakes in tabulating the gradients. It is also possible that he has added the descending to the ascending gradients. I can conceive no other solution of such a manifest error. I wish it to be distinctly understood that I do not disagree with Mr. Greene from any hostile feeling, but I assert that, from the want of sufficient investigation, or the too ready credence given by him to unreliable information, he has allowed his judgment to be biassed.

The stern logic of figures is against the assertion that the gradients on the adopted line are shorter than by Mr. Wylie’s route. A tracing in my possession of the Company’s working section shows the gradients for about four miles from the south end of the tunnel. It gives a continuous ascending gradient

up to the south end of the tunnel of 1 in 40 for a length of 2 miles 53 chains, except a short bit of about 25 chains on a gradient of 1 in 45 $\frac{1}{2}$. The same gradient continuing throughout the tunnel, 49 chains on 1 in 40 gives a continuous incline of 1 in 40 for a distance of 3 miles 12 chains, except the small portion just referred to. This is much longer than any gradient by Mr. Wylie's route. Bearing in mind the well-known mechanical laws which govern the power of locomotives—laws which can be readily found in the most common text-books of mechanics—it is unaccountable to me how Mr. Greene can have fallen into his self-evident egregious mistakes respecting gradients.

Mr. Greene has avoided all allusion to the difference in the wear and tear by the two routes. I consider it a matter that should not be overlooked, from the number of miles of very steep gradients formed on sharp curves by the adopted line. The cause of the great deterioration of wheels and rails on lines of this description chiefly arises from the difference between the length of the outer and inner rails on curves. Therefore on curves of 5 chains radius, of which there are many miles, the injury to both rails and rolling stock must be much greater than on curves of 7 chains radius. The wheels of all rolling stock used on railways being tightly keyed on to the axles, consequently both wheels must revolve at the same velocity; and if we suppose the outer rail a foot longer than the inner rail in the distance of a chain, there is only one way known by which the outer wheel can keep square with the inner one,—which is by the outer wheel sliding forward and the inner wheel sliding back: before this sliding can take place the flanges of the wheels are pressed with enormous force against the outer rail, thus grinding the flanges to sharp edges, and the treads into hollows, which clip the rails and shake them loose from the sleepers. From the sliding of the wheels on the rails under such heavy pressure the laminæ separate and the metal is destroyed. This crushing and grinding iron into powder is done at a great expense of steam power. There would be wear and tear by Mr. Wylie's route from the same cause, but certainly not *one-fourth* as much, there being only a comparatively short length of the line in curves of even so short a radius as 10 chains. It will thus be seen that the shorter the radius the greater the difference in the length between the outer and inner rail, hence the greater the distance the wheels would have to slip, consequently the increased wear and tear. And when it is taken into consideration that nearly the whole of the adopted line between Bridgewater and York Plains is in sharp curves, it may be a question whether the cost of maintenance and renewals, with the additional steam power required, would not exceed the receipts from the traffic. It would also require a locomotive of 28 horse power more to take a gross load of 130 tons at a speed of 10 miles an hour up the adopted line than by Mr. Wylie's, independent of the tunnel. I may observe that a locomotive can take a heavier load up a gradient of 1 in 35 in a straight road, than the same locomotive can take up a gradient of 1 in 40 on a curve of 5 chains radius: my estimate provides that no gradient shall be steeper than 1 in 43, and only a short distance in curves of so short a radius as 7 chains. It has been proved beyond all question that the limit of the load which a locomotive can haul up an incline is in proportion to the amount of adhesion allowed for the *steepness* of the gradient and the condition of the rails. And it is well known that it is the *steepest* gradient upon a railway that governs the weight of a train which is to be drawn along that railway for its whole length. With these established facts, which I should have thought were familiar to every engineer, it is unaccountable to me how Mr. Greene could have found 14 per cent. in favour of the gradients by the adopted line, unless for the reasons before given.

Mr. Greene considers Messrs. Doyne's proposed route by way of Jerusalem the best yet suggested. He seems here to go out of his way to cast a reflection on the memory of the late Mr. Wylie. It will be only necessary to instance a few of the expensive and objectionable propositions of Messrs. Doyne's, to show the superiority of Mr. Wylie's skill as an engineer in selecting the route he chose after careful deliberation.

From Bridgewater northwards, within a distance of 15 miles, Messrs. Doyne proposed to construct no less than seven tunnels; and between Bridgewater and York Plains, fifteen or sixteen open cuttings, each about sixty feet in depth—one, if not more, of these deep cuttings over a mile in length. It was also proposed to have a part of this route on what is known as the zig-zag system,—a system never adopted by any engineer to get over a difficulty until driven to his last shift, and a practical failure as abundantly proved on the Sydney Blue Mountain line. And notwithstanding these heavy and objectionable works, a great number of miles of steep gradients were to be used.

I think you will agree with me that these indisputable facts ought to carry more weight than bare assertions; and should be convincing proof of Mr. Wylie's superiority as a railway engineer. Although Mr. Wylie was only known to me by name and reputation, I consider I am fully justified in all I have said, as I believe he possessed in an eminent degree all the attributes necessary to constitute an engineer in the true sense of the word, which (according to Mr. Stevenson and other high class engineers) embraces the gift of invention, and capability of not only recommending but advising how the greatest amount of work can be carried out in an efficient manner for the benefit of mankind at the least cost. Notwithstanding these are a few of the qualifications which it is generally admitted should be possessed by engineers in Europe, they appear to be ignored to a lamentable degree on this side of the Equator.

As Mr. Greene has referred to the evidence given before the Select Committee respecting the difficulty and danger of working a tunnel on a steep gradient situated on the top of a long steep incline, and having given a directly opposite opinion in his report to that evidence, it is necessary for me to make a few remarks, more particularly on the only proof he has advanced to bear out what he has said on the subject; viz., "Railway tunnels as a rule are at the top of gradients." In giving this proof Mr. Greene has not been candid. A tunnel may be at the top of a gradient of 1 in 1000, or it may be 1 in 10,000; but I venture to affirm that neither Mr. Greene nor anyone else can point to any tunnel ever having been constructed on the top of a gradient of 1 in 40, with the tunnel on the same gradient (1 in 40), on a railway for the conveyance of passengers, and worked with a locomotive. This is a very disingenuous way of attempting to prove his case.

As to there being no apprehension of the wheels slipping on such a tunnel, I know that where it has been tried to work a locomotive in a tunnel on a gradient of 1 in 48, it was found impossible to do so, although every contrivance that could be thought of by the most eminent civil and mechanical engineers was tried. And it is a fact that this tunnel still continues to be worked with a stationary engine. There is another novelty about this tunnel which Mr. Greene has not alluded to; viz., the size. I have before me the dimensions of a great many tunnels, a few of which I will name, that you may be able to compare and form a correct opinion on this part of the adopted route, which has called forth such eulogiums from Mr. Greene.

DIMENSIONS of Tunnels on different Railways in England and France.

	Wide.	High.
The London and North Western	27 ft. 0 in.	23 ft. 6 in.
The Great Western	35 ft. 0 in.	29 ft. 0 in.
The Manchester and Leeds	27 ft. 0 in.	24 ft. 0 in.
The Paris and Lyons	26 ft. 3 in.	26 ft. 3 in.
The Rouen	25 ft. 0 in.	25 ft. 0 in.

And the largest of these tunnels has circular air shafts twenty-five feet in diameter.

These dimensions give the average size of about 700 square feet of sectional area. Whereas the tunnel under consideration is not more than one-fourth of this size, if my information be correct. The tunnel being on a gradient of 1 in 40, the locomotive in taking a load up this steep incline will have to be worked up to the maximum of its power; consequently it would emit at least double the quantity of steam and smoke than if the tunnel were on the level. And again, a locomotive would be three times longer hauling a train up a gradient of 1 in 40 than it would on the level. It may therefore be fairly assumed there would be six times as much steam and smoke condensed into a space of only one-fourth the size of an ordinary tunnel, (is it possible this can be about the best part of the line?) It is really almost like a libel on tunnels to call such a small aperture through a hill a *tunnel*, it being more comparable to the dimensions of an ordinary sewer. It might be asked if such an objectionable work had been necessary on the route recommended by Mr. Wylie, whether Mr. Greene would not have considered himself fully justified in condemning the route from that circumstance alone.

Mr. Greene has certainly given a very decided opinion respecting the power of the Government to interfere with the contractors until the completion of the contract. As this seems to me more a legal than an engineering question, I could not presume to give an opinion, beyond saying that it appears to me contrary to common sense that your Government should be compelled to pay interest on the cost of constructing a railway by a different route, and one altogether inferior to the one they contracted for.

With respect to the first clause in the schedule to which Mr. Greene has referred, and as far as I understand his report, he quite confirms the practicability of Mr. Wylie's route; for he says, "it would give quite as satisfactory results as the Company's line, and might have been constructed within the capital of the Company." This is in reality all the public were led to believe was needed to settle the question. With respect to the power given in this first clause to "alter or vary the route." Now *the* route could only refer to a defined and contracted route, and the one for which the Act was obtained; therefore, could not possibly mean a new route fourteen or fifteen miles distant in quite another direction, and which Mr. Greene's report sufficiently proves to have been neither necessary nor advantageous. Again, the power given to alter or vary is to be governed by certain conditions. The first being "exigencies of construction." It has been proved by everyone who has taken the trouble to carefully examine both routes, that there was no "exigency" whatever for the line to be altered beyond reasonable limits: and next comes "difficulties of route." You have not only my often expressed opinion, but also that of Mr. Zeal who carefully examined both routes, that the difficulties to be overcome to construct a railway are much greater by the adopted line than by Green Ponds. And those opinions are fully borne out by the estimate for a substantial railway from contractors of means and experience; and I am quite prepared to prove not only that the working expenses would be less, but that a higher rate of speed may be maintained with safety by Mr. Wylie's route than by Jerusalem.

The last condition named in the clause, and doubtless the most important to the Colony, is "the prospects of traffic." Mr. Greene has altogether avoided alluding to this, notwithstanding its importance, and its being a subject always commanding a primary consideration, when reporting on the comparative merits of different routes for railways. From the best information I could obtain during my stay in Tasmania, (from published documents as well as from gentlemen who have taken an interest in the statistics of the colony), there can be no question that the traffic for a railway by Green Ponds would be over twelve thousand pounds (£12,000) per annum greater than that by the Jerusalem route; and allowing 50 per cent. for working expenses, leaves six thousand pounds (£6000), which capitalized at 5 per cent. equals one hundred and twenty thousand pounds (£120,000) per annum; which sum would be the difference in the marketable value of a railway by the two routes referred to. Thus showing that if the Company intend to work the line, and that if it had been required, the Company would have been gainers to have expended one hundred and twenty thousand pounds (£120,000) more in the construction of a line by Green Ponds than upon a line by Jerusalem; particularly when the difference in the cost of working the two lines is considered. This difference of twelve thousand pounds (£12,000) per annum in the receipts from traffic between the two routes is rather less than four pounds ten shillings (£4 10s.) per mile per week. I therefore consider this sum very much within the mark, after allowing 50 per cent. for working expenses; whereas the difference for working this extra traffic would be very little beyond the cost of steam power, as the management, staff of employees, &c., would be about the same in both cases.

Some rather strong remarks having been made relating to the speed of twenty-three miles an hour as being unprecedentedly high for a narrow gauge line, I must observe that is not the case. Captain Tyler (the Government Inspector of railways in England), stated in his evidence before a commission appointed to enquire into the gauge question, that he had frequently travelled upon the locomotive on a line of only two feet gauge at a speed of thirty-five miles an hour; and he considered it would be quite safe at even a higher speed, although this line has curves of shorter radius than any that would be required in the route by Green Ponds. A fact from the highest authority on railway matters ought to be proof sufficient that I have not overstated the speed that trains may be run with safety on a 3ft. 6in. gauge line by Mr. Wylie's route.

Mr. Greene speaks of the number of unnecessary level crossings of the Main Road by the adopted route, in which I think every one will coincide.

I am authorised by the Contractors, whose estimate I enclose, to say that for the sum of three thousand Pounds (£3000) in addition to the gross amount for the whole line between Bridgewater and York Plains they will undertake to construct the railway on the east side of the Main Road from Bridgewater to Brighton, and thus do away with four dangerous level crossings on the adopted route, which occur within a distance of about two miles on the Main Road.

I scarcely think it worth while to render this necessarily long communication longer by referring at length to the absurd remarks made by Mr. Grant in his letter to the Colonial Secretary, dated December 24th, 1873, and published in the *Mercury* of May 29th, 1874. Although I am frequently alluded to in that letter in terms the reverse of flattering, Mr. Grant's pretensions to the opinion of an expert are so palpably shallow that it would be mere waste of time to discuss his letter at length. Speaking of Mr. Wylie's route, he produces an engineering difficulty of his own creation, thus commenting on the said route:—

"In grading his line he has not hesitated to show cuttings of two or three miles in continuous length, involving therefore a great length of time in execution, which (as also the character of his whole line) is entirely incompatible with the statement that it could all be completed in from eight to nine months."

Now, the only cutting of anything at all approaching this length on the whole line occurs between the north side of Spring Hill and Jericho, where the line follows the gentle slope of the ground between the Main Road and the stream. On referring to the section, I find this stupendous cutting—which it is said will involve such a great length of time in execution—averages only about two feet in depth, except in one place, seven chains in length, averages about four feet deep. In giving these depths I must inform you that all the excavation required is merely taking about two feet off the higher side of the line and throwing it to the lower. Indeed the work is very little more than simply forming the line for the ballast. You will also have observed this is the only cutting on the whole length of Mr. Wylie's route that Mr. Grant has referred to as an example of the absurdity of my statement that there were no works on the line by the route proposed by Mr. Wylie to prevent the line from being finished within a period of eight or nine months. It may, probably, rather astonish Mr. Grant when I say that this cutting, which was to prevent the completion of the line to some indefinite period, may be executed with a small gang of men in about *one* month; the excavation being nearly all (to speak in railway phraseology) pick and shovel work.

As this may really be looked upon as a fair specimen of the great upheaving of the hills and sinking of the valleys which Mr. Grant's letter would lead me to believe had taken place in your midst, it would, as I have said before, be folly to weary you with any more detail of the "difficulties" set forth in Mr. Grant's letter against Mr. Wylie's route, except to draw your attention to the fact that it was on this part of the line Mr. Greene reported he could see no difficulties, notwithstanding it must have been very apparent to everyone who read Mr. Greene's report that he was not favorable either to Mr. Wylie's route or to my section. Yet this formidable mountain of two feet in height had altogether escaped his notice.

I will trouble you with only one other item advanced against my section by Mr. Grant, which I think will be sufficient to convince anyone, not altogether blinded by prejudice, of the unscrupulous and reckless assertions that have been made relating to the "difficulties" shown on my section. When Mr. Grant was examined before the Select Committee on my section from Oatlands northwards, he pointed out that a tunnel of about 15 chains in length would be required to be made near the Oatlands Lagoon, at a place where I proposed a cutting; and evidence to that effect was accordingly taken down. As I had stated before the Committee that no tunnel would be necessary on any part of the line I had levelled, I was sent for and interrogated on my apparently untruthful evidence. I was taken by surprise at such an imputation, and wished to know on what part of the line this expensive work was wanted; on the section being produced, it turned out to be a bit of a hillock only 7 chains and 20 links in length, with an average depth of about 13 feet. How Mr. Grant contemplated making a tunnel of about 15 chains long in a cutting only 7 chains and 20 links in length I cannot say. I have frequently heard of people making "mountains of mole-hills," but I never before heard of such an engineering exploit. On Mr. Grant's next examination the section was laid before him, with the length and depth of the cutting figured upon it. I need scarcely mention that the evidence he had given previously relative to this matter was expunged. If I had not been in the Colony at the time, the probability is that his (Mr. Grant's) printed evidence would have contained full particulars of this expensive imaginary tunnel as some proof of the impracticability of the route.

If what I have narrated is taken as a specimen of the way "difficulties" have been magnified on Mr. Wylie's route, it will serve as *data* for you to calculate the allowance to make for any other exaggerated objections from the same quarter that may hereafter come to light adverse to the Railway being taken by Green Ponds.

Should a Railway similar to the one now being constructed by the Company by Jerusalem be considered sufficient for the Main Line, namely,—gradients 1 in 40 and curves 5 chains radius, with ballast and sleepers as used by the present Contractors, and referred to in Mr. Greene's Report,—I beg to say that a Railway of this character could be constructed by Mr. Wylie's route, and with sufficient rolling stock to work the traffic, for a sum considerably under Four thousand Pounds (£4000) per mile; and this line would, for light trains, be capable of sustaining a speed up to 15 or 16 miles an hour, provided good lime mortar were used in the construction of all masonry, and the rails laid in a proper manner:

I will only further add, I have not advanced anything on any of the different subjects I have referred to but what I believe can be proved as satisfactory as the cost which the line can be constructed for between Bridgewater and York Plains.

I have, &c.,
(Signed) DANL. CLIMIE.

South Yarra, 17th June, 1874.

(Copy.) June, 1874.

ESTIMATE of the Cost of constructing Railway according to the Section prepared by Mr. D. Climie, by Mr. Wylie's route from Bridgewater to York Plains, including Rolling Stock, Stations, and everything complete (except Land) for working the Traffic, in accordance with the conditions of the Contract as regards gauge, weight of rails, size of sleepers, &c.

ONE MILE—AVERAGE COST.

	£	s.	d.
Clearing			
Fencing			
Side Ditches			
Excavating			
Forming			
Bridges			
Viaducts			
Culverts			
Drains			
Gates and Cattle Guards			
Ballast			
Sleepers			
Rails			
Fish Plates, Bolts, and Spikes			
Carriage of Permanent Way materials			
Laying Permanent Way			
Rolling Stock			
Stations			
Engineering			
Contingencies, 10 per cent.....	£4490	0	0
	449	0	0
TOTAL.....	£4939	0	0

Colonial Secretary's Office, 21st July, 1874.

SIR,
I HAVE the honor to acknowledge the receipt of your letter of the 17th instant, forwarding for the information of the Government Mr. Daniel Climie's reply to the statements of Messrs. Grant and Greene upon Mr. Wylie's line as surveyed by him from Bridgewater to York Plains; also an estimate of the cost of constructing a Railway by the said route.

The papers connected with the subject of the Main Line Railway are now being printed for Parliament; and Mr. Climie's reply will be added to the correspondence before its issue to the Members of the Legislature.

I have, &c.,
(Signed) THOS. D. CHAPMAN.

THOS. GORRINGE, Esq., Chairman Main Line Railway Association,
Wilderness, Green Ponds.

Wilderness, Green Ponds, 20th July, 1874.

SIR,
I HAVE the honor to forward you Mr. W. A. Zeal's reply to Mr. Grant's statements that "in grading his (viz., Mr. D. Climie's) line he has not hesitated to show cuttings of two or three miles in continuous length;" Mr. Grant's letter to the Colonial Secretary, 24th Dec. 1873; also a Resolution adopted at a meeting of the Committee of the Main Line Railway Association.

I beg now to state that the Association have fulfilled the pledge given to the Government, viz., that they would have a survey of the late Mr. Wylie's route made by a competent Engineer, to prove its practicability or otherwise. Not only have they done this, but, to put the matter beyond dispute, they have employed a second eminent Engineer, W. A. Zeal, Esq., C.E., of Victoria, who confirms the truthfulness of the survey, whose report we have had the honor to lay before the Government, as well as that of Mr. D. Climie's—with what satisfactory results the reports and answers to the several objections made sufficiently show. There can be no doubt in any unprejudiced mind that Mr. Wylie's route is not only reasonably practicable, but that it is a better, cheaper, shorter, and a superior line in every sense than the adopted one; it is moreover the line contracted for.

I have, &c.,

(Signed) THOS. GORRINGE, *Chairman*.

The Hon. the Colonial Secretary.

[Copy of Mr. ZEAL's letter referred to *re* his Report.]

Melbourne, 15th July, 1874.

DEAR SIR,

THE Contractors who furnished Mr. Climie with an estimate for the construction of a Railway between Bridgewater and York Plains are ————. They, I need scarcely add, are in every way competent to carry out their promises.

I have seen in the papers some questions asked as to my experience in Railway making in the Colonies. I think it an opportune time to state that I have superintended the expenditure of upwards of four millions (£4,000,000) pounds of public money, principally on Victorian Railways; and I had the entire management of Cornish and Bruce's Contract between Melbourne and Sandhurst, the works of which speak for themselves.

Truly yours,

(Signed) W. A. ZEAL.

THOMAS GORRINGE, *Esq., Warden, Green Ponds.*

RESOLUTION.

"THAT the Chairman be requested to ask the Government whether they will undertake to have the Report forwarded on the 17th instant printed with all Reports and documents bearing on the Main Line Railway forwarded through this Association to the Government since last Session of Parliament, together with Mr. Greene's Report." (A copy of which was courteously forwarded to me as Chairman of the Association.)

Melbourne Bank Chambers, Queen-street, 8th July, 1874.

SIR,

IN reply to your enquiry of the 30th ultimo, I have to say that the statement you attribute to Mr. Grant, if made by that gentleman, "that (on Climie's section) his gradients show cuttings two or three miles in continuous length," is not in accordance with fact. Mr. Climie's section shows nothing of the kind,—there is no heavy cutting on the section more than a mile in length, and where the longest cuttings occur the earthworks are comparatively light. As I before pointed out, it is manifestly unfair to Mr. Climie to disparage his reputation by holding him to the precise letter of his scheme, or to the four corners of a plan and section prepared in a hurried manner for a Parliamentary committee. I have no doubt Mr. Climie could improve and shorten both plan and section if he were allowed to make a permanent contract survey of the country.

I submit with deference that the Government in dealing with the merits of the respective schemes for the Main Line of Railway should bear in view one broad fact,—that whatever Mr. Climie's plan and section may be—good or bad, straight or circuitous—Mr. Greene, the chosen referee of the Government, and a not too favourable judge of Mr. Climie's qualifications, has deliberately stated, after five months reflection, that Climie's route shows equally favourable results when contrasted with that of the Company,—even though the latter have spent large sums in preparing their survey; that survey, be it remembered, being based on information obtained from Mr. Doyne, whose scheme was for a substantial permanent line, capable of being worked at high speeds, which the Company's line never can be.

If this is so, and I fully confirm the foregoing opinion, what stronger evidence do the Government require as to the practicability of Wylie's route; and why do they weaken their own case by acting in such a manner as to virtually discredit the deliberately cautious opinion of their chosen referee?

With respect to the estimate for the construction of Climie's line, I have (at your request) called upon the contractors who supplied it. These gentlemen are well prepared in every way to carry out such a contract as that proposed. Their estimate amounts to the sum of Four thousand nine hundred and thirty-nine Pounds (£4939) per mile for a complete line, including stations and rolling stock, but not including the cost of the land through which the proposed line would pass. I think it right to inform you the

quantities of material, &c., were furnished to the Contractors by Mr. Climie, but the prices are their own; and I can personally vouch for the latter being ample. I give you the names of these contractors (in confidence) on a separate enclosure, and you can use your discretion in furnishing the Government with their names, if circumstances arise which warrant you in so doing.

I have, &c.,
(Signed) W. A. ZEAL.

THOMAS GORRINGE, *Esq., Warden, Green Ponds, Tasmania.*

Colonial Secretary's Office, 21st July, 1874.

SIR,

I HAVE the honor to acknowledge the receipt of your letter of the 20th instant, forwarding a communication addressed to you by Mr. W. A. Zeal dated the 8th July, 1874, also copy of a letter from that gentleman of the 15th of the same month, and a Resolution adopted at a meeting of the Committee of the Main Line Railway Association.

Before the receipt of this Resolution, the Government had decided to have Mr. Greene's report, and all other documents relating to the Main Line Railway received since the last session, printed for Parliament. The papers now transmitted by you will be added to the correspondence.

I have, &c.,
(Signed) THOS. D. CHAPMAN.

THOS. GORRINGE, *Esq., Chairman Main Line Railway Association,
Wilderness, Green Ponds.*

*Tasmania,
Colonial Secretary's Office, 4th November, 1873.*

GENTLEMEN,

You are aware that in March last year, this Government entered into a contract with the Tasmanian Main Line Railway Company for the construction of a narrow gauge railway, (3ft. 6in.) to connect this city with the town of Launceston on the other side of the Island.

Among the conditions of the contract is one providing that the bridges shall be built of such a strength as to comply with the Regulations of the English Board of Trade.

As it will be necessary for this Government to see that all the Regulations of the English Board of Trade in reference to the construction, maintenance, and working of railways in this Colony are properly carried out, I shall feel obliged by your applying to the Board of Trade in London, and request them to be good enough to furnish you, for the use of this Government, with two copies of all their existing Reports and Regulations in reference to the construction, maintenance, and working of railways in the United Kingdom, so that this Government will be enabled to introduce similar regulations in respect to the construction, maintenance, and working of railways in this Colony.

I shall feel obliged by your forwarding these regulations, together with any information that you may think likely to be useful to us in dealing with the subject, by return mail, if possible.

I have, &c.,
(Signed) THOS. D. CHAPMAN.

The Crown Agents for the Colonies.

*Offices of the Crown Agents for the Colonies,
Spring Gardens, London, S.W., 3rd January, 1874.*

SIR,

HAVING applied to the Board of Trade for the Reports, &c. referred to in your letter of the 4th November last, I transmit herewith a copy of a letter received from that Department, together with six copies of the usual requirements of the Board of Trade in regard to new railways.

I have, &c.,
(Signed) W. C. SARGEAUNT.

The Hon. the Colonial Secretary.

(Copy.)

Board of Trade, (Railway Department), London, 31st December, 1873.

SIR,

I AM directed by the Board of Trade to acknowledge the receipt of your letter (with enclosure) of the 24th instant, and, in compliance with the request contained therein, to enclose for the information of the Government of Tasmania six copies of the usual requirements of this Department in regard to new railways.

I am, &c.,

(Signed) W. R. MALCOLM.

W. C. SARGEANT, *Esq., Crown Agent for the Colonies.*

A.

DOCUMENTS TO BE SENT TO THE RAILWAY DEPARTMENT, BOARD OF TRADE, PREVIOUSLY TO THE SECOND NOTICE OF THE INTENTION TO OPEN A RAILWAY BEING GIVEN.

I. A copy of the Parliamentary Plan and Section, with any deviations which in the construction may have been made from either, marked thereon in red; the corrections in the distances, levels, inclinations, sections of ground, and radii of curves, rendered necessary by such deviations, being also marked in red, as well as the positions of the several Stations, and the length of the Platforms on the Section. The width of cuttings and embankments on each side of the railway also to be marked on the Plan.

II. A table of Gradients and level portions, with the positions of the Stations distinctly shown.

III. A table of Curves and straight portions.

IV. A table of Cuttings and Embankments.

V. A table of the Bridges for roads crossed by the Railway.

VI. A table of the Bridges and Viaducts over watercourses and valleys.

VII. A table of all Level Crossings, public, occupation, or private; bridle or foot-ways.

VIII. A table of Tunnels.

IX. A table of Aqueducts and large Culverts.

X. A statement affording detailed information under the following heads:—

According to the forms forwarded herewith, observing that the situations of Works, &c. should be described in each by reference to the same fixed point; and that it will be convenient if the Station nearest to the Metropolis, for a main line—or the junction with the main line for a branch Railway—be adopted as such point of reference.

1st. *Permanent Way.*—Whether the line be double throughout, or partly double and partly single, or single throughout with sidings; the distances from the fixed point adopted in the tables, at which the single portions commence and terminate—or, for a single line, at which the sidings commence and terminate; whether the land has been purchased, or whether any other arrangements have been made with a view to adding an additional line at a future period; the width of the line at formation level; the gauge; the width between the lines where double; the description of rails employed, with a diagram section, their length and weight per yard; the description and weight of the chairs, where these are employed; the mode of fixing the chairs and securing the rails; the fastenings adopted for the joints of the rails; the description of sleepers, with their smallest and average scantling and length; their distance asunder if transverse, and if longitudinal, the details of any ties by which they are connected; the nature of the ballast, and its depth below the under surface of the sleepers; the description of switches adopted, with the name of the patentee if they are patented; the number and positions of all facing points connected with the main line; and the names of the Stations or other places at which Engine-turntables are provided.

2nd. *Fences.*—Description of fencing adopted on each portion of the line, especially the height of the rails, and distance between posts, if post and rail; the height, number of wires, distance between supports, and means of straining, in the case of wire fencing.

3rd. *Drainage.*—General description of the drainage employed, and if on any part of the line it has been attended with peculiar difficulty, a detailed description should be given.

4th. *Stations.*—Their names, and their distances, at commencement and termination from the fixed point, respectively; the gradients on which they are situated and approached, and the distances between the main and the distant-signals.

5th. *Width of Line.*—The minimum space allowed from a height of 2 feet 6 inches above the rails, between the sides of the widest Carriages in use upon the Railway, and any fixed works, such as Pillars and Walls at Stations, Abutments, Piers, Supports, Arches, or Girders of Bridges, Telegraph Posts, Sheds, &c. along the Line. The minimum section of each tunnel should be appended, showing within it a section of the widest carriage in use on the line.

6th. *Bridges and Viaducts.*—Drawings of all Bridges and Viaducts, either over or under the Railway, in detail, accompanied by sufficient information to allow of the probable strength of each being ascertained by calculation; and by sections showing the distances between the girders and the sides of the widest carriages in use on the line, when the girders are more than 2 feet 6 inches above the level of the rails.

7th. Diagrams of all Junction and Station arrangements.

XI. *Carriages to be used for the Conveyance of Parliamentary or Cheap Train Passengers under the Act 7 & 8 Vict. c. 85.*—The following minimum dimensions should be observed in the construction of these carriages:—They should contain 20 cubic feet of space per passenger; the area of the glass windows should afford 60 superficial inches per passenger; the seats should be provided with backs, should be 15 inches broad, and should afford 18 inches in

width per passenger; they should be provided with proper means of ventilation, and with two lamps at least to each carriage. Drawings of these carriages consisting of the three following figures, to a scale of not less than four feet to an inch, viz. :—

1. An outside elevation, showing the position of the windows, ventilators, and lamps.
2. A transverse section.
3. An inside plan, showing the arrangements of the several seats, with reference by letters, specifying the width and length of each seat, and the number of passengers to be accommodated on each; also a memorandum of the size of the windows and ventilators, stating whether they are fixed or constructed to open and close, and the position of the lamps for lighting the carriages at night.

B.

MEMORANDUM OF IMPORTANT REQUIREMENTS.

1. The lines of Railway leading to the passenger platforms to be so arranged that the engines shall always be in front of the passenger trains as they arrive at and depart from a station; and that each line shall have its own platform.
 2. Platforms to be continuous and not less than 6 feet wide for stations of small traffic, nor less than 12 feet wide for important stations; and the descent at the ends to be by means of ramps, and not by steps. Pillars or Columns for the support of roofs or other fixed works not to be nearer to the edge of the platforms than 6 feet. The height of platforms considered desirable is 2 feet 6 inches; the minimum height to be 1 foot 9 inches above the rails.
 3. When stations occur on or near a viaduct or a bridge under the railway, a parapet wall on each side, 3 feet high, should be built, with a hand-railing or a fence on the top, sufficient to prevent passengers from falling over the viaduct or bridge in the dark. All viaducts under the railway should be provided with handrails and with projecting platforms for the protection and escape of the platelayers. Viaducts of timber and iron should be provided with manholes and other facilities for inspection.
 4. The steps of staircases approaching stations, and of foot bridges over the lines, and of foot-subways, to be not less than 11 inches in the tread, or more than 7 inches in the rise, and all such staircases to be provided with efficient handrails.
 5. Clocks to be provided in positions where they are visible from the line.
 6. Main-signals and Distant-signals for each direction to be supplied; with extra signals for such sidings as are used either for the arrival or for departure of trains.
 7. The levers and handles of switches and signals to be brought close together, into the position most convenient for the person working them. The switches to be provided with double connecting rods. The levers of the switches to be sufficiently long to enable the pointsmen to work them without risk or inconvenience, and not to be placed between the lines of rails. They should also be connected with locking apparatus.
 8. No Facing Points to be put in, except on single lines, or at junctions, or in exceptional cases. At all stations and junctions the signals and points to be locked and worked as pointed out in No. 21.
 9. All sidings connected with passenger lines to be supplied with a blind siding or safety point, with the points or point closed against the main line, and interlocked with signals.
 10. Turntables for engines to be erected at terminal stations, and at junctions and other points at which the engines require to be turned, of sufficient diameter to enable the longest engines and tenders in use on the line to be turned without being uncoupled. Care should be taken to keep all turntables at a safe distance from adjacent lines of rails, so that an engine, wagon or carriage in the act of turning may not foul another line, or endanger the traffic upon it.
 11. Stations not to be constructed on a steeper gradient than 1 in 260, except where it is unavoidable. When the gradient at a station is necessarily steeper and the line is double, and where danger is to be apprehended from vehicles running back, a catch-siding, with points weighted for the siding, should be provided further down the incline than the passenger platform and goods-yard, to intercept runaway vehicles. When the line is single, a second line should be laid down, double platforms constructed, and a catch-siding similarly provided.
 12. In a cast-iron bridge the breaking weight of the girders should be not less than three times the permanent load due to the weight of the super-structure, added to six times the greatest moving load that can be brought upon it.
 13. In a wrought-iron bridge the greatest load which can be brought upon it, added to the weight of the super-structure, should not produce a greater strain on any part of the material than five tons per square inch.
- The heaviest engines in use on railways afford a measure of the greatest moving loads to which a bridge can be subjected. These rules apply equally to the main and the transverse girders. The latter should be so proportioned as to carry the heaviest weights on the driving wheels of locomotive engines.
14. The upper surfaces of the wooden platforms of bridges and viaducts should be protected from fire.
 15. The joints of the rails should be secured by means of fish-plates, or by some other equally secure fastening. The weight of the cast-iron chairs on branch lines, or lines on which the traffic will be small and light, and where it will be worked by engines of ordinary construction, should be not less than 26 lbs. each; but on main lines, and where heavy traffic may be worked at high speeds, the chairs should weigh not less than from 28 lbs. to 30 lbs.
 16. When chairs are used under the rails they should be secured to the sleepers, at least partially, by iron spikes

or bolts. With flat-bottomed rails, when there are no chairs, or with bridge rails, fang- or other through-bolts should be used, at least at the joints and in some intermediate places.

17. No standing work (other than a passenger platform) should be nearer to the side of the widest carriage in use on the line than 2 feet 4 inches at any point between the level of 2 feet 6 inches above the rails and the level of the upper parts of the highest carriage doors. This applies to all arches, abutments, piers, supports, girders, tunnels, bridges, roofs, walls, posts, tanks, signals, fences, and other works, and to all projections at the side of a railway constructed to any gauge.

18. The intervals between adjacent lines of rails, or between lines of rails and sidings, should not be less than 6 feet.

19. At all level crossings of turnpike and public roads the gates should be so constructed as to close across the railway, as well as across the road, on every side of the crossing. They should not be capable of being opened at the same time for the road and the railway. A lodge or station house should be provided, as is required by Act of Parliament. When a level crossing occurs at a station, there should be a box, if there is not a lodge, at the gates, for the use of the gate-keeper. Wooden gates are considered preferable to iron gates for closing across the railway.

20. The fixed signals attached to the gates at the level crossings should be placed in convenient positions for being seen along the railway as well as along the road. When a level crossing is so situated that an approaching train cannot be seen from a sufficient distance, distant-signals (which may both be worked by one lever) should be supplied.

21. At all junctions, home-signals and distant-signals for each line are required. It being necessary that a uniform system of signals should be adopted on all railways, the semaphore arms should, when there is more than one on one side of a post, be made in future, at stations and junctions, to apply,—the first or upper arm to the line on the left,—the second arm to the line next in order from the left, and so on. Clocks should be placed in conspicuous positions for the use of the signalmen.

22. The signal-handles and the levers of the switches at junctions should be brought together under cover upon a properly constructed stage, with glass sides enclosing the apparatus. They should be so arranged that while the signals are at danger the points shall be free to move; that a signalman shall be unable to lower a signal for the approach of a train until after he has set the points in the proper direction for it to pass; that it shall not be possible for him to exhibit at the same moment any two signals that can lead to a collision between two trains; and that after having lowered his signals to allow a train to pass he shall not be able to move his points so as to cause an accident or to admit of a collision between any two trains. Every signalman should be able to see the arms and the lamps of his home as well as his distant-signals, and the working of his points.

23. Mile-posts and gradient-boards should be provided along the line.

24. The junctions between the main line and any sidings which lead to ballast pits in use, or which are employed for colliery or other purposes, should be protected by a home signal and a distant-signal in each direction. The sidings should be so arranged that the shunting carried on at them shall present the least possible obstruction to the main line; and there should be a blind siding or safety point,—the points or point to be closed against the main line and interlocked with the signals.

25. When a junction is situated near to a passenger station, or is connected with goods or mineral sidings, the platforms and sidings should be so arranged as to prevent, as far as possible, any necessity for shunting over the junction.

26. When two single lines meet, the junction should in ordinary cases be formed as a double-line junction.

27. Tunnels, and those portions of Railway which are more dangerous, from obstructed view, steep inclines, heavy traffic, or liability to fog, should be protected by means of the telegraph. In the 7th paragraph of Section D will be found certain recommendations as to the way in which the telegraph should be worked.

28. Tunnels should in all cases be constructed with recesses for the escape of the plate-layers.

29. All signals which are worked by a wire should be so weighted as to fly to "danger" on the fracture of the wire.

C.

MODES OF WORKING SINGLE LINES.

In the case of a line being single, a certificate, under the seal, and signed by the Chairman and Secretary of the Company, should be sent to the Board of Trade, through the Inspecting Officer, to the effect that one of the three following modes of working single lines will be adopted, namely:—

- I. That only one engine in steam, or two or more engines coupled together, shall be allowed to be upon the single line, or upon portions thereof, (to be distinctly defined in the certificate), at one and the same time.
- II. That a system similar to that in use on the North-Eastern Railway, that of working by means of a train porter, and described in the accompanying amended regulations, shall be adopted, viz.:—

RULES FOR WORKING THE THIRSK AND MALTON BRANCH OF THE NORTH-EASTERN RAILWAY.

General Instructions.

1. A time table showing the working of all the trains on this branch, and a copy of these rules, are to be furnished, through the respective departments, to every servant of the Company employed on the branch.

2. A pilotman, under the traffic department, is to be appointed for working the branch.

3. He is to wear a red badge on his right arm, to signify that he is the person appointed as pilotman, and his name (and the name of the person appointed to succeed him, should any change be made,) is to be given to the pointsmen Malton and the Main Line Junction.

Instructions to the Pointsmen at Malton and the Main Line Junction.

4. You are required to have in your possession a time table showing the working of all the trains on the branch, as well as a copy of these rules, and to be acquainted with the pilotman appointed for working the branch.

5. You are not on any account whatever to allow any train or engine to move on to the branch at either end, unless the same be accompanied by the pilotman.

Instructions to the Pilotman of the Branch.

6. You are required to have on your person a time table showing the working of all the trains on the branch, and also a copy of these rules.

7. You are to wear a red badge on your right arm, to mark that you are the pilotman of the branch.

8. The instructions given to the pointsmen at each end of the branch are, that they are not to allow any train to move on to either end of the branch, unless accompanied by you.

9. Your duty will be to travel over the branch with the various trains, and when it is necessary for a train to move on to the branch you must always be at the junction to accompany it.

10. When there are two trains to pass over the branch in the same direction, you must accompany the first train on to the branch, and, having dispatched it, you must wait for the second, and then proceed with it along the branch to the other end, and until your arrival no train is to be permitted to enter from the opposite end.

11. In case the second train which you accompany shall be a goods' train, and you find by your time table that you cannot arrive at the junction or end of the branch in time to allow the passenger train to enter at its proper time, you must shunt the goods' train into a siding, detach the engine, and proceed with it to the junction in time to accompany the passenger train on its entering the line. You will attach both engines to the passenger train, and on arriving at the siding where the goods' train is standing, the goods' engine shall be detached and shall take on the goods' train to its destination accompanied by you, after the passenger train has proceeded on its journey.

12. In case the first train which you dispatch from one end should be a goods' train, you will wait, according to Rule 10, and accompany the succeeding passenger train; and in case the passenger train should overtake and pass the goods' train, your duty will then be to remain with the goods' train, and to accompany it to the terminal station or junction.

13. When an engine is disabled, and unable to proceed to its destination, you are to go immediately for another engine; and before you go you are to instruct the engine-man that should the disabled engine be got right again before you return, it is not, under any circumstances, to proceed along the line, but is to wait until you are present.

14. When there are two engines attached to a train, they must not be separated, but must be considered as one with reference to these regulations.

15. If these rules are strictly obeyed it will be impossible for two trains to meet each other when proceeding in opposite directions.

16. You are required not only to observe all the rules for working this branch contained in this paper, but to notice any infraction of them by other parties, and to report the same immediately to the head of your department.

III. That the line shall be worked by Train-staff, in the mode adopted on many of the leading Railways, and described in the following amended regulations:—

RULES FOR WORKING THE SINGLE LINE BETWEEN A., B., C., &c.

1. Either a train-staff or a train-ticket is to be carried with each engine or train to and fro, and for this purpose

						Colour of Staff and Ticket.	Form of Staff and Ticket.
[One, two, or more] train-staffs and sets of train tickets will be employed, viz.:—							
One between A. and B.	-	-	-	-	-	Red.	Square.
One between B. and C.	-	-	-	-	-	Blue.	Round.
&c.	&c.	-	-	-	-	&c.	&c.

2. No engine or train is to be permitted to leave either of the terminal stations, A., B., or C., &c., unless the staff for the portion of line over which it is to travel is then at the station.

3. If no second engine or train is intended to follow, the staff is to be given to the guard or person in charge.

4. If other engines or trains are intended to follow before the staff can be returned, a train-ticket, stating "staff following," will be given to the person in charge of the leading train, and so on with any other except the last train, the staff itself being given to the person in charge of the last train. After the staff has been sent away, no other engine or train can leave the station under any circumstances whatever until its return.

5. The train-tickets are to be kept in a box fastened by an inside spring, and the key to open the box is the train-staff, so that a ticket cannot be obtained without the train-staff.

6. The train-staffs, the train-tickets, and the ticket-boxes, are painted or printed in different colours, red between A. and B.; blue between B. and C.; &c., the inside springs and the keys on the staffs being so arranged that the red staff cannot open the blue box, nor the blue staff the red box, and so forth. This is to prevent mistakes.

7. The ticket-boxes are fixed by two brackets in the booking-office at the terminal stations, the brackets being turned up at the end to receive the train-staff when it is at the station.

8. The clerk in charge, the inspector, or the person in charge for the time at a terminal station, is the sole person authorised to receive and deliver the staff.

9. A guard or engine-man taking a staff, or ticket, beyond the portion of line to which it belongs, or starting from a station without the staff, or without a ticket, as hereinbefore explained, will render himself liable to dismissal, although no accident may arise.

10. No Engine-man is to start from A., B., or C., &c. with a train until the guard has shown him the train-staff or train-ticket, or with an engine until he has received either the one or the other.

11. The usual special train tail-signal, "engine following," is to be used when a ticket is given, for the guidance of the platelayers and gatekeepers upon the line.

12. When a ballast train has to work on the line, the staff is to be given to the guard in charge of it. This will close the line whilst the ballast train is at work. The ballast train must proceed afterwards to one of the terminal stations of the staff, to open the line, before the ordinary traffic can be resumed.

13. In the event of an engine or train breaking down between two terminal stations, the fireman is to take the train-staff to the terminal station in the direction whence assistance may be expected, that the staff may be at the station on the arrival of an engine. Should the engine that fails be in possession of a train-ticket instead of the staff, assistance can only come from the station at which the train-staff has been left. The fireman will accompany any assisting engine to the place where he left his own engine.

N.B.—The train-staff may either be fixed in a socket on the engine or tender, or carried over the shoulder by means of a cross-belt.

D.

PRECAUTIONS RECOMMENDED IN THE WORKING OF RAILWAYS.

1. There should be a break-vehicle with a guard in it at the tail of every train; this vehicle should be provided with a raised roof and extended sides, glazed to the front and back; and it should be the duty of the guard to keep a constant look out from it along his train.

2. There should be means of intercommunication between a guard at the tail of every passenger train and the engine driver, and between the passengers and the servants of the company.

3. There should be at least one break-vehicle to every three or four carriages in a passenger train, a proportion which may be economically provided by the use of continuous breaks. On steep inclines, and with trains which travel at high speed, a larger proportion of break-power is required.

4. The tyres of all wheels should be so secured to the rims of the wheels as to prevent them from flying open when they are fractured.

5. The engines employed with passenger trains should be of a steady description, with not less than six wheels, with a long wheel-base, with the centre of gravity in front of the driving wheels, and with the motions balanced. They should not be run tender first.

6. Records should be carefully kept of the work performed by the wearing parts of the rolling-stock, to afford practical information in regard to them, and to prevent them from being retained in use longer than is desirable.

7. When a line is worked by telegraph, the telegraph-huts should be commodious, and should be supplied with clocks, with record-books, with a separate needle for signalling the trains on each line of rails, and with an extra needle for other necessary communications between the signalmen. The telegraph-instruments and signal-handles should face the directions in which they work.

8. When drovers or other persons are permitted to travel with goods or cattle trains, suitable vehicles should be provided for their accommodation near the front of such trains.

9. Luggage should not be carried on the roofs of railway carriages.

*Board of Trade, (Railway Department),
February 1872.*

*Tasmania,
Colonial Secretary's Office, Hobart Town, 18th April, 1874.*

GENTLEMEN,

My attention has just been called to the City Article in the *London Mail* of the 9th of February last, having reference to a Prospectus published in that day's paper inviting subscriptions for £400,000 Share Capital in the Tasmanian Main Line Railway.

The City Article referred to states that the Capital consists of £650,000 in Debentures, which bear a guarantee of 5 per cent. interest for 30 years from the Tasmanian Government.

Will you be good enough to call the immediate attention of the Editor of the *Mail* to the erroneous statement put forth in the Article referred to, and request him to inform the public that the Bonds for £650,000 issued by the Tasmanian Main Line Railway Company are the Bonds of the Tasmanian Main Line Railway Company, Limited, and for the payment of principal and interest on these Bonds the Tasmanian Government is in no way responsible.

The Tasmanian Main Line Railway Company have a Contract with the Tasmanian Government to construct, work, and maintain a narrow (3 feet 6 inches) gauge Railway between Hobart Town and Launceston; such line of Railway to be through the centres of population, and to be completed and open for traffic by the 15th March, 1876.

The Company are bound to run Four Trains daily upon the said Line throughout the entire length, namely,—Two Trains daily from Hobart Town to Launceston, and Two Trains daily from Launceston to Hobart Town.

The minimum average speed at which such Trains shall travel shall be, for one daily Train each way twenty-three miles an hour, including all stoppages and detentions; and for the other daily Train, each way ten miles per hour, including all stoppages.

I send you a copy of the Contract herewith, which you will see contains many other provisions.

The Government guarantee interest to the Company during construction on the cost not exceeding £650,000, at the rate of 5 per cent., for 4 years from the date of signing the Contract.

The Government further guarantee to the Company 5 per cent. interest for 30 years on the cost not exceeding £650,000, provided they work and maintain the Line in accordance with the provisions contained in the Contract; but you will see that the Government have nothing whatever to do with the Bonds issued by the Company.

The attention of the Government having been called to the character of the works some months since, they informed the Company that they would be expected to carry out the Contract strictly in accordance with its provisions, and that the rate of speed—viz. twenty-three miles an hour for one daily train each way—would be insisted on.

You will see therefore that the payment of interest to the Company by the Government depends entirely on the Company faithfully performing their Contract with the Government; and I have to request that you will, on behalf of this Government, request the Editor of the City Article in the *London Mail* to make this clear to the public: and should the Editor decline to do so, I have to request that you will then cause a letter to be published in the *London Times* at an early date, stating the position in which the Bond-holders stand in reference to the Contract between the Tasmanian Main Line Railway Company and the Tasmanian Government.

I have further to request that you will be good enough to forward at once a copy of the *London Times* or *Mail* containing any reference to this subject that may arise out of this communication.

Trusting you will excuse the trouble I am giving you,

I have, &c.,

(Signed) THOS. D. CHAPMAN, *Colonial Secretary.*

The Crown Agents for the Colonies, London.

COPY Extract from the Money Market and City Intelligence Article published in The Mail of the 9th of February, 1874.

THE National Bank of Australasia and Messrs. R. W. Carden and Co. have invited applications for £400,000 share capital of the Tasmanian Main Line Railway Company (Limited), at the price of £70. The line is 125 miles in length, and is expected to be opened in a year. The capital consists of £650,000 in debentures, which bear a guarantee of 5 per cent. from the Tasmanian Government, and of the £400,000 ordinary shares now offered, on which 6 per cent. is guaranteed by the Contractors until the opening and for one year thereafter.

ADDITIONAL CORRESPONDENCE.

*Tasmanian Main Line Railway Company, Limited,
Engineer's Office, Hobart Town, Tasmania, 25th July, 1874.*

SIR,

I NOTICE in this morning's impression of the *Mercury* a letter from Mr. Thomas Gorringe, the Chairman of the Green Ponds Railway Association, with a long report from Mr. Daniel Climie, and letter from a Mr. W. A. Zeal, respecting the route of the Main Line Railway.

The report of Mr. Climie is so entirely inaccurate both in his statement of figures and facts, and the deductions drawn therefrom so absurd and erroneous, that I will not trespass upon your attention by replying to them in detail; the more especially that a reference to my Reports to you on the same subject, with accompanying plans, will furnish the complete refutation.

As regards his remarks on the professional opinions and experience of Mr. Greene and myself, I am happy in the belief that, coming from such a source, they are not in the least likely to affect either Mr. Greene or myself, or the conduct of any works we may have in hand; nor will any support he is likely to receive be sufficient to make him a *reliable* authority on railway matters.

Mr. Gorringe's letter is apparently written for the purpose of introducing what is called an estimate of certain parties (whose names or qualifications we are not informed about) for the completion of a Railway from Bridgewater to York Plains; but Mr. Zeal candidly informs us that this estimate is based entirely on quantities and information (quantities of material, &c.,) obtained from Mr. D. Climie, and is exclusive of the cost of land, which Mr. D. Climie does not state. It is in fact Mr. D. Climie's very rough estimate, pure and simple; and it does not appear that the parties in question have done anything more, or incurred other responsibility, than to affix to such estimate the prices at which, from the information furnished them, they *think* that such work might be done in Tasmania. Under such circumstances we cannot doubt Mr. Zeal's statement that the prices are ample, and he might probably have added that they had no necessary relation to the real cost of the work.

The trial section made by Mr. D. Climie, unaccompanied as it is by any plan, is quite insufficient to allow any prudent Contractors to quote therefrom a price per mile for the cost of the line; and had they any local knowledge of the country traversed by Mr. D. Climie's line, I am sure that (having even a slight knowledge of the business) they would long hesitate to bind themselves to a fixed price, with even an enormous margin for contingencies.

I could readily reply to each paragraph in Mr. D. Climie's Report, and commencing with the much vaunted record of his experience, as detailed by himself, prove that the statements made are wilfully and deliberately untrue, and written only with the intention to deceive; but this very long document showing the same result on each part would only weary you, and therefore I will only quote the last paragraph which contains direct statements devoid of technicalities, which can easily be verified or refuted by the documents you have at hand.

Mr. Climie writes:—

"I will trouble you with only one other item advanced against my section by Mr. Grant, which I think will be sufficient to convince any one not blinded by prejudice of the unscrupulous and reckless assertions that have been made relating to the 'difficulties' shown on my section. When Mr. Grant was examined before the Select Committee on my section from Oatlands northwards, he pointed out that a tunnel of about 15 chains in length would be required to be made near the Oatlands Lagoon at a place where I proposed a cutting, and evidence to that effect was accordingly taken down. As I had stated before the Committee that no tunnel would be necessary on any part of the line I had levelled, I was sent for and interrogated on my apparently untruthful evidence. I was taken by surprise at such an imputation, and wished to know on what part of the line this expensive work was wanted; on the section being produced it turned out to be a bit of a hillock only 7 chains and 20 links in length, with an average depth of about 13 feet. How Mr. Grant contemplated making a tunnel of about 15 chains long in a cutting only 7 chains and 20 links in length I cannot say. I have frequently heard of people making 'mountains out of mole-hills,' but I never before heard of such an engineering exploit. On Mr. Grant's next examination the section was laid before him with the length and depth of the cutting figured upon it,—I need scarcely mention that the evidence he had given previously relative to this matter was expunged. If I had not been in the Colony at the time, the possibility is that his (Mr. Grant's) printed evidence would have contained full particulars of this expensive imaginary tunnel as some proof of the impracticability of the route.

"If what I have narrated is taken as a specimen of the way 'difficulties' have been magnified on Mr. Wylie's route, it will serve as data for you to calculate the allowance to make for any other exaggerated objections from the same quarter that may hereafter come to light adverse to the railway being taken by Green Ponds."

A reference to the original notes taken by the careful and painstaking Committee Clerk (which the Clerk of the House of Assembly kindly allowed me to examine) will show conclusively that the printed evidence is an exact and full copy of *all* the evidence that was taken down; and I am informed that it is entirely contrary to the rules which govern Committees of Parliament to allow any evidence to be expunged, and that certainly none was omitted in this case; and further it does not appear that Mr. D. Climie was called to correct any statements on the subject that I may have made, nor was I re-examined thereon. Furthermore, no cutting on *his* section has been marked with its length or depth, nor is there any such cutting thereon as he describes.

The documentary evidence at your disposal shows that the whole statement quoted is utterly untrue and absurd, and it therefore coincides with those made throughout the remainder of the Report.

I have, &c.,

(Signed) CHARLES H. GRANT.

The Hon. T. D. CHAPMAN, M.L.C., Colonial Secretary.

*Tasmanian Main Line Railway Company, Limited, Engineer's Office,
Hobart Town, Tasmania, 30th July, 1874.*

SIR,

FROM the newspaper report of your Financial Statement to the House of Assembly on the 29th instant, it would appear that you do not consider the Main Line Railway Company have fulfilled, or will eventually be able to fulfil, their Contract with the Government of Tasmania; and would not therefore, after the period allowed for the construction of the line has expired, be entitled to claim the annual subsidy payable to them under the Contract. I notice that this is stated as being your opinion, fortified by the statement of a gentleman who has reported to the Government upon the construction of the Railway; and afterwards, in the report of the *Mercury*, you are made to state that "the Engineer had reported that the Main Line Railway Company cannot fulfil its Contract."

Were these remarks simply the statements of a private individual I would not trouble you with any reply thereto, but coming from a very distinguished Member of the Tasmanian Government, and one who, as paying the guaranteed interest quarterly, would naturally be supposed by the public at large to be better acquainted with the proceedings of the Railway Company than any member of the Ministry, I feel that it is necessary in the interests of the Company, and for the protection of its property against the very undue depreciation in value that would follow the publication in England of your statements, to most emphatically protest that they are based on no solid grounds.

On the other hand I most unhesitatingly and positively assert that the Railway Company both have fulfilled, and will fulfil in the letter, (and more than fulfil in the spirit, by making a far better line than the terms of the specification necessarily provided,) the whole of the terms of the Contract with the Government; and confidently challenge the judgment of any competent authority who may be versed in such Contracts.

I would point out that the opinion to which you incline is from an Engineer, doubtless of great ability, integrity, and eminence in his profession, but entirely unaccustomed to negotiate or interpret such Contracts as that in question, and who has had no experience whatever in the construction of ordinary or light Railways, or in the use of the rolling stock especially adapted thereto. Furthermore, he had not the local knowledge to guide him that the Company's officers possess.

Your remarks I apprehend refer principally to the question of speed, on which I may observe that, with a full knowledge of the engineering features of the line, the Chairman of the Tasmanian Main Line Railway Company, also of the Isle of Man (a narrow-gauge, 3 ft. 6 in., Railway), and who further occupies the same position in, or is a Director of, a *great* number of Railways of various gauges in all parts of the world, including the gigantic London and North Western Railway (the largest and most important railway system in England), has written to inform me that the contract speed both can and will be maintained; the contractors for the line and the makers of the rolling stock guarantee it; and the Consulting Engineer for the Company—one of the very highest authorities on narrow-gauge railways, and connected with nearly all that are being constructed—assures me that he apprehends no difficulty in obtaining the speed required, and that some locomotives are being specially prepared for these express-trains. As regards the works of construction on the Railway, I can guarantee that they will be found thoroughly efficient for the very highest rate of speed that the gauge will permit.

There is an ambiguity in the report of your speech which might allow it to be understood as quoting my opinion against the attainment of the prescribed rate of speed. If so, I would remark, that I looked at the matter from the Railway Manager's point of view rather than an Engineer's; and being guided by experience, and the practical information afforded by the time-tables of all narrow-gauge Railways, I feel strongly the impolicy of running through express trains at the highest attainable rate of speed, and to the sacrifice of much local accommodation. Still, if any inconvenience accrue the remedy is in the hands of the Government, and the public are in every way the most interested in the result.

In alluding to the improvement of the branch roads from the townships to the Railway, you particularly mention that the House of Assembly had not approved the route. This remark I am at a loss to comprehend, because the Contract most specifically states that the route is to be determined by the only person who can possibly define it; namely, the Railway Company's Engineer. It would be a novel feature for a Legislative Assembly to set out the line of a Railway; and, so far as I know, the route of every Railway hitherto constructed has been fixed by the Engineer of the proprietary,—whether a Government or Public Company; nor do I see how this simple principle could be advantageously departed from.

Your remarks are the more calculated to injure the Company at this time, since they affect a property already enormously and wholly unnecessarily depreciated in value by the attacks made upon it in this country; and because, whether rightly or wrongly, there is now a strong feeling in England that the Government or Legislature of Tasmania have not acted fairly and in good faith to the Company in the matter of the promised remission of wharfage rates and other minor matters, in which the Company, when undertaking the Contract, relied upon the honor of those they negociated with to fulfil all their agreements, whether expressed or implied.

As the Company's interests might be most seriously imperilled by your observations respecting them being allowed to remain unchallenged, I beg to request that you will consent to the immediate publication of this letter.

I have the honor to be,
Sir,

Your most obedient Servant,

CHARLES H. GRANT.

Hon. P. O. Fysh, M.H.A., Colonial Treasurer.

MAIN LINE RAILWAY.

Additional Correspondence in continuation of Paper No. 22.

Tasmania,
Colonial Secretary's Office, 12th August, 1874.

SIR,

I HAVE the honor to forward printed copies (2) of a correspondence which has taken place with Mr. Charles H. Grant, Engineer-in-Chief of the Main Line Railway, with reference to your Report on the route and works of the Main Line Railway; and I shall esteem it a favour if you will furnish me with any remarks you may feel disposed to make on Mr. Grant's letters, dated respectively the 3rd and 6th instant.

I have, &c.,

(Signed) THOS. D. CHAPMAN.

W. H. GREENE, *Esq., Kyneton, Victoria.*

Tasmanian Main Line Railway Company, Limited, Engineer's Office,
Hobart Town, Tasmania, 3rd August, 1874.

SIR,

In perusing Mr. Greene's Report on the route and works of the Main Line Railway, you will probably have noticed a slight ambiguity in his remarks as to the speed to be obtained on the line; and as I am sure that the Government and Railway Company are only desirous that a full knowledge of everything appertaining to this question should be arrived at, I venture most respectfully and deferentially to submit to you the expediency of requesting Mr. Greene to state clearly his views on the matter.

In the epitome of the conclusions at which Mr. Greene had arrived, he states,—

"3rd. That *any line* which would give the results stipulated for in the Contract, and which could be constructed within the capital of the Company (£1,650,000), *must traverse the Coal River valley*, and keep close to the route selected by Messrs. Doyne, Major, and Willett between Bridgewater and Antill Ponds.

"4th. That the Company, while following the general direction of Mr. Doyne's line between Bridgewater and York Plains, have made such deviations, introducing an unnecessary number of sharp curves and steep gradients, as to completely sacrifice speed and efficiency in working to economy in present construction."

The direct implication from the above-quoted remarks (as I think we must admit) is, that, had the Company laid down the narrow gauge on the surveyed route of Messrs. Doyne & Co., the Contract speed could have been readily maintained, but on the Company's line it cannot be.

Now, setting aside the *enormous* cost of the line surveyed by Messrs. Doyne & Co., which was for this reason not accepted by the Government or the Company, I think that both would desire to know whether the public could have travelled quicker between Bridgewater and York Plains on Messrs. Doyne & Co.'s line, with its increased distance on the whole length between Bridgewater and York Plains of two miles, its almost continuous rise with the extreme gradient of 1 in 50 throughout 9 miles 16 chains, its two reversing stations, and curves of 10 chains radius on a gauge of 5½ feet, compared with the Company's line, on which the maximum gradient is 1 in 40 (but with numerous alternations of much easier grades) for exactly 7 miles, and with five chains curves thereon.

I feel certain Mr. Greene will fully admit that the constructed line, with its rolling stock specially constructed for readily traversing even sharper curves, will be more easily and economically worked, and a higher speed obtained thereon than on Messrs. Doyne & Co.'s broad-gauge line, with its zig-zags, and the ordinary rolling stock: but I wish to go further than this, and to challenge the decided opinion of Mr. Greene whether the Company's constructed line will not admit of the distance from Bridgewater to York Plains being traversed in less time, and at less cost, than had the Company adopted Messrs. Doyne & Co.'s *exact surveyed route*, and laid down the *Contract gauge* thereon.

These questions present themselves on an inspection of a diagram of the grades on each of the proposed routes which I am having prepared for the information of the Government and Legislature, and hope to be able to forward you by the end of the week

I would remark, that the curves and grades objected to by Mr. Greene were mostly introduced to obviate the objectionable features of Messrs. Doyne & Co.'s survey, as shown by the above-quoted figures; and without taking advantage of the curves and grades having been bargained for in the Contract, I think it would be admitted by any disinterested authority that the line constructed will give much better practical results than that of Messrs. Doyne & Co.

In the earnest hope that, for the complete elucidation of the questions at issue, you will consider it advisable to obtain the opinion I herein most respectfully request,

I have, &c.,
(Signed) CHARLES H. GRANT.

The Hon. the Colonial Secretary.

Colonial Secretary's Office, 6th August, 1874.

SIR,

I HAVE the honor to acknowledge the receipt of your letter of the 3rd instant, calling my attention to Mr. Greene's remarks in his Report upon the Main Line Railway as to the speed to be obtained on the line, and suggesting that Mr. Greene should be requested to state more clearly his views on the matter.

Before taking any action upon your suggestion, I desire to call your attention to the amount stated by you in brackets on the second page of your letter as the capital of the Company,—namely, £1,650,000.

In the Memorandum of Association, the Capital of the Company is stated at One million Pounds, and the Chairman of the Company, Mr. George Sheward, at the third ordinary general meeting is reported to have said,—“With regard to the Capital, I do not know whether any of you have read the original Prospectus, but there you will find the Capital consists of Four hundred thousand Pounds in Shares, and Six hundred and fifty thousand Pounds in Bonds.”

Mr. Greene, in the paragraph of his Report quoted by you, speaks of the Capital of the Company as One million Pounds, as you will perceive upon referring to the third paragraph of his Report, and not One million six hundred and fifty thousand Pounds as named by you.

Not having learnt up to the present time from any source that the Capital of the Company exceeded that stated by the Chairman as quoted above, I shall feel obliged by your informing me when the Capital was increased from One million and fifty thousand Pounds to One million six hundred and fifty thousand Pounds.

I have, &c.,
(Signed) THOS. D. CHAPMAN.

C. H. GRANT, *Esq., Engineer in Chief,*
Main Line Railway.

Tasmanian Main Line Railway Company, Limited, Engineer's Office,
Hobart Town, Tasmania, 6th August, 1874.

SIR,

I HAVE the honor to reply to your letter bearing this day's date, in which you remark that, by the Memorandum of Association of the Tasmanian Main Line Railway Company, Limited, the Capital of the Company is stated at One million Pounds; and that the Chairman is reported to have stated, at the third ordinary general meeting, that the Capital consists of Four hundred thousand Pounds in Shares, and Six hundred and fifty thousand Pounds in Bonds.

You then remark that Mr. Greene adopted £1,000,000 as the Capital of the Company, and request to be informed when it was increased to the sum of £1,650,000, as stated in my letter.

As regards Mr. Greene's observations, you will notice that I quoted from his concluding remarks (not having perused the body of the Report); and here he distinctly refers to the whole Capital of the Company, while in the 3rd paragraph he specifically states that the sum mentioned in the Memorandum of Association as the Capital of the Company—viz. One million Pounds sterling—was the amount specially referred to. But the article that he so far quotes runs thus:—
“5. The Capital of the Company is One million Pounds, divided into One hundred thousand Shares

of Ten Pounds each;" and the very paper from which he quoted was a Prospectus for the issue of £650,000 in Bonds, which clearly showed that only 40,000 of these Shares (£400,000) were to be paid to the Contractors,—the remainder being reserved in the hands of the Company, with which to defray the miscellaneous expenses that must fall upon them.

At the time of the issue of the Prospectus the direct disposal of about £400,000 only of the Shares was effected; nor am I aware that any important additional amount has yet been issued or dealt with in any manner: but it is abundantly clear that the Company will require some money with which to fully equip the Line, pay expenses of Staff, and commence working the Traffic; and I cannot understand how any of this can be obtained unless it be from the proceeds of sale of the unissued Shares.

I have no copy of the remarks of the Chairman to the third general meeting, but there seems to be no reason to doubt the general correctness of those you quote; because, until more Shares are allotted than these 40,000 issued to the Contractors, and the few additional shares held by the Directors and their friends (as then stated by the Chairman), the Capital of the Company consists of about £400,000 of Shares, and £650,000 of perpetual Debentures.

I have not seen it stated that the £650,000 obtained on Debentures (which by most financiers is not classed as "ordinary capital," but as "loan capital," *i. e.* a liability on loans) is in substitution of any of the Shares: in fact, the dissimilarity of the gross total forbids this assumption; and I therefore apprehend that the available Capital or "powers to create Capital" are still limited, as at first, and until an alteration is sanctioned by a general meeting of the Shareholders, to £1,000,000 in Shares and £650,000 in perpetual Debentures. I must, however, disclaim any special knowledge of the subject, since the arrangement of such questions belongs solely to the executive authorities of the Company in England; and therefore I can only ask you to receive my remarks herein as the probable explanation of the question you moot.

I have, &c.,

(Signed) CHARLES H. GRANT.

The Hon. T. D. CHAPMAN, Colonial Secretary.

Colonial Secretary's Office, 27th July, 1874.

SIR,

I HAVE the honour to forward copy of a letter addressed by the Secretary to the Post Office to the Postmaster-General, under date the 25th instant, upon the subject of the state of the Railway crossings on the Main Line of Road, and especially to the crossing at Antill Ponds, where the Mail Coach containing the English Mail was delayed an hour and a quarter through a loaded wagon having stuck in the crossing.

I shall feel obliged by your calling the attention of the contractors to the subject, with the view of having the evil complained of remedied without delay.

I have, &c.,

(Signed) THOS. D. CHAPMAN.

C. H. GRANT, Esq., Engineer-in-Chief
Main Line Railway.

Tasmania,

General Post Office, Hobart Town, 25th July, 1874.

(Copy.)
SIR,

I HAVE the honor to inform you that the coach from Launceston conveying the English Mail per *Pera* was detained last night one hour and a quarter at the Railway crossing at Antill Ponds, through a loaded wagon being stuck in the crossing.

I am informed that the Railway crossings generally are in very bad order for the Mail Coaches, and that on ordinary occasions they have to be dragged through them, as the metal is laid on so thickly that the wheels imbed themselves in it and will not revolve.

I have, &c.,

(Signed) A. C. DOUGLAS, Secretary.

The Hon. P. O. Fysh, Postmaster-General.

Colonial Secretary's Office, 3rd August, 1874.

SIR,

WITH reference to previous correspondence respecting the state of the Main Line of Railway crossings over the Main Road, I have the honor to forward for your perusal a Report furnished by Mr. Frith on the subject; and to request that you will take steps to have them brought to a state fit to bear the general traffic, by causing the metal to be blinded and rolled, so as to prevent the annoyance to the public, which their present condition involves.

I have, &c.,

(Signed) THOS. D. CHAPMAN.

C. H. GRANT, *Esq., Engineer-in-Chief,*
Main Line Railway Company.

(Copy.)

Hobart Town, 31st July, 1874.

CROSSINGS OF MAIN ROAD BY THE MAIN LINE RAILWAY COMPANY.

SIR,

AT present there are only three places where the Railway Company have interfered with Main Road by forming crossings. One near Rosetta Cottage about 6 miles from Hobart Town, one opposite Mr. Bilton's house further on, and one a few chains south of the *Half-way House*.

The first-named crossing has been made about 3 months, by raising the Main Road about 18 inches, with hard material covered with broken metal and permanently fenced in, and gates hung to close across the road when the trains are running, leaving a passage 16 feet wide across the Railway.

The second-named crossing is on the hill rising from the creek south of Mr. Bilton's house. The Railway here running across the road necessitates the breaking the continuous grade of the hill, and causing the lower side of the Railway to be raised about 18 inches above the original surface of the road. This depth has been filled up with materials from the Railway Cuttings, and covered with a heavy coating of road metal for about 3 chains in length: this metal is at present in a loose state, having only been lately put on:

The third-named crossing at the *Half-way House* was, on my passing the place on Saturday last, being raised about 18 inches with clay, the wheels of vehicles crossing going down through it: the day coach, which was passing at the time I saw it, had some difficulty to get through it. I saw Mr. Grant, the Company's Engineer, on my arrival in Hobart Town on Tuesday, and informed him of the case, he immediately went to the Telegraph Office, and forwarded a message to the local Engineer to at once have it put right by having hard material put on to make the crossing good.

On my return I will examine the place, and report what steps, if any, have been taken to remedy the defect.

I have &c.,

(Signed) JOHN R. FRITH, *Inspecting Engineer Main Line Railway.*

The Director of Public Works.

Tasmanian Main Line Railway Company, Limited, Engineer's Office,
Hobart Town, Tasmania, 7th August, 1874.

SIR,

I HAVE the honor to acknowledge your letter of the 3rd instant, enclosing copy of report from Mr. J. R. Frith respecting the crossings of the Main Road by the Main Line Railway, which matter had already received my attention.

I note you desire that any new metal laid down at these crossings should be blinded and rolled, and beg to assure you that this suggestion shall receive a careful attention, with a view to the proper maintenance of the road, and to cause the least possible annoyance to the public.

I have, &c.,

(Signed) CHARLES H. GRANT.

The Hon. the Colonial Secretary.

Resident Engineer's Office, Railway Department,
Kyneton, 20th August, 1874.

SIR,

I HAVE the honor to acknowledge the receipt of your letter of the 12th instant, with its enclosures, in which you invite any remarks I may have to make with reference to the subject of Mr. Grant's letters of the 3rd and 6th instant, respectively, the latter being in reply to your letter of the same date.

As stated in your letter to Mr. Grant, the amount of the Tasmanian Main Line Company's capital was quoted in my report as one million pounds sterling (£1,000,000), that being the sum mentioned in the 5th clause of the Memorandum of Association of the Company, printed at page 25 of the Parliamentary Paper, No. 112 of 1873, House of Assembly, Tasmania.

I am not clear, from Mr. Grant's explanation in the last paragraph of his letter to you of the 6th instant, whether the sum mentioned in his letter of the 3rd instant, viz., one million six hundred and fifty thousand pounds sterling (£1,650,000), can be regarded as the available means of the Company; but if so, it is all the more obligatory on the Company to carry out their Contract with the Tasmanian Government in a satisfactory manner, both as regards the route and the character of the works. In no other point of view, as far as I can see, does the amount of the nominal or available capital affect the subject of my report.

With regard to Mr. Grant's letter of the 3rd instant, relating to the speed which may be expected upon the adopted line, and that which might be expected upon a line constructed by the route selected in Messrs. Doyne, Major, and Willett's survey, I may remark that a speed of twenty-three miles an hour cannot be expected by either route between Bridgewater and York Plains; but if Messrs. Doyne and Co.'s route had been more closely followed between Hobart Town and York Plains, the very sharp curves on the adopted line would have been avoided, and the gradients very considerably improved; and, notwithstanding the time necessarily lost at the two reversing stations proposed by Messrs. Doyne and Co., a much higher average speed might have been maintained between the terminal stations than can be expected on the adopted line. I assume, as stated in my report, that the contract gauge would have been used on either route.

I had no opportunity when in Tasmania of making a survey or examination of Messrs. Doyne and Co.'s exact route, or of forming an opinion whether it could not be improved by slight deviations; but an examination of the plans and sections of that route, furnished to me by the Government, shows that a narrow gauge line constructed upon it would give much more satisfactory results than may be expected from the Company's route.

I have perused the Main Line Correspondence, of dates subsequent to March last, which is included in the Parliamentary Paper, No. 22, House of Assembly, 1873. I see nothing in this correspondence which would lead me to alter the tenor of my report to you of the 9th April last.

It appears to me that the matter lies in a very small compass. The Contract between the Government and the Company stipulated for results by which both parties to the Contract must abide: If it shall be found that the Contract conditions can be fulfilled, it is all the Government can demand and all the public have a right to expect; but if, and as I believe, the conditions cannot be fulfilled, the Tasmanian Government have within the Contract a remedy, which may be applied should necessity arise, and not till then.

I have, &c.,
(Signed) W. H. GREENE.

The Hon. T. D. CHAPMAN, Colonial Secretary, Tasmania.

Colonial Secretary's Office, 31st July, 1874.

SIR,

I HAVE the honor to acknowledge the receipt of your letter of the 28th May last, requesting that the Government would be pleased to introduce and support a Bill in Parliament authorising the Company to use Cattle-guards at all road crossings (other than those of the Main Road), provided that such are made to their approval.

The subject has received that full consideration which its importance demands; and I have now to inform you that the Government are not prepared to introduce such a measure as that indicated by you, and have decided to adhere to the terms of the Act of Parliament under which the contract has been entered into.

I have, &c.,
(Signed) THOS. D. CHAPMAN.

C. H. GRANT, *Esq., Engineer-in-Chief,*
Main Line Railway.

*Tasmanian Main Line Railway Company, Limited, Engineer's Office,
Hobart Town, Tasmania, 2nd June, 1874.*

SIR,

IN confirmation of my letters of the 4th November and 13th and 17th December, 1872, I have the honor to forward you herewith a letter from the contractors of the Main Line Railway Company referring to the amount they are required to pay for wharfage, and protesting against any such charge

on the ground that the arrangement made between the Government and Mr. Coote should be honorably accepted by Parliament, such being one of the conditions on which the Main Line Railway was contracted for.

On the part of the Company I have most earnestly to request the favorable consideration of the Government to the matter, because the Company have determined to import the whole of their rolling stock from England, and the cost of wharfage on such bulky articles would be enormous; and, as this is an element of its cost, might lead to a great diminution of the rolling stock with which the line is provided, and therefore may be productive of public inconvenience, besides being an injustice to the Main Line Railway Company and contractors.

I trust, therefore, that the Government will give their early attention to the remission of this charge, and the return of any sums already paid on this account; and that if necessary they would seek the concurrence of Parliament in the equitable fulfilment of this condition of the contract.

I have, &c.,

(Signed) CHARLES H. GRANT, *Engineer.*

Hon. T. D. CHAPMAN, *M.L.C.*,
Colonial Secretary.

*Tasmanian Main Line Railway, Contractors' Office,
Hobart Town, 29th May, 1874.*

(Copy.)

Wharfage.

DEAR SIR,

REFERRING to our letters No. 276 of 8th November, 1872, and No. 1754 of 9th October, 1873, relative to the wharfage question, we must again beg of you to bring the matter under the notice of the Government, and have some arrangement made, as the sums we are now compelled to pay form a very serious item in our expenditure.

We are, &c.,

(Signed) CLARK, PUNCHARD, & REEVE.

C. H. GRANT, *Esq.*

Colonial Secretary's Office, 14th August, 1874.

SIR,

I HAVE the honor to acknowledge the receipt of your letter of the 2nd June, referring to your previous letters of the 4th November, the 13th and 17th December, 1872, and forwarding a letter from the Contractors of the Main Line Railway Company respecting the amount they are required to pay for wharfage.

You request that the Government will remit this charge, and cause any sums already paid to be returned; and further, that if necessary, the Government will seek the concurrence of Parliament in the equitable fulfilment of this condition of the contract.

In reply I desire to remark that the remission of wharfage rates upon the articles imported by the Company or Contractors for the construction of the Railway formed no condition, either legal or equitable, of the contract between the Government and the Main Line Railway Company.

At a conference between the Members of the Ministry and Mr. Audley Coote, when negotiating the terms of the contract, that gentleman urged the remission of wharfage rates in the Company's favour; and it was pointed out to him that such a remission was not within the power of the Executive Government, the collection of wharfage rates being fixed by Statute.

At the pressing instance, however, of Mr. Coote, the Government consented to insert a clause in a Bill about to be introduced into the Legislature in the Session of 1871, authorising the remission of wharfage rates in favour of the Company, and which was worded as follows:—"Notwithstanding anything to the contrary contained in any Act, no wharfage rates shall be payable or paid to the Collector of Customs at the Ports of Hobart Town or Launceston on any railway plant, rolling-stock, or materials entered to be landed at such ports by the said Company."

The second reading of this Bill was moved on the 8th December, 1871, when the motion was lost by sixteen votes to nine.

There is nothing to lead the Government to anticipate a different result at the present time, and they are therefore not prepared to seek the concurrence of Parliament in a remission of wharfage dues payable upon the imports of the Company.

I have, &c.,

(Signed) THOS. D. CHAPMAN.

C. H. GRANT, *Esq.*, *Engineer in Chief Main Line Railway.*

*Tasmanian Main Line Railway Company, Limited, Engineer's Office,
Hobart Town, Tasmania, August 22nd, 1874.*

SIR,

I HAVE the honor to acknowledge the due receipt of your letter of the 14th instant respecting the payment of wharfage on goods imported for the construction of the Main Line Railway, in which you state that the Government are not prepared to seek the concurrence of Parliament in the remission of wharfage dues; and further remark that such remission formed no condition, either legal or equitable, of the contract between the Government and the Main Line Railway Company.

Since the Company strongly entertain a directly contrary opinion, I have the honor to most respectfully submit their view of the case in detail, as founded on official and public documents, with which alone they are acquainted.

On the 28th August, 1871, the Honorable the Colonial Secretary replied to Mr. Henry Dobson's letter of the 11th August preceding in the following terms :—

Colonial Secretary's Office, 26th August, 1871.

SIR,

I HAVE the honor to acknowledge the receipt of your letter under date 11th instant, requesting that the Government will "remit the wharfage which the Main Line Railway Company will otherwise have to pay on landing their plant in the Ports of Hobart Town and Launceston."

In reply, I beg to inform you that the Act of Parliament, 21 Victoria, No. 16, authorises the Marine Board to fix and collect wharfage rates, and it would require a Statutory enactment to enable the Government to comply with your request.

With this object in view, the Government will be prepared to submit to Parliament a Bill to enable the Governor in Council to exempt from wharfage rates the railway plant in question.

I have, &c.

(Signed) JAMES MILNE WILSON.

HENRY DOBSON, *Esq., Solicitor Main Line Railway Company.*

The arrangement as to the remission of wharfage was therefore made in accordance with Mr. Henry Dobson's condition as expressed in his letter of the 11th August, and the Contract was signed by the Governor in Council on the 15th of that month, and then forwarded to England; while Mr. Coote, in following it there, took with him the letter above quoted, and had forwarded to him the draft Bill to be submitted to Parliament, intituled "A Bill to further amend 'The Main Line of Railway Act,' No. 8, 1871," in which was the following condition, quoted by you :—

8. Notwithstanding anything to the contrary contained in any Act, no wharfage rates shall be payable or paid to the Collector of Customs at the Ports of Hobart Town or Launceston on any railway plant, rolling stock, or materials entered to be landed at such ports by the said Company.

9. It shall not be lawful for the Governor in Council or for the Municipal Council of any Municipality, or the Trustees of any Road District, to make, levy, or raise any rate upon any property used or taken by the said Company for the purposes of the said railway and works, or upon the said railway and works, except for a supply of water where the same is used.

In placing this document in the hands of the Railway Company and their Contractors, Mr. Coote (a *quasi* agent of the Government under previous authority, and particularly the letters from the Hon. the Colonial Secretary of the 19th November, 1869, to the Crown Agents, and of the 21st April, 1870, to Mr. Coote) had no hesitation in stating that the Government of the day were powerful and reliable to carry out their engagements; and that in this, as in all constitutional governments, any contract made or condition agreed to by the Executive would be ratified by Parliament; and that therefore the remission of the wharfage and rating (which in the personal negotiations for the arrangement of the Contract had always been provided for, but were accidentally omitted in the draft) might be considered as the absolute conditions of the Contract.

Upon this information, and on these conditions, the Contract was signed by the Company on the 15th March, 1872. And although the Bill had been rejected on the 8th December, 1871, the Government did not in any way inform Mr. Coote or the Company to this effect; and the first intimation thereof occurred in a letter from Mr. Dobson to Mr. Coote, which the latter received at Brindisi on April, 1872, while on his way out to the Colony with the Contractors and their Staff.

It would appear, therefore, that the Company have both reason and the equity of custom in such cases for considering that the remission of the wharfage and rating were primary conditions of their Contract with this Colony; and their view of the matter is confirmed by the remarks made on the second reading of the Bill on the 8th December, 1871, which I quote from the *Mercury* of the following day's date. The Honorable the Attorney-General stated, in the course of the debate,—

Honorable Members could scarcely have paid sufficient attention to the provisions of the Bill, or they would see that there was not a single clause in it that was not foreshadowed in the correspondence between the Government and the Company. It was distinctly understood that such a bill would be submitted to Parliament, and not to have done so would have been a breach of faith. One Hon. Member had said, and he regretted exceedingly that he should have done so, that he felt himself at liberty to repudiate any contract of which he disapproved. If this doctrine were to be tolerated, the most shameless repudiation might be carried out from Parliament to Parliament. Did that Hon. Member hold that he might come down and repudiate a contract simply because in his then wisdom

he did not think the work would be reproductive?..... It would be a matter of deep regret to the people of Tasmania that Hon. Members should on any account repudiate the action of the Government. The Government had a right, after the previous action of Parliament, to see that the terms of the contract were fair and equitable, and they had made no terms or arrangements which they had not been justified in making; and that being the case, it was not well that Hon. Members, although they had not been Members of the House when the contract was authorised by Parliament, should take advantage of their individual immunity not to hold themselves bound by the action of the former Parliament. He thought the Company should mete a more fair and generous support on the present occasion, and that no advantage should be attempted to be taken of the present occasion, when the measure proposed simply sought to supply certain omissions, and thus enable the Government to carry out the other Bill; and he considered that whatever the feelings of Hon. Members might be in reference to the Main Line Railway, they had no right, under the circumstances he had pointed out, to attempt to defeat this Bill.

The Hon. the Colonial Treasurer also stated, referring to the Company :—

He considered that they were bound by their agents. They consented to accept a 5 per cent. interest on £650,000 on certain conditions, saying they would make the line on certain conditions. Government now came to the House to ask their concurrence in the desired concessions..... If they refused their sanction the contract might be interrupted, and the Parliament might be called upon to provide for any liabilities incurred through the breach of contract.

These views were also concurred in by other Members of the House, and in the editorial of the *Mercury* of the same date it is stated :—

The result of last night's debate on the Bill to further amend the Main Line Railway Amendment Act was an event in our Parliamentary history much to be regretted. Not, we should hope, that the railway is thereby endangered, but because one of the branches of the Parliament of Tasmania, and that which is considered to best represent public opinion, has, by a solemn vote, and after due deliberation, almost every Member having expressed his opinion, introduced as a justifiable principle in our legislation the right of Parliament to repudiate the engagements of the Government, entered into with its sanction and acting under its authority. Hon. Members may seek to disguise to themselves the ugly fact, but no mystification or sophistry can get over the true signification of last night's vote..... which was tantamount to saying: "Ministers may have committed themselves; but the very fact of their having to apply to Parliament for further powers shows they have not legally committed the Colony; and whatever may be the effect as to Ministers, our antipathy to the Main Line Railway is such that we will avail ourselves of any quibble or loophole to shake the Colony quit of the responsibilities of Government."..... What shall we say of the inconsistency of those who, having entrusted to Government the task of making the best bargain they could for the construction of the railway, now refuse their assent to the action of Government, done in compliance with their own instructions? They pledged themselves, Parliament and the Colony, to Government; and asked Government to pledge itself to the Main Line Railway Company; and in exposing themselves to a charge of bad faith they ask the Government to be *participes criminis* with them. In fact, they place Government in the unenviable position of not only repudiating their engagements, but of bringing into disrepute the credit of the Colony.

They have done what in them lies to ruin the good faith of the Colony, and bring Tasmania into contempt. Apart from the petty jealousies and considerations which actuated the majority, the result of last night's division is likely to cast a stain on the Colony. It may be, as was argued, that the Company have too good a bargain to lightly throw it away, and that they will accept the contract divested of the stipulations which the Attorney-General said the Government were bound in honor to submit to Parliament, and which Parliament was equally bound to sanction. If the Company so act, we need not wonder if they consider themselves defrauded, and absolved from all regard to honorable dealings in their after treatment of the Colony,—a nice position to occupy with a Company, on a proper understanding with which so much depends. And it will be a lesson not lost on others, effectually damning our good faith and our character as an obligation-fulfilling Colony.

"And," in the language of the Attorney-General, "an act of shameless repudiation, damaging to our credit as a community, and our reputation as honest men."

If the views above expressed are held by wholly disinterested persons resident in this Colony, it cannot be surprising to find that those who are personally and pecuniarily interested in the Main Line Railway have the same ideas, and feel that they have not received from the Legislature of Tasmania that reciprocity and consideration to which their immediate and liberal contribution of the required funds, and their vigorous prosecution of the construction of the Railway, should in their opinion fairly entitle them.

Without, therefore, adding any further remark, I think it has been shown that the honor and good faith of the Colony are in a great measure involved in the questions above mooted, irrespective of the consideration as to whether these may or may not be strict legal or equitable conditions of the Contract.

I have, &c.

(Signed) CHARLES H. GRANT, *Engineer*.

The Hon. T. D. CHAPMAN, *M.L.C.*,
Colonial Secretary.

Colonial Secretary's Office, 31st August, 1874.

SIR,

I HAVE the honor to acknowledge the receipt of your letter of the 22nd instant, in which you inform me that the Company strongly entertain an opinion directly contrary to the tenor of my letter to you of the 14th instant, upon the question of the payment of wharfage upon goods imported for the construction of the Main Line of Railway.

The Government are compelled to differ from the conclusions drawn by you from the various quotations contained in your communication, as expressed in the last paragraph.

You must be fully aware that the action of any Responsible Government, under Free Institutions, is controlled by the decisions of the Parliament; and the letter of the Colonial Secretary to Mr Henry Dobson, of the 22nd August, 1871, contains no pledge beyond that of submitting "to Parliament a Bill to enable the Governor in Council to exempt from wharfage rates the Railway plant in question."

The Contract contained no provision for the remission of wharfage rates,—such remission depending entirely (as the letter above quoted, and which Mr. Coote took with him to England, clearly shows) upon the concurrence of Parliament in the measure which all the Members of the Ministry, in redemption of their pledge, submitted to, and supported in, the Legislature.

The Company, when signing the Contract, could not be ignorant of the contingency that might, and as it proved did, arise of the refusal by the Parliament to pass the Bill containing the clauses remitting the wharfage rates; and though Mr. Coote at a former period was authorised to negotiate for the construction of a Main Line of Railway upon terms and conditions specially set forth, his mission failed. Mr. Coote subsequently returned to the Colonies, bringing with him an offer from, and acting as the Agent of, the Tasmanian Main Line Railway Company.

From this time Mr. Coote could not in any way consider himself, or be considered by others, as an Agent of this Government, or as speaking with authority under a commission which had absolutely terminated.

His statements therefore to the Company, which without question were made in good faith, as to the ability of the Executive Government to pass such a measure, could only be accepted by the Company as the expression of the opinion entertained by their Agent, but which could not, even by implication, involve the Executive Government in the remotest degree.

The Government cannot recognise that the Colony has been guilty of the slightest approach to a breach of faith, as you infer in your letter, in consequence of the Parliament declining to legalise the remission of the wharfage rates referred to; and the Company must have been fully aware of the fact, that such a contingency might arise, when the Contract was entered into.

I have, &c.,

(Signed) THOS. D. CHAPMAN.

C. H. GRANT, *Esq., Engineer-in-Chief,*
Main Line Railway Company.

*Tasmanian Main Line Railway Company, Limited, Engineer's Office,
Hobart Town, Tasmania, 25th July, 1874.*

SIR,

I HAVE the pleasure to return herewith the diagram of alternative routes of the Main Line Railway, which you kindly lent me.

You will notice that I have added thereto the last section of Mr. D. Climie's line, which I also return herewith.

I have, &c.,

(Signed) CHARLES H. GRANT.

B. T. SOLLY, *Esq., Assistant Colonial Secretary.*

Colonial Secretary's Office, 4th August, 1874.

SIR,

I HAVE the honor to acknowledge the receipt of your letter of the 25th ultimo, returning the diagram of alternative routes of the Main Line Railway; and I desire to thank you for having added the last section of Mr. D. Climie's line, which I also received.

I have, &c.,

(Signed) THOS. D. CHAPMAN.

C. H. GRANT, *Esq., Engineer-in-Chief,*
Main Line Railway Company.

*Tasmanian Main Line Railway Company, Limited, Engineer's Office,
Hobart Town, Tasmania, 3rd September, 1874.*

SIR,

I HAVE the honor to forward you herewith, for the information of the Government and the Members of the Legislature, a diagram of the gradients on the various routes proposed for the Main Line Railway by Messrs. Doyne, Major, & Willett, Mr. Daniel Climie, the late Mr. Wylie and on the line constructed by the Main Line Railway Company. I would also have added Mr. Sprent's line, which very nearly corresponds with that of Messrs. Doyne & Co. and with the existing Railway, had the distance mentioned in his Report of the 18th February, 1856, been sufficiently exact to allow of a section being accurately drawn.

The gradients are plotted from the original documents, and I believe are correctly shown. The same base line and the same scales, both horizontal and vertical, are used for each section; and, therefore, the relative character of the inclines are seen by a simple inspection of the diagram.

I scarcely need mention that it would be practically impossible in any country to make a long length of line entirely level, or but just sufficiently inclined to facilitate drainage; but, were such a line obtainable, it would doubtless be operated to the best advantage. Failing this, the very best line, both for speed and economy in working, is obviously that which has the shortest lengths of severe gradients and the least heights to rise and fall; or, in other words, the most alternating character without any great and sudden ascents and descents being necessary.

On applying this elementary principle to the examination of the gradients indicated in the diagram, I venture to submit that the route adopted for the Main Line Railway fulfils the conditions in the most striking manner, and is much better than the line proposed by Messrs. Doyne & Co., on account of the greater severity of his rise at the Flat-top Hill and his two reversing stations, while that proposed by Mr. Daniel Climie is very extreme in its departure therefrom; and, moreover, his line is, on his own last statement, four miles longer than necessary; but, shortly before this, he calculated the excess distance at nearly eleven miles against his line.

In the diagram I have, for the sake of clearness, given the grade levels only, omitting the line of the natural surface of the ground, because on this occasion I simply desire to show the relation of the working capabilities of each line, irrespective of the difficulties of construction.

I have, &c.,

(Signed) C. H. GRANT.

Hon. T. D. CHAPMAN, M.L.C., Colonial Secretary.

Colonial Secretary's Office, 3rd September, 1874.

SIR,

I HAVE the honor to acknowledge the receipt of your letter of this day's date, forwarding a diagram of the gradients on the various routes proposed for the Main Line Railway, and to thank you for the same.

I have caused the diagram to be exhibited in a room in the Parliamentary Buildings, where the information it contains will be available for the Members of the Legislature.

I have, &c.,

(Signed) THOS. D. CHAPMAN.

*C. H. GRANT, Esq., Engineer-in-Chief,
Main Line Railway.*