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*Proceedings of the Madras Government, Public Works Department,
14th February 1871.*

No. 328 Read the following letter from the Acting Consulting Engineer for Railways, to the Secretary to Government, Public Works Department, dated Madras, 21st January 1871, No 33 —

I HAVE the honour to submit the trace of the proposed extension of the Great Southern of India Railway laid down on the Ordnance Map, together with surveys and sections of the whole line, and report of inspection lately made by the Deputy Consulting Engineer.

2 The estimates for the construction of the line are not quite ready for despatch, but as the Government of India have expressed their readiness to sanction preliminary outlay on the preparation of materials, Engineers' bungalows, etc, when the location of the line is approved, such information is now afforded, with reference to G. O, No 2,406, dated 5th October 1870, as will, it is hoped, be sufficient for the final sanction of the route chosen, so that the Engineering staff may find employment in the preparation of materials pending the sanction of the detailed plans and estimates. The Chief Engineer of the Great Southern of India Railway reports, in his letter of the 16th September 1870, on the portion of the line to the south of Madura, and points out that a mistake was made in attributing to Mr. Carr, the former Chief Engineer, the selection of a trace too far eastward, inasmuch as the Deputy Consulting Engineer in 1868 took an alternative and rejected trial survey to be the one adopted by Mr. Carr; and the Government, in their Order of the 5th August 1868, No 2,510, gave the preference to the line described by the Collector of Tinnevely and Captain Lindsay.

3. Correspondence relating to the Southern Extension dates back upwards of ten years. The proposition in 1861 was for a railway between Madura and Tuticorin. The survey was carried out in 1862, and Mr. Carr's report thereon to the Board of Directors, dated 8th September 1862, is published in G. O, No. 580, dated 20th October 1862. It was then observed by the Government that the Great Southern of India Railway Company were not likely to undertake the construction of the line unless under a guarantee of interest on the capital expended, and the Government were not prepared to recommend that the guarantee should be given.

After an interval of five years negotiations were entered into between the Secretary of State and the Directors, See G O, No 3,079, dated 4th October 1867 regarding the construction of a line from some point on the Great Southern Railway through Madura to Tuticorin. The question as to the route to the north of Madura, which had been deferred in G. O, No. 205, dated 16th March 1861, was then brought forward again, and the Government decided that an examination of that part of the country should be made by the Railway Engineers, but that a second inspection of the country between Madura and Tuticorin was not necessary.

A cursory examination of the country along the alternative lines from Caroor and Trichinopoly to Madura having been made by the Chief Engineer, Mr. Dibblee, whose report of the 9th January 1868 is strongly in favour of the western

line by Caroor, the Government directed the concentration of the survey parties on the Caroor and Dindigul line. The
G. O., No 520, dated 14th February 1868 direction of the line from Tuticorin

through Madura to Dindigul being thus determined, a fresh question arose for consideration as to the section in continuation from Dindigul on account of the contract for the extension of the Tramway from Arconum as a first-class Railway to Cuddalore, and the more remote but probable contingency of the Carnatic Railway being carried on to join with the Great Southern. Under this new aspect it appeared to the Government that Caroor is too far from the direct route to the south from Trichinopoly and places eastward, but that Dindigul should not be avoided from its own importance and position commanding the traffic from the west, while the more circuitous route in this direction would, by its far greater accommodation to the public, more than compensate the disadvantage of losing the direct line from Trichinopoly to Madura. It was therefore finally

determined that the extension should be
G. O., No. 1,257, dated 16th May 1870 carried out from Trichinopoly through Dindigul.

4. The whole subject has been much under the attention of the Government in the past three years, and the detailed reports are recorded in their Proceedings, so that I will only briefly recapitulate the reasons which have led to the selection of the line now adopted.

The question of promoting the production of cotton in India drew the attention of the Directors of the Great Southern of India Railway Company to the important cotton district of Tinnevely, and Tuticorin being the only port for shipment, became necessarily the terminus of the proposed railway. The line to Madura had therefore to be laid out, so as best to serve the cotton-growing tracts; at the same time it was essential that there should be communication with the important town of Tinnevely, situated in the centre of the highly-cultivated valley watered by the Tambrapoorney, and in the line of a large traffic from the Travancore country northwards to Madura and the Coimbatore and Malabar Districts. The most direct line would run from Tuticorin through Ettiapuram and Aroopocottah to Madura, but Mr Carr considered in 1862 that the principal centres of traffic were at Tirumungalum to the north, and at Covilputty midway between the town of Tinnevely and the northern limit of the district, and his trace was taken through these places running at first westward on leaving Tuticorin, so as to give accommodation to traffic coming from the town of Tinnevely and the country to the west and south of it. It was not then intended to bring the line into Tinnevely, but it was supposed that a branch into that town, and, perhaps, further, would afterwards be found necessary. The route selected, though involving a greater length of line than the direct route, was found to be better suited for economy of construction and maintenance, inasmuch as it runs through higher land less liable to floods and less intersected by nullahs.

In April 1868, Mr. Puckle, the Collector of Tinnevely, stated that a direct line from Madura to Tuticorin would pass through the poorest part of the district, where there is not a single town; it would skirt the extreme east of the cotton fields, and would miss carrying rice from the Tambrapoorney

valley, and timber from the hills. On the other hand, if the line followed the trunk road from Madura to Khytar, thence branching to Tuticorin and Palamcottah, it would pass through Virduputty, Satoor, and Khytar, all centres of trade, it would also not be far from Sevakasi on the west, and Ettiapuram on the east, the country between growing cotton and tobacco and requiring much

rice and salt In July 1868, Captain
Vide G. O., No 2,510, dated 5th August 1868. Lindsay wrote in favour of the same trace, that from Madura to Khytar the land is almost perfectly level, the banks need not be high, and but little waterway to be provided; building material to be found in the neighbourhood of the lime, and kunker met with a few feet under the surface of the cotton soil. From Khytar or thereabouts a branch should run into the town of Tinnevely, thereby connecting the latter by the shortest line possible with Madura, and the station at Tuticorin to be placed in the centre of the town (rather than to the north as proposed by Mr Carr) where there is an excellent site affording a clear way to the beach, and where a pier for the landing of railway material may be constructed. Mr. Logan, the present Chief Engineer, in his recent report, adheres very nearly to this latter route; but considers that Khytar is too far removed from the great and increasing traffic between the town of Tinnevely and Tuticorin, besides involving the haulage of that traffic over an unnecessarily high summit, he has therefore selected Keel-Munniachce as the point of bifurcation, diverting thereby the northward traffic only slightly out of the direct line from Tinnevely, and making more direct the line of traffic of imported goods from Tuticorin northwards to Madura. Mr. Logan has also fixed on a central position in Tuticorin for the Terminal Station.

5. Captain Smith having lately inspected the whole of the survey trace reports chiefly on the proposed construction of the line, its gradients, curves, facilities for materials being obtained, and engineering difficulties, and I agree with him in opinion that the line finally adopted by Mr. Logan is the best, both as to economy of construction and commercial convenience. The only question as to the alignment has been whether the branch to Tinnevely should leave the main line at or about Khytar, or if the main line should run more to the east.

If the route by Khytar were adopted, we should have the following distances.—

	Miles
Madura by Khytar to Tinnevely . . .	92
Do. by do. to Tuticorin . . .	102
Tinnevely by do. to do. and by the easterly route	46
Madura by Keel-Munniachce to Tinnevely . .	98
Do. by do. to Tuticorin	99
Tinnevely by do. to do. . .	37

Thus while by the line proposed goods carried from Tinnevely to Madura will have 6 miles additional journey, the mileage between Tuticorin and Madura is reduced by 3 miles, and that between Tinnevely and Tuticorin by 9 miles. The route through Khytar has not been surveyed, but as Khytar and Keel-Munniachce are just about equi-distant from Tinnevely, the distances between those two places, or about 9 miles, is the difference between the alternative lines from Tinnevely to Tuticorin. The line through Keel-Munniachce runs through

a more populous country than that following the trunk road from Coivilputty to Khytar; and though Khytar is a Sub-Magistrate's station, and on the shortest line between Madura and Tinnevely, I think, as traffic considerations have led to the line being taken from Trichinopoly by Dindigul to Madura involving about 19 miles additional length of railway as compared with the direct line, the slightly increased distance from Tinnevely through Keel-Munniachee northwards should not weigh against the great advantage thereby given to the Tuticorin traffic, both between that port and Tinnevely, and also along the main line to Madura.

6. In 1867, the Chief Engineer, Mr Dibblee, made a *reconnaissance* of the two routes from Trichinopoly to Madura and from Caroor to Madura. The Government observed thereupon that no engineering difficulties were found on either; but on the eastern line, the Vellaur river has to be bridged, and a rather abrupt water-shed to be crossed, while on the western line, no river of any size is encountered, and the country is easy. The arguments used in support of the eastern route were that the (then) present movement of traffic was nearly 100 per cent. in excess of that by the western route, and that the Tanjore and Trichinopoly traffic would be lost if the Railway were taken from Caroor. The Government, however, were inclined to think, on consideration of all the information collected, that, notwithstanding the apparently larger traffic on the eastern route, owing, presumed, to the existence of a good road and to a large temporary demand for food grains in the southern districts, in consequence of the deficient harvests of the two past years, the western route was the more promising. It was generally considered that the through traffic, would, under any circumstances, be secured to the Railway, there was little development of local or other traffic to be expected on the eastern route; while on the other, populous and productive portions of the Madura and Coimbatore Districts would be opened up, and the Madras Railway, with the districts it commands, would be brought into the most direct communication with the south. Captain Lindsay, in his report of the 15th February 1868, says, that he gives the preference to the Dindigul route, on account of easier gradients and a better crossing over the Vigay river, that the Madura Talook would be opened up, and the Pulney Talook brought within 30 miles of the line, the rich Cumbum valley would be tapped, and though part of its southward traffic would probably not take the rail before Madura, the whole of the northward traffic would be carried from a point about Ammanaikenoor. Along the eastern route from Trichinopoly, there are no towns or villages of importance, and no tract of country likely to be improved in the vicinity of the line. Captain Lindsay sums up the advantages of the western route, as recommended by officials and native merchants, that it is the shortest way to Madras and both coasts, that it runs through a more productive country, and that it has an extensive trade with the west, which would be caught by this line only.

Mr. Dibblee reported in August 1868 on the survey then made between Caroor and Madura. For 16 miles out of Madura, he decided on adopting a line to the north of the river Vigay, in preference to that which he had first taken on the south. By this line there is the advantage of having a better site for the station both from proximity to the town from having level ground and facilities for

drainage. The crossing of the Vigay on this line is favourable, from there being nowhere more than 10 feet of sand over the rock, while, by the other line, the sand was found to be 20 feet in depth for 6 chains in length rendering the foundations of a bridge very expensive. Likewise, on the north of the river, the land to be taken up is much less expensive, being more than half dry land or waste, instead of all irrigable land as on the south bank. Between the Seroomullays and the Lower Pulney hills, the valley is contracted to a pass scarcely 1 mile in width, so that the position of the line is fixed without any choice. The ground rises regularly for 15 miles from the Vigay river to the summit, and then falls gradually again for 7 miles to Dindigul. The earthwork required is very light; in fact only such as is necessitated to allow for drainage openings.

Mr. Logan has adopted much the same line, the station at Madura being placed by him close to the town on the west side, and the route on the north bank of the river being chosen in preference to that on the south. From Dindigul towards Trichinopoly the location of the line, by Captain Smith's present report, is determined by the narrow gorge between the hills near Iyaloor. From this ridge the line passes round the foot of the Taikmullay hill, and then enters on the descent into the plain round Trichinopoly; at 8 miles beyond the Taikmullay hill the direction of the line becomes guided by the course of the Arriaur river, which, 4 miles from Yellangakoorchy, occupies the gorge between two detached hills. After rounding the hill and passing the village of Munnerparay, the line follows the right bank of the Arriaur for 6 miles; then leaving it crosses the ridge close to the village of Colattoor, and, finally, after crossing the Coryaur river, enters the cantonment of Trichinopoly, joining the Great Southern Line on the high ground to the south of the town, where it is proposed to build the new station.

7. As regards the produce of the country that will be affected by the Railway, information has been recorded that the bulk of local traffic in Madura District is from the west to the main stream passing north and south, that is from Travancore through Tinnevely, to Madura; there being hardly any trade with the portion of the district to the east of the town of Madura, except in salt and salt-fish. The cotton grown in the south of Coimbatore and north-west part of Dindigul Talook is conveyed to Tuticorin or Palamecottah by Dindigul. The Madura District receives supplies of betel-nut, curry-stuff, pepper, spices, and oil, by Palghaut and Dindigul from the West Coast. From Madras, Salem, and Bangalore, trade is carried on in cloths, cotton-twist, iron, hides, English goods, potatoes, wheat, sugar, etc., to Trichinopoly, and for the southern districts of Madura and Tinnevely. Salt which is now brought from the East Coast of Madura will be conveyed in large quantities from Tuticorin, and will be supplied by the rail road through Madura to the Cumbum valley to Dindigul and the Coimbatore District. The Cumbum valley grows grain, garlic, mustard, oil-seeds, wood, bamboos, fruit, and these products find their way both through the Dindigul valley northwards to Madura and into the Tinnevely country. Tobacco is grown about the Pulney Talook and in the north-west part of Tinnevely round Streevelliputur and Shivegasi, whence it is conveyed to Dindigul and Trichinopoly.

In contrast with the numerous products on the west of Madura, the produce of the country lying to the east and north-east is almost entirely grain, no cotton at all is grown, and there is an absence of those soils which are favourable to the production of cotton, tobacco, etc. In Madura there is a large manufacture of cloths, which are exported to Tinnevely and Travancore, while cloths are also sent from Tinnevely into Madura to be dyed. Jaggery is sent from the south to the north parts of Tinnevely, also on to Madura and Coimbatore. Cotton seed is exported from Tuticorin, and also travels northwards on its way to the Trichinopoly and Tanjore Districts.

Cumboo, onions, chillies, oil-cakes, rice, and paddy are the principal exports from Tuticorin to Columbo, the traffic on land in timber, jute, and salt-fish, though not as yet extensive, is likely to be much developed by the construction of the railway.

The export of cotton from Tuticorin has been estimated at 12,000 tons in the year, and the total amount of goods passing north and south between Madura and Tinnevely and Tuticorin at 212,000 tons per annum. From the statistics

G O, No 2,510, dated 5th August 1868. furnished in 1868, there was a fair promise, in the opinion of the Government, that the traffic in goods alone would nearly pay 5 per cent on the cost of construction, supposing the length of the line to be 125 miles, and the expenditure £7,000 per mile. The length of the line, as now surveyed, is 117 miles, but as detailed estimates are not yet furnished, the cost of the southern section of the Railway cannot at present be compared with the expected receipts

8. Over the whole length of the line, from Trichinopoly to the two southern points, there is no really heavy gradient, and with the exception of a curve of fifty-two chains radius at the Munniachee Junction, and another of forty chains radius on quitting the Vigay bridge on the north side, there is no curve proposed of less than 1 mile radius

The country traversed nowhere presents any real difficulties for the Engineer to contend with. Between Trichinopoly and Madura, the ruling gradient cannot be less than 1 in 100, owing to the height of the ridge 7 miles to the south of Dindigul, and the fall from thence in the valley of the Vigay river. From Madura to Tuticorin and Tinnevely, the ruling gradient need not be more severe than 1 in 200. On the sections now forwarded some gradients are shown steeper than this, but from Captain Smith's discussions with Mr. Logan while going over the ground, I anticipate that in the detailed estimates these gradients will be reduced.

The site of the bridge over the Chittaur river, 11½ miles out of Tinnevely, has been judiciously selected below the point where a large stream called the Oopaur falls in, so as to avoid a second bridge, and as high up the river as possible, on account of the rise to the ridge near Munniachee. Beyond Kuddumboor, the line has to be diverted from the straight and skirts along the west side of a range of low hills to Covilputty. The Satoor river is crossed at a point a little below the bridge on the high road, and Mr. Logan proposes a bridge of twenty spans of 50 feet. After passing through Terumungalum and Virduputty, the line runs close to the foot of the Sekunder Mullai, a detached hill 4 miles from Madura, where

excellent building stone is obtained. The Madura station ground is close to the western extremity of the town, but clear of all buildings, the bridge over the Vigay river is designed of twenty-one 50-feet spans. The line follows up the Vigay valley for 14 miles to Sholavandon, and then changing direction to the north runs round the Siroomullay hills, with a heavy ascent of 1 in 100 for 3 miles, to attain the elevation of the ridge at the head of the valley. From this ridge there is a descent now in the Cauvery drainage basin to Dindigul, where the station is placed on the east side about 1½ miles from the native town. From the Iyaloor gorge, there is a descent in 4 miles with gradients of 1 in 100 and 1 in 110, to Covilputty. Four miles north of Yellangakoorchy, the Arriaur river occupies another gorge, but it appears feasible to make a new cut for the diversion of the stream, and thereby save the alternative of building two bridges over the river, or else running a tunnel through the side of the hill. Below the Samudrum tank where a breach in the bund has formed a channel which the river is inclined to follow in divergence from its own course, the river must be retained in its original bed. Beyond this point the line is laid out to avoid as much as possible, by easy curves, the numerous tanks till it joins the main line at Trichinopoly.

9. Some alterations will be made in details of the exact location of the line, such as shown in paragraph 7 of Captain Smith's report, while also the drainage areas are being more fully investigated, in order to determine finally the waterway to be given at different places; but these matters and the reduction of some of the gradients do not affect the general alignment, and I consider it unnecessary to keep back this report, as all information will be furnished shortly with the detailed estimates.

10. There are only two bridges of any magnitude on the extension, namely, over the Vigay and Satoor rivers, where it is proposed to allow twenty-one and twenty spans of 50 feet. I am not altogether satisfied that larger spans would not be advisable so as to reduce the obstruction in the waterway during heavy floods. Both of these rivers are dry for many months of the year, and ordinarily no floods of any depth come down. The banks are tolerably well defined as to the usual amount of drainage, but occasionally, after heavy falls of rain on the hills, the freshes rise very rapidly, and the water not being contained in the normal section of the river bed, there being also no protective embankments, the river spreads over the country where low along the edge there is consequently a great accumulation of water where the stream is impeded as by the embankments leading up to a bridge. This was strongly exemplified during the storm in November 1869, when the Satoor bridge gave way. This bridge consisted of seventeen arches of 40-feet span, and the waterway was not near sufficient to carry off the great flood. I have referred this question for Mr. Logan's further consideration.

11. At Tinnevely, the Terminal Station is placed quite to the west of the town at a distance of 2 miles from the bridge over the Tambrapoorney, and 4 miles from the native town and cantonment of Palamcottah, while the approach to the station will be by the very narrow roads in the town of Tinnevely. Mr. Puckle has not yet expressed his opinion, but I am in communication with him regarding the site. Another station is provided only a mile off at Tetchanellur, which would be a general passenger station for Palamcottah, just as Perambore

has been for Madras Tetchanellur is at the point where the trunk road branches off both to Tinnevely and to Palamcottah, and is about the same distance from Palamcottah as the west side of Tinnevely. All traffic from the south of the river must cross by the bridge, which it is hoped will be restored before the railway is opened, and this traffic will be greater than that from any other quarter, for all from the east and north will have the railway already, and there is left only the western traffic to be accommodated such as comes from the north side of the river. A station close into Tinnevely will be of great convenience to the merchants of the town, but from the short distance to Tetchanellur, it seems questionable whether two stations are required in such close proximity, and if not, which of the two places is on all considerations to be preferred. Not being prepared to make a distinct recommendation to the Government just now, I will take care to do so in my next report when submitting the estimates.

Report on the trace proposed for the Great Southern of India Extension.

THE general direction of the line has been so fully discussed in previous correspondence, and favourably noticed in the Government orders thereon, that, in reporting on the trace as at present staked out, I have assumed, as fixed points, the towns of Madura, Tirumungalam, Virupputty, Satoor, Covilputty, Tinnevely, and Tuticorin, and confined my remarks to the question whether, having regard to economy in working hereafter, as well as in first cost, the present trace deviates as little from the straight route between these towns, and presents as easy gradients as the nature of the country will permit, noticing what facilities exist for procuring building materials, and what engineering difficulties present themselves. The town of Khytar was also mentioned among the towns to be served in the previous reports, but engineering considerations, as well as a desire to serve the better populated valley of Kuddumboor and district east of it, determined the Chief Engineer to adopt the present trace.

2. LINE DIVIDED INTO TWO SECTIONS.—The line may be considered as divided into two distinct sections.—

(1) That from Trichinopoly to Madura, on which the ruling gradient must be 1 in 100.

(2.) That from Madura to Keel-Munniachee and thence to Tinnevely and Tuticorin, on which the ruling gradient will be but 1 in 200.

3. TUTICORIN TO KEEL-MUNNIACHEE.—Starting from the station ground at Tuticorin, conveniently situated near the sea-shore and nearly midway between the extremities of the town, the line first crosses a few miles of drift sand, with little or no drainage to provide for; thence, ascending with a moderate gradient, it crosses a ridge and enters the valley in which is situated Vomericcottah; here a drainage area of about 67 square miles is provided for; thence, the line gradually rises to Keel-Munniachee, a village near the crest of the ridge which separates the Kuddumboor valley from that of the Chittaur; third-class stations are provided near Vomericcottah and at Keel-Munniachee (the junction); a first-class station is provided for at Tuticorin.

4. TINNEVELLY TO KEEL-MUNNIACHEE.—At Tinnevely the station ground has been selected to the extreme west of the town; engineering considerations favour this site, and it met the approval of the Acting Collector. It has the disadvantage of being at the furthest point from Palamcottah and the bridge over which much southern traffic must pass, and of having very restricted approaches from the town and bridge. The question has been referred to the Collector. From the town of Tinnevely the line will pass over wet lands (unavoidably for some 3 miles), it then, passing close to Tatchanelloor, skirts the low range of hills to the north, and, avoiding tanks as far as possible, runs nearly straight to the crossing of the Chittaur. A third-class station for Gaingoondaun, distant from the line about 1 mile, being proposed at the 9th mile from Tinnevely. The site for this bridge was fixed with a view, first, to obviate the necessity for a second bridge over the Oopaur, (a large tributary of the Chittaur,) and, secondly, to cross as high up as possible on account of the gradient thence to the ridge near Keel-Munniachee.

From the Chittaur bridge, where the drainage from 901 square miles is provided for, the line rises along the face of a spur, crossing only one small drainage (of about 14 square miles) over the ridge to Keel-Munniachee, the rising gradient here of 1 in 150 can be reduced to 1 in 200.

5. KEEL-MUNNIACHEE NORTHWARD TO KUDDUMBOOR.—From Keel-Munniachee northward the line follows the eastern face of the ridge, which extends from Kuddumboor, at the head of the valley towards the Vulnad hills; at Kuddumboor it crosses the water-shed into the basin of the Oopaur, having that far provided for the drainage of an area less than 20 square miles, and having crossed two small shallow tanks, neither of them worth avoiding.

6 KUDDUMBOOR TO COVILPUTTY.—From Kuddumboor, where a third-class station is provided, the line, after passing between two detached hills, has to be diverted from the straight route to Covilputty to avoid a range of low hills at the foot, and to the west of which it is laid out; the soil is "black cotton" throughout, and only one small drainage is crossed.

7. COVILPUTTY TO SATOOR.—At Covilputty the line crosses the water-shed separating the basins of the Oopaur and Chittaur. A second-class station is proposed here.

For the first 5 miles from Covilputty the line is laid out with easy gradients, over dry lands, for the greater part, until it approaches the drainage near Nuttree, where the gradients proposed are 1 in 165, and 1 in 150. These will be reduced, either by a slight alteration carrying the line below instead of above the Kandjanputty tank, or by increasing the earthwork.

This drainage is estimated at 70 square miles. The line then passes close to the Wudduecurra hill, where excellent building stone is procurable, and curving a little to the west, passes through a small village; but the Chief Engineer agreeing with me that the village is worth avoiding, a diversion will be laid out, with this view. After passing the village the line enters within the flood line of the river known as "the Satoor river," a main branch of the Vypaur, draining upwards of 750 square miles. This it is proposed to cross by 20 spans of 50 feet. The choice of site for the bridge was limited by the necessity for carrying the line close to the large village of Satoor, and to avoid the large tank east of it; the site appears a favourable one, but before the estimates are submitted, the bed will be

thoroughly examined, and the nature and extent of the foundations necessary ascertained.

8. SATOOR TO VIRDUPUTTY—A third-class station is proposed for Satoor. Leaving this the line passes still over black cotton soil, crosses two large drainages of 77 and 428 square miles area respectively, and, passing over the extremity of a spur of quartzite with a small cutting and easy gradient of 1 in 240, enters the basin of another tributary of the Vypaur, draining some 90 square miles; from this to the station ground at Virduputty the line rises with a gradient of 1 in 168, but by moving the station ground a little further north, and a small addition to the earthwork, this can easily be reduced to 1 in 200, which the Chief Engineer has arranged for. A second-class station is proposed for Virduputty, and a fourth-class station about midway between it and Satoor, at a village called Patambudu.

9 VIRDUPUTTY TO TIRUMUNGALAM—From Virduputty to Tirumungalam the line runs nearly straight over black cotton soil, it crosses three considerable drainages, from basins of 47, 253, and 206 square miles area, respectively, there is only one gradient calling for remark, it is 30 chains only in length, 1 in 110, this will be reduced to 1 in 200. A second-class station is proposed for Tirumungalam, and a third-class station for Cheverucottah, 6 miles further south.

10. TIRUMUNGALAM TO MADURA—At Tirumungalam the line curves to the eastward with a 160 chains curve, and is carried nearly straight over wet lands for a great portion of the distance to the east end of the large Moolangecolum tank; it then skirts an adjoining small tank, close to the foot of the Secundermulay hill, where good building stone is procurable, and passes over rice lands to the extreme west of the town of Madura. A good site for a station ground and an apparently good site for the bridge over the river Vygay, which drains upwards of 1,500 square miles, are here met with. There are in this portion four gradients, 1 in 177, 1 in 100, 1 in 150, 1 in 100, which will be reduced each to 1 in 200. A first-class station will be provided at Madura.

11. REMARKS ON THE SECTIONS GENERALLY.—From the above sketch it will be seen that between Madura and the southern terminus, although the drainages to be crossed are extensive, the present trace offers no engineering difficulty of any kind. Except to avoid a village or tank, deviation from the straight, between the towns to be served, is rarely called for; the sharpest curve is that at Keel-Munmachee Junction of 52 chains radius, in no other is the radius less than 80 chains. Good building stone at no great distance from the large bridges, and lime almost anywhere along the line is procurable, as will be seen from form A. The very moderate amount of earthwork required to secure a gradient of 1 in 200 will be seen from Statement B, which accompanies this Report.

12. SECTION 2. MADURA TO SHOLAVANDAN.—The line leaves the Madura bridge, which it is proposed should consist of 21 spans of 50 feet each, with a curve of 40 chains, and, passing through a small shallow tank and across the corner of the Veilangoody tank, crosses a considerable drainage (the basin of which has not yet been fully investigated). It then passes close to the village of Paravay, through the shallow portion of the large tank, north of the village of Samianellur, and thence straight to Sholavandan. I have satisfied myself that the trace here, especially with reference to the tanks crossed, could not be improved upon. A third-class station is provided for Sholavandan.

13 SHOLAVANDAN TO AMMANAIKANOR.—Thus far from Madura the line has followed the course of the river Vygay, the water-way required being for the most part for supply channels from the river to the tanks, and for the re-distributing channels therefrom.

At Sholavandan the line leaves the river, and, turning to the north, crosses the drainage of the Serumallay hills, at the foot of which it runs. The main consideration affecting the location of the line here is the gradient of approach to the summit between Sholavandan and Dindigul, which is in fact the water-shed between the valleys of the Vygay and Cauvery.

The difference of level to be overcome between Sholavandan and the summit is 208 feet, and numerous trial surveys and sections have been taken to determine the easiest gradient. The trace determined on, giving a gradient of 1 in 100 for 3 miles, cannot, I believe, be improved upon.

On leaving Sholavandan the line curves to avoid the large tank, on the bund of which it passes, and after one or two easy and short curves, crossing no considerable drainage, but with gradients of 1 in 110 and 1 in 100, it passes close to and to the west of Ammanaikanoor, where a small cutting through the foot of a detached hill has been allowed for to save the large tank from interference.

14 AMMANAIKANOR TO DINDIGUL—From Ammanaikanoor, where a second class station has been proposed, the line rises to the summit, crossing, in a distance of about 10 miles, a series of small hill-streams from the Serumalays. From the summit to Dindigul the line falls about 70 feet over dry cultivated land, with here and there small hill-streams.

The station ground for Dindigul is proposed to be laid out east of the small hamlet where the market is now held, it is some mile and a half or more from the native town, but this was unavoidable, except at the cost of a steeper gradient, and a line altogether less favourable in an engineering point of view. The proposed site met the approval of the Sub-Collector. The station will be of the second-class.

15. DINDIGUL TO IYALLOOR.—From Dindigul the line again falls (56 feet), and then commences the ascent to the narrow gorge, between the hill ranges near Iyalloor, the position and level of which here determines the location of the line. The steepest gradient in this ascent is 1 in 132 for a distance of $1\frac{1}{4}$ mile.

The drainages crossed proceed from inconsiderable basins, but their beds have heavy falls, and they rise where rain will be very quickly passed off. After leaving the station ground at Dindigul the line skirts the village of Balakistnapuram with an S curve of 1 mile radii to avoid a series of tanks, and after running straight for 4 miles, along the bund of the Mooloopady tank, through the corner of the Vailvarcotta tank, it curves with two easy S curves, avoiding each of a series of six tanks, and reaches the summit near Iyalloor, where a fourth-class station has been provided.

16 IYALLOOR TO MUNNERPARAY.—From the summit the line descends in 4 miles (in which occur gradients of 1 in 100 and 1 in 110) to the village of Culputty, where a third-class station is proposed, thence, with gradients varying from 1 in 132 to 1 in 250, the line passes round the foot of the Taikmullay hill, and here, leaving the range of hills, commences the descent into the plain round Trichinopoly, the total fall from the summit to Trichinopoly in the 43 miles being 834 feet.

*Proceedings of the Madras Government, Public Works Department,
14th February 1871.*

For a distance of 8 miles from Taikmullay hill there is little of interest to guide the location of the line, which here runs nearly parallel to the Arriaur river; one large tributary, draining some 35 square miles, and several small hill-streams are crossed, most of the tanks having been avoided by turning the line with curves of 1 mile radius. A third-class station is proposed for the village of Yellangakoorchy, 7 miles from Culputty. Four miles from Yellangakoorchy the river Arriaur, which here carries the drainage of some 60 and odd square miles, passes between two detached hills, and so occupies the gorge that either a diversion of the river, a tunnel through the hill-side, or two bridges across the river, must be allowed for.

Judging from the appearance of the gorge, rock will not be met with within the required depth of cutting; the new cut between the two bends will not be a long one, and, I think, "the diversion" has been selected, as the most economical plan of the three, with good reason. From this gorge, after rounding the hill spur, and crossing a ridge with an easy gradient, the line passes through the shallow portion of the Munnerparay tank to high ground west of the village, where a second-class station is proposed.

17. MUNNERPARAY TO COLUTHOOR AND TRICHINOPOLY—For the next 6 miles from Munnerparay the line follows, as close as would be safe, the right bank of the Arriaur river; threading its way, with easy curves of one mile radius, through the small tanks and detached rocky hills which here rendered the location of the line a matter of some labour. At the 6th mile from Munnerparay the line is taken between the river and the Summootheram tank, at a point where the tank having breached has scoured out a deep channel, which the river, leaving its old bed, is fast appropriating; the diversion of the river to its old bed is necessary, not only for the location of the line, but for the safety of the tank, which the river here threatens to undermine. It is however a work of no difficulty, or doubtful result, as there is plenty of grass of the right description, and stone in the neighbourhood, while the line could hardly be otherwise laid out.

Shortly after passing this point the line leaves the river, and avoiding, as far as possible, the numerous petty tanks which here cover the country, crosses the ridge east of, and close to, the village of Coluthoor, where a third-class station is proposed, and, following the east face of this ridge, passes between two large detached hills, where good building stone is procurable, and after crossing the Arriaur river (drainage basin 151 square miles) enters the Cantonment of Trichinopoly, joining the existing line on the "high ground," where it is proposed to erect the new station building.

18. GENERAL REMARKS ON SECTION 2. TRICHINOPOLY TO MADURA—On this section it will be seen the gradients, rather than the water-way, form the most important considerations, and a class of engine, superior to that which would suffice for the section south of Madura, is, I fear, unavoidable; stone, lime, and firewood are to be found within easy distance, and I am of opinion that no better trace can be found for a line from Trichinopoly to Madura, *via* Dindigul, than that now proposed.

19. GENERAL REMARKS ON THE CHARACTER OF THE ESTIMATE, ETC.—I have discussed very fully with the Chief Engineer the character and extent of the drainage area, and the measures proposed to ensure due provision for the floods.

*Proceedings of the Madras Government, Public Works Department,
14th February 1871.*

As this subject will be more fitly treated when the estimates are sent forward for sanction, I will only add that every precaution is being taken to guard against error, and that I have pressed on the Chief Engineer's notice that the Government will require the fullest information as to the principles upon which the works have been designed, both as regards water-way and foundations, before sanctioning the estimates. I beg to report that should it be thought advisable, from any considerations as to gauge, the tract of country to be served, or otherwise, to alter the present trace, much valuable time and a large sum of money will have been wasted, as the surveys, plans, and estimates now in course of completion are in full detail, and not those of such a preliminary and approximate description as would have sufficed to determine the class and direction of the line to be adopted, and I would suggest that the Chief Engineer of the Carnatic Railway Company be invited to pay particular attention to this point in the preparation of his surveys. Should the present trace be adopted, the necessity for at once sanctioning the bungalows for the staff, that the officers may be housed on their work before the commencement of the ensuing hot season, can hardly be exaggerated.

(Signed) C. J. SMITH, Captain, R.E.,
Deputy Consulting Engineer for Railways.

A.

GREAT SOUTHERN OF INDIA RAILWAY, SOUTHERN EXTENSION.
List of large Bridges over 50 feet water-way

Name or position of stream.			Nature of building stone.	PROBABLE DISTANCE FROM LINE OF		
				Stone.	Lime	
	Miles	Chains		Miles.	Miles	
District 1 ...	0	46	Gneiss ...	2	Near Bridge	
Do ...	3	43	Do. ...	1	Do. ...	
Do 3 ...	1	64	Do ...	3	Do ...	
Do ...	9	43	Do ...	4	Do ...	
Do ...	16	0	Do ...	4½	Do. ...	
Do 4 ...	5	73	Do ...	2½	Do	
Do ...	8	29	Do. ...	1	Do ...	
Do 5 ...	3	9	Do	2	Do ...	
Do ...	7	57	Do.	1	Do ...	
Do 7 ...	Vygay	.	Do ..	6	3	
Do 8 ...	Goondar	...	Do. ...	7	Near Bridge	
Do ...	10	47	Do. .	2	Do.	
Do ...	14	10	Do .	3	Do	
Do 9 ...	7	30	Do. .	2	Do ..	
Do ...	12	40	Do ...	4½	Do	
Do ...	13	72	Do. .	5	Do. ..	
Do 10 ...	2	24	Do. ...	2	Do. ...	
Do ...	6	39	Do .	2	Do. ...	
Do ...	Vypaur	...	Do ...	4	Do. ...	
Do 11 ...	0	73	Do ..	3½	Do. ...	
Do 12 ...	2	3	Do. .	3	Do. ...	
Do ...	3	27	Do ...	3	Do ...	
Do 13 ...	1	16	Do. ...	At Bridge.	Do ...	
Do ...	3	28	Do. .	1	Do	
Do ...	4	35	Do. .	2	Do ..	
Do 14 ...	2	45	Do. ..	1	Do. ...	
	Chittaur		Do. .	2	1	

TRICHINOPOLY,
26th November 1870

(Signed) D. LOGAN,
Chief Engineer

(Limestone of excellent quality is to be had 13 miles from bridge. Ordinary lime is brought from 3 miles out of Madura.)

B.

GREAT SOUTHERN OF INDIA RAILWAY, SOUTHERN EXTENSION
Classification of Banks and Cuttings over 6 feet.

				EMBANKMENT OR CUTTING					
				Length over 6 feet and under 10 feet high or deep		Length over 10 feet and under 15 feet high or deep		Length over 15 feet high or deep.	
				Ms	Chs	Ms	Chs	Ms	Chs.
District 1	..	..		4	77	0	49	..	..
Do 2	..	..		1	57	..	..	..	..
Do 3	..	..		3	73	0	36	..	..
Do 4	..	..		4	25	1	26	0	11
Do 5	..	..		2	35	0	8	0	5
Do 6	..	..		1	53	..	..	..	..
Do 7	..	..		2	14	0	30	..	..
Do 8	..	..		0	70	0	11	..	..
Do 9	..	..		1	61	0	9	..	..
Do 10	..	..		2	2	0	51	..	..
Do 11	..	..		1	49	0	11	..	..
Do 12	..	..		0	27	..	..	..	..
Do 13	..	..		2	21	0	29	..	..
Do 14	..	..		2	23	..	..	..	..
Total...				32	27	4	20	0	16

TRICHINOPOLY,
26th November 1870

(Signed) D LOGAN,
Chief Engineer.

From the Chief Engineer, to the Agent of the Great Southern of India Railway, dated Trichinopoly,
16th September 1870, No 2,471

I HAVE to acknowledge receipt of your letter* informing me that Government are prepared to consider the surveys of the Southern Extension, in order that lock-spitting and acquisition of land may be proceeded with at once; and I have now the pleasure to forward copies, in duplicate, of the working surveys and sections of District Nos 7, 8, 9, 10, and 11, forming a continuous length of 73½ miles, starting at a point 5 miles northward of Madura and passing south through Madura and thence close by the public road from Madura to Tinnevely through Tirumungalam, Virduputty, Satoor, and Covilputty.

				Distance from Madura	
				Miles	Chs
Tirumungalam	..	..	..	10	65
Virduputty	..	..	..	27	12
Satoor	..	..	..	43	51
Covilputty	..	..	..	57	15
Keel-Munnachee	..	..	..	79	35
Tuticorin	..	..	..	98	65
Tinnevely	..	..	..	98	05

Vide accompanying Map A

2 At Covilputty the road turns to the south-west, while the Railway bears in general direction a little to the east of south until it reaches Keel-Munnachee, where it separates into two branches, the one running into Tuticorin and the other into Tinnevely.

3. The three Districts (Nos 12, 13, and 14) remaining are not quite ready, as, from the tenor of the reply to my proposition that the land plans should be considered at once, I did not anticipate that it would be adopted, and the plans were not, therefore, pushed with reference merely to getting in copies of the surveys. These plans will, however, follow with all speed.

4. I do not think it necessary to furnish any lengthened report upon the route which I have adopted, as it agrees in the main with that reported upon,† recommended by Mr Puckle, Collector of Tinnevely, and Captain Lindsay, Acting Deputy Consulting Engineer for Railways, and approved of by His Excellency the Governor in Council — Vide paragraph 4 of Government Order No 2,510, of the 5th August 1868.

5 The route is also up to Kuddumboor, a distance of 70 miles, very nearly that proposed by Mr Carr in 1862, who, as the then Chief Engineer of the Railway, first surveyed and reported upon the scheme for a Railway from Madura to Tuticorin

6 Guided by the reports referred to and personal examination of the country, aided by the investigations of my Assistants, and from consultations and correspondence with officials and merchants who know the country and its wants, such a line has been secured as I am confident will best serve local, without, at the same time, unduly sacrificing general, interests

7 To a great extent the cotton trade centres in Virduputty and Covilputty, and through these towns the line passes, while between them it has been kept as near to Shevakasi as is consistent with not carrying the line far from the centre of the cotton district, up to Covilputty, therefore, it will be seen that the route adopted is identical with that approved of by Government in 1868

8 South of Covilputty I found that a very considerable and increasing traffic exists between Tuticorin and Tinnevely To carry the Railway close by the public road from Covilputty through Khytar to Tinnevely, branching off to Tuticorin at Khytar, as suggested by Mr Puckle and Captain Lindsay, would necessitate so great a round for the Tuticorin and Tinnevely interchange of traffic, as to risk the loss of a great part of it, or a recourse to a reduction in the rates so as to secure it Besides, it would involve the haulage of all such traffic not only by a circuitous route but over an unnecessarily high summit, the country rising from Tinnevely and Tuticorin to Khytar. I therefore selected a mean point of bifurcation, Keel-Munnachee, which, while it carries the Tinnevely and midland traffic slightly out of the direct line to the north, to accommodate the Tuticorin and midland traffic and *vice versa*, does not necessitate such a round as to ensure a comparatively heavy toll on, or to risk the loss of, the Tuticorin and Tinnevely direct traffic

9 Keel-Munnachee is also considerably lower in level than Khytar, and goods have not therefore to be raised by this route to such a height in transit between Tuticorin and Tinnevely Another reason for keeping this point of junction more to the east than Khytar is, that much of the traffic which has been entered in returns as passing between Tinnevely and Madura consists of imported articles which come from Tuticorin, such as grey shirtings, metals, twist, spirits, oilman's stores, cow yarn, and the like, purchased by Tinnevely merchants to be sent up-country, and this traffic on the opening of the line will go direct from port to Madura and the north

10 Altogether it is the general opinion that upon the opening of the Railway, a very large amount of direct traffic will be developed between the port of Tuticorin and the north, and it would therefore be unwise to carry the line so far west as Khytar, apart from any considerations for Tuticorin and Tinnevely direct traffic.

11 In addition to these reasons for fixing the route where I have placed it, south of Covilputty, the country between that place and Keel-Munnachee is populous and well cultivated, there being many large villages* on the line and immediate neighbourhood, whereas the line close to the public road, *via* Khytar, is neither so populous nor so continuously under cultivation

12 It will be seen from an inspection of the working surveys and sections, that the work, especially in earthwork, is very light. I need hardly add that I have as far as practicable avoided valuable land, tanks, chuttrums, and all unnecessary interference with the prejudices and private rights of the people.

* The principal being,			
	Popula- tion		Popula- tion
Mungatope	749	Kuddumboor	1,500
Keleveputty	840	Kodungal	578
Woothumpully	637	Crasadlam	800
Comarapoorum	200	Yellarangal	3,300
Velly Chary	1,900	Punnecolam	1,090
Puraputty	306	Paryvellacottay	1,380
Vangytharu	1,083	Ootamtonce	1,300
Paranbakota	900	Kolenkaner	900
Otrumpatty	384	Keel Munnachee	728

17

*Proceedings of the Madras Government, Public Works Department,
14th February 1871.*

13 Before closing these remarks I should like to take the opportunity of pointing out a mistake which has been made in crediting my predecessor, Mr Carr, with selecting a line which (to quote Government Order No 2,510, of 5th August 1868), "would only skirt the great cotton field, and pass through a tract of country where not a single town exists"

14 Mr Carr's report,† which was forwarded to Government in September 1862, states,

† Dated Negapatam, 8th September 1862

(paragraph 6) * * * "I made a careful
" examination of the country to be served by

" the proposed line, and guided by this examination, in conjunction with the investigations of Mr.
" Walker and the opinions as to the best traffic routes given by the Collectors of Madura and
" Tinnevely, I concluded to adopt the route shown in *red* on the Plan No 1, already referred to "

Paragraph 9 — " The main north and south traffic of the districts of Tinnevely and Madura
" may be said to centre in Tirumungalam and Coivilputty ; thus the traffic is better served by the

† i.e., a line from Madura to Tuticorin direct. " circuitous line which passes close by both
" those places, than by the more direct line ‡

" which would not pass within many miles of either of them "

Paragraph 10 — " Moreover, by running westward on first leaving Tuticorin, accommodation
" is afforded to traffic coming from the town of Tinnevely, and the country to the west and south
" of it, and when the line is constructed it will be found that a light branch line to Tinnevely and
" perhaps beyond it, will soon become a matter of first importance, extending the traffic of the
" main line Our having taken a westerly course with this line will then be found especially
" advantageous "

Paragraph 13 — " It will be seen by reference to the Map No 1, that the line adopted for
" survey takes a remarkably central position through the cotton district "

15 From the foregoing, and on inspection of the Map A accompanying this letter, upon which I have laid down Mr Carr's line, it will be seen that instead of his route skirting the cotton field it ran right through the middle of it, touching Tirumungalam, Viriduputty, and coming close to Coivilputty, thereafter swinging round to the south and east to Tuticorin, the question then being a Railway from Madura to Tuticorin with only remote reference to communication with Tinnevely

16. The mistake, I believe, arose from the Acting Deputy Consulting Engineer having inadvertently taken the survey of an alternative trial line from Tuticorin through Ettayapooram as the one referred to in Mr. Carr's report

I am glad to take this opportunity of bringing the matter to notice, as it not only shows that Mr Carr's views are in the main confirmed by succeeding investigations, bearing in mind the difference in the conditions of the questions then and now, but it will enable Government to remove the now-shown-to-be undeserved imputation upon that gentleman's proposals

No. 329. ORDER THEREON, 14th February 1871, No. 456.

RAILWAY, No. 39.

ORDERED that these papers be for-
warded to the Government of India.

(True Extract)

Colonel, R.E.,

Secretary to Government.

To the Acting Consulting Engineer for Railways.

Exd S T Augustin.

Govt. of {1871} Madras.

PUBLIC WORKS.

To

THE ACTING CONSULTING ENGINEER

FOR RAILWAYS.

Dated February, 14th.

Recd.

Encl.

G O, 14th February 1871, No. 456

FEBRUARY

Nos. 328-329

*Great Southern of India Extension —
Passing orders on reports, tracings, and
sections relating to the extension of the
Great Southern of India Railway from
Trichinopoly to Tuticorin.*

PUBLIC WORKS DEPARTMENT,
FORT ST. GEORGE, 14th February 1871.

No. 330.

No. 457.

To

THE SECRETARY TO THE GOVERNMENT OF INDIA,

PUBLIC WORKS DEPARTMENT.

RAILWAY, No. 40.

SIR,—Adverting to my letter of the
20th January 1871, No. 160, which gave
cover to the Proceedings of this Govern-

ment explanatory of the grounds on which Trichinopoly had been selected as the point of departure from the main line for the proposed extension of the Great Southern of India Railway to Madura and Tuticorin, and those on which the somewhat circuitous route by Dindigul had been preferred to the more direct one to Madura, I am directed, herewith, to forward a letter from the Acting Consulting Engineer for Railways submitting the reports of his Deputy and of the Chief Engineer on the trace of the proposed extension, accompanied by working surveys and sections.

2. Captain Prendergast's full review of the correspondence which has taken place during the last ten years regarding this extension makes it needless for the Madras Government to do more at present than briefly describe the direction proposed to be followed, and the considerations on which it has been selected.

3. Starting from Trichinopoly, the extension will be carried almost in a direct line by Munnerparay and Iyaloor to Dindigul, and thence, sweeping round to the south eastward past Ammanaikanoor into the valley of the Vigay, it will follow the course of that river by Sholavandan, and, crossing the Vigay nearly opposite Madura, will pass close to the westward of the town, where there will be a first-class station 97 miles from Trichinopoly. From Madura the line will run in a south easterly direction to Tirumungalam and thence, trending almost directly south, it will pass Virduputty and Satoor and follow the direction of the trunk road up to Covilputty, from which point it will be carried by Kuddumboor to Tuticorin, throwing off a branch at Keel-Munniachee to the town of Tinnevely. The length of the line from Madura to Tuticorin will be 99 and of the branch to Tinnevely 18 miles, while the distance of Keel-Munniachee to Tuticorin will be 19 miles.

4. The papers which have been laid before the Government of India with my letter already referred to, will show that, although in the selection of a point from which the extension should leave the main line of the Great Southern of India Railway, the Government were at first in favour of Caroor, they saw reason to change their opinion, and to give the preference to Trichinopoly, as soon as it became apparent from the terms of the Agreement which the Secretary of State has entered into with the Carnatic Railway Company for the construction of a first-class Railway from Arconum to Cuddalore, that such a line could not stop there and must, in the nature of things, be carried on ultimately to form a junction with the Great Southern of India Railway. The point of junction will, the Madras Government think, be Tanjore, and the most convenient location for the bifurca-

Remitted

tion from the main line of the southern extension of the Great Southern of India Railway to afford the greatest accommodation to through traffic, which will then become important, would therefore be that place. But a Railway from that place southward *via* Madura would run through so poorly populated a country and would be of so little advantage to the local traffic which, consisting principally of food grains, will always, it is believed, follow the route by sea which it now takes from the neighbouring ports of Negapatam, Karikal, etc., as to make the selection of Tanjore undesirable. Caroor, on the other hand, although well situated with

• *Vide* Proceedings of Madras Government, 14th February 1863, No 520

ward to form a convenient point for the departure of the extension from the main line in the event of the connection with the latter of the Carnatic Railway so far to the eastward as Tanjore, and, after the fullest consideration, His Excellency the

† Proceedings of Madras Government, 16th May 1870, No 1,237

importance of the town is in His Excellency's judgment more eligibly situated than either of the other places for the point of bifurcation of any branch running to the southward, provided, as is proposed, it follows the route of Dindigul and thereby opens an outlet from that valley and affords accommodation to the large traffic from the westward which passes that way towards Madura and the coast.

5. From Madura a direct line to Tuticorin would carry the Railway through the poorest part of the Tinnevely District, where the lands mostly belong to Zemindars and there are no large towns. It would no more than skirt the great cotton field as well as the productive countries through which the trunk road has been carried, and would necessitate the construction of a lengthy branch to bring it into connection with the important town of Tinnevely, the rich valley of the Tambrapoorny, and the traffic which may be expected from the westward. For these reasons the Madras Government, so long ago as the 5th August 1863, on taking the question of the direction in which Railway extension should be carried south of Madura, recorded in their Proceedings of that date, No. 2,510, of which a copy will be found amongst the papers now submitted, their opinion that the extension should follow generally the direction of the trunk road as far as Khytar, from which it would turn southward to Tuticorin and throw out a branch to Tinnevely. This route has not been materially deviated from in laying out the line, but, for the constructive and other reasons which are fully explained in the accompanying reports, it will be seen that the exact alignment has been inclined to the eastward from about the 160th mile so as, leaving Khytar to the west, to carry the line direct to Keel-Munniachee 19 miles from Tuticorin as the point of bifurcation of the branch to Tinnevely. So aligned the Railway will pass through a more populous tract than if it were carried to Khytar, and the distances from Madura to Tuticorin and from Tuticorin to Tinnevely, will be less than if a more western trace were adopted, while, at the same time, a lower summit level will have to be surmounted. Throughout, there are no engineering difficulties to be overcome. Only two streams of any magnitude have to be bridged, namely, the Vigay and the Satoor. For the former 21 girder openings of 50 feet, and for the latter 20 openings of the same size will suffice. The gradients are not severe, for while that between Trichinopoly and Madura will not rule more than 1 in 100, between Madura and Tuticorin it will be only 1 in 200, and, with the exception of two

21
curves at the Keel-Munniachee Junction and on quitting the Vigay bridge of 52 and 40 chains radius, respectively, there will be no curve of less than one mile radius. The earthworks will not be heavy, and both stone and lime are to be found within easy distance of the line.

6. The extension will be divided into 14 Districts of an aggregate length of 215 M. 5 C. 76 L., as follows:—

	M.	C.	L.
From Trichinopoly to Madura comprising Districts 1 to 6 and 6 miles of District 7	97	32	0
From Madura to Keel-Munniachee comprising 6 miles of District 7, Districts 8 to 11, and 12 miles 40 chains of District 12	79	65	12
From Keel-Munniachee to Tuticorin comprising 2 miles 60 chains of District 12 and District 13.	19	10	0
From do to Tinnevely comprising 2 miles 21 chains of District 12 and District 14	18	58	64

7. As regards the prospects of traffic, the returns are encouraging. The Consulting Engineer details at some length the sources from which it is likely to be principally derived, and looking to the flourishing condition of the districts to be traversed, and to the large amounts of cotton and various merchandize which pass to and fro through the country the line will occupy, the Madras Government are confident that few better locations for a Railway could be found, and they have no reason to doubt that as good a trace as can be selected has been adopted.

8. Under these circumstances I am desired to request that the Government of India may be moved to give their early sanction to the location of the extension as now proposed, in order that, pending the submission of the detailed plans and estimates and such discussion of the question of gauge as may arise, measures may at once be taken for acquiring possession of the necessary land, for the erection of bungalows for the engineering staff, for the opening of quarries, the collection of materials, and the erection of the telegraph.

I have the honour to be,

Sir,

Your most obedient servant,

Colonel, R.E.,

Secretary to Government.

Exd. S T. Augustin.

Govt. of Madras

PUBLIC WORKS.

To

THE SECRETARY TO THE GOVERNMENT
OF INDIA.

Dated February 14th.

Recd.

Encl.

G. O., 14th February 1871, No. 457.

FEBRUARY

No. 330

FORWARDING with remarks, reports,
working surveys, and sections relating to
the extension of the Great Southern of
India Railway from Trichinopoly to Tutu-
corin.

23
23
Report on the trace
proposed for the Great
Southern of India Extension

The general direction of
the line has been so fully discussed
in previous correspondence, and
favourably noticed in the Govern-
ment orders thereon, that, in
reporting on the trace, as at present
laid out, I have assumed as
fixed points the towns of Madurai,
Girumangalam, Virdupatty, Sator,
Coilpatty, Gimmerville and
Tuticorin and confined my

Remarks

remarks to the question, whether
having regard to economy in
working hereafter, as well as
in first cost, the present trace
deviates as little from the
straight route between these
towns, and presents as easy
gradients, as the nature of the
country will permit; noticing
what facilities exist for pro-
curing building materials, and
what Engineering difficulties
present themselves. The town
of Hyat was also mentioned
among the towns to be served,
in the previous reports, but
Engineering considerations, as
well

well as a desire to serve the better
populated valley of Huddumbrook
and district east of it, determined
the Chief Engineer to adopt the
present trace.

Line divided 2
into two sections.

The line may be con-
sidered as divided into two
distinct sections:

- (1) That from Trichinopoly to
Madura on which the ruling
gradient must be 1 in 100.
- (2) That from Madura to
Heel Maniachee and thence to
Simmenelly and Tuticorin, on
which the ruling gradient
will be but 1 in 200.

Tuticorin to
Heel Maniachee. 3

Starting from the
station

station ground at Guttorin,
conveniently situated near the
sea shore and nearly midway
between the extremities of the
town, the line first crosses
a few miles of drift sand,
with little or no drainage to
provide for; thence, ascending
with a moderate gradient, it
crosses a ridge and enters the
valley in which is situated
Vomericottah; here a drainage
area of about 67 square miles
is provided for; thence, the
line gradually rises to Keel-
Maniahee a village near the
crest of the ridge which
separates

separates the Hiddimbod valley
from that of the Chittar, third
class stations are provided near
Vomericottah and at Keel-Maniahee
[the junction]; a first class
station is provided for at Guttorin.

Ginnelly to
Keel-Maniahee. 4

At Ginnelly, the
station ground has been selected
to the extreme west of the town.
Engineering considerations favour
this site; and it met the ap-
proval of the Acting Collector;
it has the disadvantage of being
at the furthest point from
Palameottah and the bridge
over which, much southern
traffic

traffic must pass, and of having
very restricted approaches from
the town and bridge. The
question has been referred to
the collector. From the town
of Ginnemully the line will pass
over wet lands (unavoidably
for some miles) it then, passing
close to Gatchanloo, skirts the
low range of hills to the north,
and avoiding tanks as far as
possible, runs nearly straight
to the crossing of the Chittar.
A third class station for Gai-
gondain, distant from the
line about 1 mile, being pro-
posed at the 9th mile from
Ginnemully

Ginnemully. The site for the
bridge was fixed with a view
1st to obviate the necessity for a
second bridge over the Copand
(a large tributary of the Chittar,
and 2nd to cross as high up as
possible on account of the
gradient thence to the bridge
near Heel Maniahee.
From the Chittar bridge, where
the drainage from 901 square
miles is provided for, the line
rises along the face of a spur
crossing only one small
drainage (of about 14 square
miles) over the bridge to Heel
Maniahee, the rising gradient
here

Here of 1 in 100 can be reduced;

to 1 in 200.

5. . . . From Keil Manialee ^{Keil Manialee}
^{northward to}

northward the line follows the ^{Huddumbor}

eastern face of the ridge which

extends from Huddumbor, at

the head of the valley towards

the Valmad hills; at Huddumbor

it crosses the watershed into

the basin of the Copiaut, having

that far provided for the

drainage of an area less than

20 square miles, and having

crossed two small shallow

lakes, neither of them worth

avoiding.

6

31/27

Huddumbor
to Conilputty.

to . . . From Huddumbor,

where a third class station is

provided, the line after passing

between two detached hills,

has to be diverted from its

straight route to Conilputty, to

avoid a range of low hills, at the

foot and to the west of which

it is laid out, the section "black

cotton" throughout, and in the

small drainage is crossed.

Conilputty
to Saton.

7 . . . At Conilputty, the

line crosses the watershed

separating the basins of the

Copiaut and Chittar.

A second class station

is proposed here.

8

For the first 5 miles from
Kandjapetty the line is laid out
with easy gradients, ~~over~~ ^{over} dry
lands, for the greater part,
until it approached the drainage
near Nuttree, where the gradients
proposed are, 1 in 165, and 1 in 150.
These will be reduced, either
by a slight alteration carrying
the line ^{below} instead of above the
Kandjapetty tank, or by
increasing the cutwork.

This drainage is estimated
at 70 square miles. The line
then passes close to the Wuddu
a curra hill, where excellent
building

28
33
building stone is procurable,
and curving a little to the west,
passes through a small village,
but, the Chief Engineer agreeing
with me that the village is
worth avoiding, a diversion
will be laid out with this view.
After passing the village, the
line enters within the flood
line of the river known as the
Patoot River, a main branch
of the Vypar, draining upward
of 750 square miles. This it
is proposed to cross by a span
of 50 feet. The choice of site
for the bridge was limited
by the necessity for carrying
the

the line, close to the large village
of Saloor, and to avoid the
large tank east of it; the
side appears a favorable one,
but before the estimates are
submitted, the bed will be
thoroughly examined and the
nature and extent of the founda-
tions necessary ascertained.

8. A third class station Saloor to
is proposed for Saloor. Leaving Virudupatty
this, the line passes still over
a black cotton soil, crosses two
large drainages of 77 and 428
square miles area respectively,
and passing over the extremity
of a spur of granite with
a

37
a small cutting and easy gradient
of 1 in 240, enters the basin of
another tributary of the Vypass,
draining some 90 square miles;
from this to the station ground
at Virudupatty the line rises
with a gradient of 1 in 168; but
by moving the station ground
a little further north, and a
small addition to the earthwork
this can easily be reduced to 1 in
200, which the Chief Engineer
has arranged for. A second
class station is proposed for
Virudupatty, and a fourth class
station about midway between
it and Saloor, at a village
called

called Patambuda.

9 From Virudupetty to Gierumangalam, the line runs nearly straight, over black cotton soil; it crosses three considerable drainages, from basins of 47-253 and 216 square miles area, respectively; there is only one gradient - calling for remark, it is 80 chains only in length, 1 in 110, this will be reduced to 1 in 200. a second class station is proposed for Gierumangalam, and a third class station for Lakshmanattal 6 miles further south.

Virudupetty
to Gierumangalam.

Gierumangalam
to Madura.

3730
10 At Gierumangalam the line curves to the eastward with a 160 chain curve, and is carried nearly straight, over wet lands for a great portion of the distance to the east end of the large Moolangalam tank; it then skirts an adjoining small tank, close to the foot of the Secunder malay hill, where good building stone is procurable and passes over rice-lands to the extreme west of the town of Madura. a good site for a station ground and an apparently good site for the bridge over the river Vyjay which

while drains upwards of 1500
square miles, and here met with.
There are in this portion four
gradients, 1 in 177, 1 in 100, 1 in 150,
1 in 100, which will be reduced
each to 1 in 200. A first class
station will be provided at Madura.

From the above
sketch it will be seen that
between Madura and the
termini, although the drainages
to be crossed are extensive, the
present state of the engineering
difficulty of any kind, except
to avoid a village or tank
deviation from the straight
line between

Remarks:
the sections
generally

between the towns to be served,
is rarely called for, the sharpest
curve is that at the junction of 500 chain radius,
in no other is the radius less
than 800 chain. Good building
stone, at no great distance from
the long bridges, and lime
almost anywhere along the
line, is procurable, as will
be seen from statement A. The
very moderate amount of
earthwork, required to secure
a gradient of 1 in 200 will be
seen from statement B, which
accompanies this report.

Section 2
Madura to 12
Cholaramdan.

The line leaves the
Madura

Moadura bridge which it is
proposed should consist of
21 spans of 50 feet each, with
a curve of 40 chains and passing
through a small shallow tank
and across the corner of the
Wellangoody tank, crosses a
considerable drainage (the basin
of which has not yet been fully
investigated). It then passes
close to the village of Pavoray,
through the shallow portion
of the large tank, north of
the village of Samianellu,
and thence straight to Sholavandan.
I have satisfied myself
that the tract here, especially
with

with reference to the tanks crossed,
could not be improved upon.

A third class station is pro-
vided for Sholavandan.

Sholavandan 13
Ammanaitanoot.

Thus far from
Moadura, the line has followed
the course of the River Tyggy,
the waterway required being
for the most part for supply
channels from the river to the
tanks, and for the re-distrib-
uting channels therefrom.

At Sholavandan, the line
leaves the river, and turning
to the north, crosses the
drainage of the Seminalloy
hills, at the foot of which it runs.

The

The main consideration affecting the location of the line here is, the gradient of approach to the summit between Kolarandau and Diudigal, which is in fact the watershed between the valleys of the Vyay and Caumary.

The difference of level to be overcome between Kolarandau and the summit is 208 feet, and numerous level surveys and sections have been taken to determine the easiest gradient. The best determined on giving a gradient of 1 in 100 for 3 miles, cannot I believe be improved upon.

On leaving Kolarandau the

the line curves to avoid the large tank, on the bank of which it passes, and after one or two easy and short curves, crossing no considerable drainage, but with gradients of 1 in 110 and 1 in 100, it passes close to and to the west of Ammanaikanoor, where a small cutting through the foot of a detached hill has been allowed for to save the large tank from interference.

Ammanaikanoor
to Diudigal.

14 From Ammanaikanoor, where a second class station has been proposed, the line rises to the summit crossing in a distance of about 10 miles, a series

series of small hill streams from the Serumalay. From the summit to Dindigul, the line falls about 70 feet, over very cultivated land, with here and there small hill streams.

The station ground for Dindigul is proposed to be laid out east of the small hamlet where the market is now held, it is some mile and half or more from the native town, but this was unavoidable, except at the cost of a steep gradient, and a line altogether less favourable in an engineering point of view. The proposed site

Dindigul to Jyaloor

site met the approval of the Sub. collector. the station will be of the 2nd class. From Dindigul, the line again falls (56 feet) and then commences the ascent to the narrow gorge, between the hill ranges, near Jyaloor, the position and level of which here determines the location of the line. The steepest gradient in this ascent is 1 in 132, for a distance of 1 1/4 mile.

The drainages crossed, proceed from inconsiderable basins, but their beds have heavy falls, and they rise where rain

rain will be nearly quite passed
off. After leaving the station
ground at Dinceljal, the line
skirts the village of Balakistna
passing with a curve of 1 mile
radius to avoid a series of tanks,
and after running straight for
four miles, along the head of
the Atrolopaday tank, through
the corner of the Warvarella
tank it curves with two easy
curves, avoiding each of a
series of six tanks and reaches
the summit near Iyaloot, where a
4th class station has been provided
16 From the summit the line descends in four miles (in
which

Iyaloot to
Munestary

which our gradients of 1 in 100 and
1 in 110) to the village of Culputty
where a third class station is pro-
posed, thence, with gradients varying
from 1 in 132 to 1 in 257, the line
passes round the foot of the Jack-
mattay hill, and now leaving the
range of hills, enters the
descent into the plain around
Trichinopoly; the total fall from
the summit to Trichinopoly
in the 40 miles being 834 feet.
At a distance of eight
miles from Jackmattay hill, there
is little of interest to guide the
location of the line, which here
runs nearly parallel to the
river.

Arrian's River; one large tributary,
draining some 35 square miles,
and several small hill streams
are crossed. Most of the tanks
having been avoided by turning
the line with curves of 1 mile
radius. a 3rd class station is
proposed for the village of
Ojellanga Koorly, 7 miles from
Kulputty. It will make from
Ojellanga Koorly, the General Division
which here carries the drainage
of some 60 sq. miles, and square miles,
passes between two, to a point
by the road, and crosses the gorge.
That cut has a diversion of the
river, a tunnel through the
hill

hill-side, or two bridges across:
the river, must be allowed for:
The bridge from the appearance
of the gorge, rock will not be
met with, within the required
depth of cutting the new cut
between the two benches, will not
be a long one, and I think the
"diversion" has been selected, as
the most economical plan of the
three, with good reason. From
this gorge, after rounding the
hill spur, and crossing a ridge
with an easy gradient, the line
passes through the shallow
portion of the Koorlyparay
tanks, to high ground west
of

of the village, where a second
land station is proposed.

17 \ The line will run from the river to the station. The line follows the river as close as would be safe. The right bank of the river is very high, and the line will run through the small tanks and clear land. The line will be built here. The location of the line is a matter of some importance. It will be built from the river to the station. The line is taken between the river and the small tanks. It is a point where the line is being broken.

5135
broken, has retired into a deep
channel, which the river leaving
its old bed, is fast appropriating.
The diversion of the river to its
old bed is necessary, not only
for the location of the line, but
for the safety of the tank, which
the river here threatens to under-
mine. It is however a work
of no difficulty, or doubtful suc-
cess, as there is plenty of grass
of the best description, and stone
in the neighbourhood, with the
line could hardly be otherwise
built.

Shortly after passing
this point, the line leaves the
river

river, and according as far as possible, the numerous petty hamlets which here cross the country, crossing the ridge east of and close to the village of Colathur; where a third class station is proposed, and following the east face of the ridge passes between two large detached hills, where good building stone is procurable, and after crossing the Carrim River (drainage basin 15 square miles) enters the southern end of Trichinopoly, joining the existing line on the "High Ground," where it is proposed to erect the new station building.

General remarks 18
on section 2
Trichinopoly
to Madurai

On this section it will be seen, the gradients, rather than the actual way forms the most important consideration, and a class of engine, superior to that which would suffice for the whole route of Madurai, viz. 1st, 2nd, 3rd, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 11th, 12th, 13th, 14th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, 22nd, 23rd, 24th, 25th, 26th, 27th, 28th, 29th, 30th, 31st, 32nd, 33rd, 34th, 35th, 36th, 37th, 38th, 39th, 40th, 41st, 42nd, 43rd, 44th, 45th, 46th, 47th, 48th, 49th, 50th, 51st, 52nd, 53rd, 54th, 55th, 56th, 57th, 58th, 59th, 60th, 61st, 62nd, 63rd, 64th, 65th, 66th, 67th, 68th, 69th, 70th, 71st, 72nd, 73rd, 74th, 75th, 76th, 77th, 78th, 79th, 80th, 81st, 82nd, 83rd, 84th, 85th, 86th, 87th, 88th, 89th, 90th, 91st, 92nd, 93rd, 94th, 95th, 96th, 97th, 98th, 99th, 100th, 101st, 102nd, 103rd, 104th, 105th, 106th, 107th, 108th, 109th, 110th, 111th, 112th, 113th, 114th, 115th, 116th, 117th, 118th, 119th, 120th, 121st, 122nd, 123rd, 124th, 125th, 126th, 127th, 128th, 129th, 130th, 131st, 132nd, 133rd, 134th, 135th, 136th, 137th, 138th, 139th, 140th, 141st, 142nd, 143rd, 144th, 145th, 146th, 147th, 148th, 149th, 150th, 151st, 152nd, 153rd, 154th, 155th, 156th, 157th, 158th, 159th, 160th, 161st, 162nd, 163rd, 164th, 165th, 166th, 167th, 168th, 169th, 170th, 171st, 172nd, 173rd, 174th, 175th, 176th, 177th, 178th, 179th, 180th, 181st, 182nd, 183rd, 184th, 185th, 186th, 187th, 188th, 189th, 190th, 191st, 192nd, 193rd, 194th, 195th, 196th, 197th, 198th, 199th, 200th, 201st, 202nd, 203rd, 204th, 205th, 206th, 207th, 208th, 209th, 210th, 211st, 212nd, 213th, 214th, 215th, 216th, 217th, 218th, 219th, 220th, 221st, 222nd, 223rd, 224th, 225th, 226th, 227th, 228th, 229th, 230th, 231st, 232nd, 233rd, 234th, 235th, 236th, 237th, 238th, 239th, 240th, 241st, 242nd, 243rd, 244th, 245th, 246th, 247th, 248th, 249th, 250th, 251st, 252nd, 253rd, 254th, 255th, 256th, 257th, 258th, 259th, 260th, 261st, 262nd, 263rd, 264th, 265th, 266th, 267th, 268th, 269th, 270th, 271st, 272nd, 273rd, 274th, 275th, 276th, 277th, 278th, 279th, 280th, 281st, 282nd, 283rd, 284th, 285th, 286th, 287th, 288th, 289th, 290th, 291st, 292nd, 293rd, 294th, 295th, 296th, 297th, 298th, 299th, 300th, 301st, 302nd, 303rd, 304th, 305th, 306th, 307th, 308th, 309th, 310th, 311st, 312nd, 313th, 314th, 315th, 316th, 317th, 318th, 319th, 320th, 321st, 322nd, 323rd, 324th, 325th, 326th, 327th, 328th, 329th, 330th, 331st, 332nd, 333rd, 334th, 335th, 336th, 337th, 338th, 339th, 340th, 341st, 342nd, 343rd, 344th, 345th, 346th, 347th, 348th, 349th, 350th, 351st, 352nd, 353rd, 354th, 355th, 356th, 357th, 358th, 359th, 360th, 361st, 362nd, 363rd, 364th, 365th, 366th, 367th, 368th, 369th, 370th, 371st, 372nd, 373rd, 374th, 375th, 376th, 377th, 378th, 379th, 380th, 381st, 382nd, 383rd, 384th, 385th, 386th, 387th, 388th, 389th, 390th, 391st, 392nd, 393rd, 394th, 395th, 396th, 397th, 398th, 399th, 400th, 401st, 402nd, 403rd, 404th, 405th, 406th, 407th, 408th, 409th, 410th, 411st, 412nd, 413th, 414th, 415th, 416th, 417th, 418th, 419th, 420th, 421st, 422nd, 423rd, 424th, 425th, 426th, 427th, 428th, 429th, 430th, 431st, 432nd, 433rd, 434th, 435th, 436th, 437th, 438th, 439th, 440th, 441st, 442nd, 443rd, 444th, 445th, 446th, 447th, 448th, 449th, 450th, 451st, 452nd, 453rd, 454th, 455th, 456th, 457th, 458th, 459th, 460th, 461st, 462nd, 463rd, 464th, 465th, 466th, 467th, 468th, 469th, 470th, 471st, 472nd, 473rd, 474th, 475th, 476th, 477th, 478th, 479th, 480th, 481st, 482nd, 483rd, 484th, 485th, 486th, 487th, 488th, 489th, 490th, 491st, 492nd, 493rd, 494th, 495th, 496th, 497th, 498th, 499th, 500th, 501st, 502nd, 503rd, 504th, 505th, 506th, 507th, 508th, 509th, 510th, 511st, 512nd, 513th, 514th, 515th, 516th, 517th, 518th, 519th, 520th, 521st, 522nd, 523rd, 524th, 525th, 526th, 527th, 528th, 529th, 530th, 531st, 532nd, 533rd, 534th, 535th, 536th, 537th, 538th, 539th, 540th, 541st, 542nd, 543rd, 544th, 545th, 546th, 547th, 548th, 549th, 550th, 551st, 552nd, 553rd, 554th, 555th, 556th, 557th, 558th, 559th, 560th, 561st, 562nd, 563rd, 564th, 565th, 566th, 567th, 568th, 569th, 570th, 571st, 572nd, 573rd, 574th, 575th, 576th, 577th, 578th, 579th, 580th, 581st, 582nd, 583rd, 584th, 585th, 586th, 587th, 588th, 589th, 590th, 591st, 592nd, 593rd, 594th, 595th, 596th, 597th, 598th, 599th, 600th, 601st, 602nd, 603rd, 604th, 605th, 606th, 607th, 608th, 609th, 610th, 611st, 612nd, 613th, 614th, 615th, 616th, 617th, 618th, 619th, 620th, 621st, 622nd, 623rd, 624th, 625th, 626th, 627th, 628th, 629th, 630th, 631st, 632nd, 633rd, 634th, 635th, 636th, 637th, 638th, 639th, 640th, 641st, 642nd, 643rd, 644th, 645th, 646th, 647th, 648th, 649th, 650th, 651st, 652nd, 653rd, 654th, 655th, 656th, 657th, 658th, 659th, 660th, 661st, 662nd, 663rd, 664th, 665th, 666th, 667th, 668th, 669th, 670th, 671st, 672nd, 673rd, 674th, 675th, 676th, 677th, 678th, 679th, 680th, 681st, 682nd, 683rd, 684th, 685th, 686th, 687th, 688th, 689th, 690th, 691st, 692nd, 693rd, 694th, 695th, 696th, 697th, 698th, 699th, 700th, 701st, 702nd, 703rd, 704th, 705th, 706th, 707th, 708th, 709th, 710th, 711st, 712nd, 713th, 714th, 715th, 716th, 717th, 718th, 719th, 720th, 721st, 722nd, 723rd, 724th, 725th, 726th, 727th, 728th, 729th, 730th, 731st, 732nd, 733rd, 734th, 735th, 736th, 737th, 738th, 739th, 740th, 741st, 742nd, 743rd, 744th, 745th, 746th, 747th, 748th, 749th, 750th, 751st, 752nd, 753rd, 754th, 755th, 756th, 757th, 758th, 759th, 760th, 761st, 762nd, 763rd, 764th, 765th, 766th, 767th, 768th, 769th, 770th, 771st, 772nd, 773rd, 774th, 775th, 776th, 777th, 778th, 779th, 780th, 781st, 782nd, 783rd, 784th, 785th, 786th, 787th, 788th, 789th, 790th, 791st, 792nd, 793rd, 794th, 795th, 796th, 797th, 798th, 799th, 800th, 801st, 802nd, 803rd, 804th, 805th, 806th, 807th, 808th, 809th, 810th, 811st, 812nd, 813th, 814th, 815th, 816th, 817th, 818th, 819th, 820th, 821st, 822nd, 823rd, 824th, 825th, 826th, 827th, 828th, 829th, 830th, 831st, 832nd, 833rd, 834th, 835th, 836th, 837th, 838th, 839th, 840th, 841st, 842nd, 843rd, 844th, 845th, 846th, 847th, 848th, 849th, 850th, 851st, 852nd, 853rd, 854th, 855th, 856th, 857th, 858th, 859th, 860th, 861st, 862nd, 863rd, 864th, 865th, 866th, 867th, 868th, 869th, 870th, 871st, 872nd, 873rd, 874th, 875th, 876th, 877th, 878th, 879th, 880th, 881st, 882nd, 883rd, 884th, 885th, 886th, 887th, 888th, 889th, 890th, 891st, 892nd, 893rd, 894th, 895th, 896th, 897th, 898th, 899th, 900th, 901st, 902nd, 903rd, 904th, 905th, 906th, 907th, 908th, 909th, 910th, 911st, 912nd, 913th, 914th, 915th, 916th, 917th, 918th, 919th, 920th, 921st, 922nd, 923rd, 924th, 925th, 926th, 927th, 928th, 929th, 930th, 931st, 932nd, 933rd, 934th, 935th, 936th, 937th, 938th, 939th, 940th, 941st, 942nd, 943rd, 944th, 945th, 946th, 947th, 948th, 949th, 950th, 951st, 952nd, 953rd, 954th, 955th, 956th, 957th, 958th, 959th, 960th, 961st, 962nd, 963rd, 964th, 965th, 966th, 967th, 968th, 969th, 970th, 971st, 972nd, 973rd, 974th, 975th, 976th, 977th, 978th, 979th, 980th, 981st, 982nd, 983rd, 984th, 985th, 986th, 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1863rd, 1864th, 1865th, 1866th, 1867th, 1868th, 1869th, 1870th, 1871st, 1872nd, 1873rd, 1874th, 1875th, 1876th,

the character and extent of the
designed work, and the measures
proposed to ensure due provision
for the floods.

As this subject will be
more fully treated when the
estimates are sent forward for
sanction, I will only add that
every precaution is being taken
to guard against error, and that
I have pressed on the Chief
Engineer to note, that the Govern-
ment will require the fullest
information as to the principles
upon which the works have
been designed both as regards
waterway and foundations, before
sanctioning

§ 34

sanctioning the estimates. I beg
to report that should it be
thought advisable, since any
considerations are to pass, the
tract of country to be served,
or otherwise, to alter the present
trace, much valuable time and
a large sum of money will have
been wasted, as the surveys,
plans and estimates now in
course of completion are in full
detail and not those of such a
preliminary and approximate
description as would be sufficient
to determine the class and
direction of the line to be
adopted, and I would suggest
that

that the Chief Engineer of the
 Madras Railway Company
 be invited to pay particular
 attention to this point in the
 preparation of his survey.
 Should the present plan be
 adopted, the necessity for at
 once sanctioning the bungalows
 for the staff, that the Officers
 may be relieved in their work
 before the commencement of the
 ensuing hot season, can hardly
 be exaggerated.

Signed C. J. Smith Capt R.E.

Dep: Comm: Engr. for Mys

True Copy

Recd at
 24th Aug 77

Ambrinck Jt Capt R.E.

Actg Consulting Engineer for Railways.

Proc. 14 Feb 1912 L. H. 328

A. G. S. P. Railway.
Southern Extension.

List of large bridges (over 50 ft waterway).

Name of position of stream	Nature of building stone	Probable distance from line of Stone	Line
Diet 1.	ms. ch	2	Mbs. Near bridge
Diet 3.	8-43	1	db
	1-64	3	db
	9-43	4	db
Diet 4.	16-0	4 1/2	db
	5-73	2 1/2	db
Diet 5.	8-29	1	db
	3-9	2	db
Diet 7.	7-57	1	db
Diet 8.	Upch. 7-57	6	db
	ms. ch	7 1/2	db
	10-47	2 1/2	db
Diet 9	14-70	3	db
	7-30	2 1/2	db
	12-40	4 1/2	db
Diet 10	13-72	5	db
	2-24	2	db
	6-39	2	db
Diet 11.	Upch. ms. ch	4	db
	8-73	3 1/2	db
12.	2-33	3	db
	3-27	3	db
Diet 13	1-16	3	db
	3-28	1	db
	4-35	2	db
Diet 14	2-45	1	db
	Chittaur	2	db

(Limestone of excellent quality 10 to 12 feet 13 miles from Bridge - Ordinary lime is brought from 3 miles east of Madhur)

True Copy

Madras
21. January 1871

W. H. Mumfry and V. Caplain R.R. Twenty 26/11/70
Ap. Coms: Eng & Cor Railway R.

/ signed/ Daniel Legan
Chip Engineer

Proc. 11-12 July 1971 L 2 528.

24/3/4/71

B. G. S. P. Railway - Southern Section.
Classification of Banks and Cuttings over 6 feet.

Embankment or cutting.					Remarks.
	Length over 6 feet or deep	Length over 10' and under 15' high or deep	Length over 15' high or deep		
District	No.	Chs.	No.	Chs.	
1	4	77	0	49	0 ✓
2	1	57	0	0	0 ✓
3	3	73	0	36	0 ✓
4	4	25	1	26	11 ✓
5	2	35	0	8	5 ✓
6	1	53	0	0	0
7	2	14	0	30	0
8	0	70	0	11	0
9	1	61	0	9	0
10	2	2	0	67	0
11	1	49	0	11	0
12	0	27	0	0	0
13	2	21	0	29	0
14	2	23	0	0	0
Total	32	27	4	20	16

Signed/ David Logan
Chief Engineer
26/11/70

Madras 21 January 1971 }
Chief Engineer
S. C. S. Eng. for Railway

No. 2471

Great Southern of India Railway
Chief Engineer's office
Tichinopoly 16th Sept 1870

W. S. Betts Esq
My dear Sir

I have to acknowledge
No. 10641 dated receipt of your letter informing me
12th instant. that Government are prepared to
consider the Survey of the Southern
Extension in order that Lockpitting
and acquisition of land may be proceeded
with at once; and I have now the
pleasure to forward copies in duplicate
of the working Surveys and Sections
of Districts No. 7, 8, 9, 10, and 11
forming a continuous length of 73 1/4 miles
starting at a point five miles northward
distance from Maoura of Maadura and passing South through
Maoura of Maadura and thence close by the public
Serrumungalam 10.65 Road from Maadura to Sinnerelly through
Vidaputty - 27.12 Sator - 43.51 Serrumungalam, Vidaputty, Sator, and
Coil putty - 47.15 Coil putty.
Kul Maniack 79.35 At Coilputty the Road turns to
Suticorrie - 98.65 the South West, where the Railway leaves
Sinnerelly - 98.05 in general direction a little to the East
of South until it reaches Keelmaaniackee
Vide accompanying where it separates into two branches
one running into Suticorrie and the
other into Sinnerelly.

12/9 314/71

From 11th Sept 1871 No. 222.

116. 10. 1870

3. The three Districts (Nos 12, 13, and 14) remaining, are not quite ready, as from the tenor of the reply to my proposition that the Land plans should be considered at once, I did not anticipate that it would be adopted, and the plans were not therefore pushed with reference merely to getting in copies of the Survey. These plans will however follow with all speed.

4. I do not think it necessary to furnish any lengthened Report upon the route which I have adopted as it agrees in the main with that reported upon, recommended by Mr. Puckle Collector & Mr. Madras of Sinnerelly, and Captain Lindsay, Fort. Public Works Department, Deputy Consulting Engineer for works Department, and approved of by his Excellency 5th August 1868 & 10th the Governor in Council - vide para 4 of Government order No 2010 of 5th August 1868.

5. The route is also up to Kuddimboor, a distance of 70 miles very nearly that proposed by Mr. Carr in 1862 who as the then Chief Engineer of the Railway just surveyed and reported upon the scheme for a Railway from Madras to Tuticorin.

6. Guided by the Reports referred to and personal examination of the country, aided by the investigations of my assistants and from consultations and correspondence with

with officials and merchants who know the country and its wants, such a line has been chosen as I am confident will best serve local, without at the same time unduly sacrificing general interests.

7. To a great extent the Cotton trade centres in Virudupatty and Coimbatore, and through these towns the line passes, while between them it has been kept as near to Sinnerelly as is consistent with not carrying the line far from the centre of the Cotton District. up to Coimbatore therefore it will be seen that the route adopted is identical with that approved of by Government in 1868.

8. South of Coimbatore I found that a very considerable and increasing traffic exists between Tuticorin and Sinnerelly. To carry the Railway close by the Public Road from Coimbatore through Kytar to Sinnerelly branching off to Tuticorin at Kytar as suggested by Mr. Puckle and Captain Lindsay would necessitate so great a round for the Tuticorin and Sinnerelly interchange of traffic, as to risk the loss of a great part of it, or at least to secure a reduction in the rates as to secure it. Besides, it would involve the haulage of all such traffic not only by a circuitous route but over an unnecessarily high summit, the country rising from Sinnerelly and Tuticorin to Kytar. I therefore selected a mean point of bifurcation, Kell Manick, which while it carries the Sinnerelly and

Midland

midland traffic slightly out of the direct line to the North, to accommodate the Sutorin and Midland traffic and vice versa, does not necessitate such a round as to ensure a comparatively heavy toll on, or to risk the loss of the Sutorin and Sumerselly direct traffic.

9. Keel Maniachee is also considerably lower in level than Kytar and goods have not therefore to be raised by this route to such a height in transit between Sutorin & Sumerselly. Another reason for keeping this point of Junction more to the East than Kytar is, that much of the traffic which has been entered in returns as passing between Sumerselly and Madura consists of imported articles which come from Sutorin, such as Grey Shirts, Metal, Swast, Spirit, oilman's Stores, Coir yarn, and the like purchased by Sumerselly merchants to be sent up Country, and the traffic on the opening of the line will go direct from Port to Madura and the North.

10. Altogether it is the general opinion that upon the opening of the Railway a very large amount of direct traffic will be developed between the Port of Sutorin and the North, and it would therefore be unwise to

carry

The principal villages on the line and immediate neighbourhood, where the line close to the

Population public Road via Kytar is neither so populous nor so continuously under cultivation.

11. It will be seen from our inspection of the working Survey and Section that the work especially in Earthwork is very light. I need hardly add that I have as far as practicable avoided valuable land, tanks, Chattrams, and all unimpaired any interference with the prejudices and private rights of the people.

12. Before closing these remarks I should like to take the opportunity of pointing out a mistake which has been made in crediting my predecessor Mr. Cairn with selecting a line which (to quote Government order, 2510 of 5. August 1862) "would only skirt the great cotton fields, and pass through a track of Country where not a single town exists".

dated Negapatam 4. Mr. Cairn's report which was forwarded 8. Sept. 1862 to Government in September 1862 States,

(para 6)

the difference in the conditions of the
questions then and now - but it will
enable Government to remove the
now-shown to be undeserved imputation
upon that gentleman's proposals

Yours faithfully,
David Logan
Chief Engineer

1 True copy 1

William B. B. B.
agent

Proo-14 July 170 in 1828.

CONSULTING ENGINEER'S OFFICE

Railway Department

No 33.

From

Captain H. L. Prendergast R. E.
Acting Consulting Engineer for Railways,

To

Colonel C. A. Orr R. E.
Secretary to Government,

Public Works Department,

Fort Saint George.

I have the honour to
submit the trace of the proposed
extension of the Great Southern of India
Railway, laid down on the Ordnance
Map, together with Surveys and Sections
of the whole line, and report of
inspection lately made by the Deputy
Consulting Engineer.
The estimates for the

construction of the Line are not quite ready for despatch: but as the Government of India have expressed their readiness to sanction preliminary outlay on the preparation of materials, Engineer's bungalows, &c., when the location of the line is approved; such information is now afforded, with reference to G. O. N. 2406, dated 5th October 1870, as well, it is hoped, be sufficient for the final sanction of the route chosen; so that the Engineering Staff may find employment in the preparation of materials, pending the sanction of the detailed plans and estimates. The Chief Engineer of the Great Southern of India Railway

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Railway reports in his letter of the 16th September 1870, on the portion of the Line to the South of Madras and points out that a mistake was made in attributing to Mr Carr the former Chief Engineer, the selection of a trace too far Eastward; inasmuch as the Deputy Consulting Engineer in 1868, took an alternative and rejected track survey, to be the one adopted by Mr Carr; and the Government in their Order of the 5th August 1868, N. 2510, gave the preference to the line described by the Collector of Tinnevely and Captain Landseay.

3. Correspondence relating to the Southern extension dates back upwards

upwards of 10 years. The proposition
in 1861 was, for a railway between
Madura and Tuticorin. The Survey
was carried out in 1862, and Mr
Carr's report thereon, to the Board
of Directors, dated 8th September
1862, is published in G. O. No 580,
dated 20th October 1862. It was
then observed by the Government, that
the Great Southern of India Railway
Company were not likely to undertake
the construction of the line, unless
under a guarantee of interest on the
capital expended; and the Government
were not prepared to recommend
that

G. O. No 3077
dated 4th October
1867.

G. O. No 3334
dated 25 October
1867.

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that the Guarantee should be given.
After an interval of
5 years, negotiations were entered
into, between the Secretary of State,
and the Directors, regarding the con-
struction of a line, from some point
on the Great Southern Railway, through
Madura to Tuticorin. The question
as to the route to the North of Madura,
which had been deferred in G. O. No
205, dated 16th March 1861, was then
brought forward again; and the
Government decided that an exami-
-nation of that part of the country,
should be made by the Railway Engineers,
but

but that a second inspection of the country between Madaya and Suleiman was not necessary.

A cursory examination of the country along the alternative lines from Casoor and Trichinopoly to Madaya, having been made by the Chief Engineer, Mr. Dibble, whose reports of the 7th January 1868 is strongly in favour of the western line by

Casoor, the Government directed the concentration of the survey parties on the Casoor and Dindigul line. The direction of the line from Suleiman through Madaya to Dindigul, being thus determined; a fresh question

G.O. No. 62
dated 14th Feb
1868.

21021

77 4

rose for consideration, as to the section in confirmation from Dindigul, on account of the Contract for the extension of the Railway from Arcot as a first-class Railway to Cuddalore, and the more remote but probable contingency of the Carnatic Railway being carried out to join with the Great Southern.

Under this new aspect, it appeared to the Government, that Casoor is too far from the direct route to the South from Trichinopoly and places Eastward; but that Dindigul should not be avoided, from its

own

now importance, and position com-
manding the traffic from the west:
while the more circuitous route in
this direction, would by its far greater
accommodation to the public, more than
compensate; the disadvantage of losing
the direct line from Trichinopoly to
Madura. It was therefore
finally determined, that the extension
should be carried out, from Trichinopoly
through Dindigul.

G.O. No 1257
dated 16th May
1870.

4. The whole subject
has been much under the attention of
the Government, in the past three years,
and the detailed reports are recorded
in their proceedings, so that I will
only briefly recapitulate, the reasons
which

79 5
which have led to the selection of the
line now adopted.

The question of promoting
the production of cotton in India,
draws the attention of the Directors of
the Great Southern of India Railway
Company, to the important cotton
district of Tinnevely; and Tuticorum
being the only port for shipment, became
necessarily the terminus of the proposed
railway. The line to Madura had
therefore to be laid out, so as best to
serve the cotton-growing tracts: at
the same time, it was essential that
there should be communication with
the important town of Tinnevely,
situated in the centre of the highly
cultivated

cultivated valley watered by the
Tambra poorney: and in the line of a
large traffic from the Travancore
country, Northwards, to Madras,
and the Coimbatore and Malabar
Districts. The most direct line
would run from Tuticorin through
Ethiapuram, and Arripocottah to
Madras; but Mr. Carr considered
in 1862, that the principal centres
of traffic, were at Tirumangalam
to the North, and at Coivilputty
midway between the town of Tirunelveli
and the Northern limit of the
District: and his trace was taken
through these places, running at first

Westward

Westward on leaving Tuticorin, so as
to give accommodation to traffic
coming from the town of Tirunelveli;
and the country to the West and South
of it. It was not then intended
to bring the Line into Tirunelveli,
but it was supposed that a branch
into that town, and perhaps further,
would afterwards be found necessary.
The route selected though involving a
greater length of line than the direct
route, was found to be better suited
for economy of construction and
maintenance: inasmuch as it
runs through higher lands, less
liable to floods and less intersected

by

by nullahs.
 In April 1868, Mr.
 Buckle, the Collector of Tanjore,
 stated that a direct line from
 Madurai to Tuticorin would pass
 through the poorest part of the
 district, where there is not a
 single town; it would skirt the
 extreme East of the Cotton fields,
 and would pass carrying rice from
 the Tambraparni valley, and timber
 from the hills. On the other hand,
 if the line followed the trunk road
 from Madurai to Chyter, thence
 branching to Tuticorin and Palaycottah,
 it would pass through Vederputty,
 Paloor

Vide G.O. No.
 2510 of 5 Aug.
 1868.

83
 Paloor, and Chyter, all centres of
 trade; it would also not be far
 from Sevakasi on the West, and
 Ettimaperai on the East; the country
 between, growing cotton and tobacco,
 and requiring much rice and salt.
 In July 1868, Captain Lindo, wrote
 in favour of the same trace, that
 from Madurai to Chyter the land
 is almost perfectly level: the banks
 need not be high, and but little
 waterway to be provided; building
 material to be found in the neigh-
 bourhood of the line, and kunkers
 met with a few feet under the
 surface of the cotton soil.
 From
 Chyter

85 8
Elhytar, or Chereibouto, a branch
should run into the town of Timnevelly
thereby connecting the latter by the
shortest line possible, with Madasa,
and the Station at Interiorin to be
placed in the centre of the town (rather
than to the North as proposed by
Mr. Carr) where there is an
excellent site, affording a clear
way to the beach, and where a pier
for the landing of Railway material
may be constructed. Mr. Logan the
present Chief Engineer in his recent
report, adheres very nearly to this
latter route: but considers that
Elhytar is too far removed from
the great and increasing traffic
between

between the town of Timnevelly and
Interiorin: besides involving the
hauling of that traffic over an
unnecessarily high summit: he
has therefore selected Heel. Munnin-
-achee as the point of bifurcation,
diverting thereby the Northward
traffic only slightly out of the
direct line from Timnevelly; and
making more direct, the line of
traffic of imported goods from
Interiorin Northwards to Madasa.
Mr. Logan has also fixed on a
central position in Interiorin for the
terminal Station.

5. Captain Smith having
lately inspected the whole of the Pussu
tra

trace, report chiefly on the proposed construction of the line: its gradients, curves, facilities for materials being obtained, and Engineering difficulties, and I agree with him in opinion that the line finally adopted by Mr Logan is the best, both as to economy of construction, and commercial convenience. The only question as to the alignment, has been, whether the branch to Timneville should leave the main line at or about Hhytar, or if the main line should run more to the East.

If the route by Hhytar were adopted, we should have the following distances

Madura

87 9

Madura by Hhytar to Timneville — 92 miles

— Do — by — Do — to Tuticorin — 102

Timneville by — Do — to — Do — 46

and by the Easterly route

Madura by Keel Munniacke to Timneville — 98 miles

— Do — by — Do — to Tuticorin — 99

Timneville by — Do — to — Do — 37

Thus, were the line proposed, goods carried from Timneville to Madura, will have 6 miles additional journey: the mileage between Tuticorin and Madura is reduced by 3 miles, and that between Timneville and Tuticorin by 9 miles. The route through Hhytar has not been surveyed, but as Hhytar and Keel Munniacke

are just about equi-distant from
Sinnivelly; the distances between those
two places, or about 9 miles, is the
difference between the alternative
lines from Sinnivelly to Tuticorin.

The line through Keel Munniachee,
runs through a more populous country,
than that following the trunk road
from Covilputty to Hhytar; and
though Hhytar is a Sub Magistrate's
station, and on the shortest line
between Madurai and Sinnivelly;

I think, as traffic considerations
have led to the line being taken from
Trichinopoly by Dindigul to Madurai,
involving about 19 miles additional
length of railway, as compared with
the

the direct line; the slightly increased
distance from Sinnivelly through
Keel Munniachee Northwards,
should not weigh against the great
advantage thereby given to the Tuticorin
traffic, both between that port and
Sinnivelly, and also along the main
line to Madurai.

In 1867, the Chief
Engineer Mr. Dibblee made a comparison
of the two routes, from Trichinopoly to
Madurai, and from Carrot to Madurai.

The Government observed thereupon, that
no engineering difficulties were found
on either; but on the Eastern line,
the Vellur river has to be bridged,
and a rather abrupt water-shed to
be

G.O. No 520
dated 14th
February 1868.

be crossed, while on the Western line,
no river of any size, is encountered, and
the country is easy. The arguments
used in support of the Eastern
route, were, that the (then) present
movement of traffic was nearly 100
per cent. in excess of that by the Western
route; and that the Tanjore and
Trichinopoly traffic would be lost,
if the railway were taken from Cassid.
The Government however were inclined
to "think on" consideration of all the
information collected, that, notwith-
standing the apparently larger traffic
on the Eastern route, owing, presumably,
to the existence of a good road, and
to a larger temporary demand for food
grains

91 11
grains in the Southern districts, in
consequence of the deficient harvests
of the two past years, the Western
route was the more promising. It
was generally considered, that the
through traffic, would, under any
circumstances, be secured to the Railway,
there was little development of local
or other traffic to be expected on the
Eastern route; while on the other,
populous and productive portions of
the Madras and Coimbatore districts
would be opened up, and the Madras
Railway, with the districts it commands,
would be brought into the most direct
communication with the South. and
Captain Lindsay in his report of
the

the 15th February 1868 says, that he gives the preference to the Diudigul route, on account of easier gradients and a better crossing over the Vygar river, that the Madura taluk would be opened up, and the Palney taluk brought within 30 miles of the line; the rich Cumbar valley would be tapped, and though part of its Southward traffic would probably not take the rails before Madura, the whole of the Northward traffic would be carried from a point about Annamalaikeeroor. Along the Eastern route from Trichinopoly, there are no towns or villages of importance, and no tract of country likely to be improved in

in the vicinity of the line. Captain Sinday sums up the advantages of the Western route, as recommended by Officials and Native merchants, that it is the shortest way to Madras and both coasts; that it runs through a more productive country; and that it has an extensive trade with the west, which would be caught by this line only.

G.O. No 2951
dated 17th September
1868.

Mr Dibble reported in August 1868 on the Survey then made between Eroor and Madura. For 16 miles out of Madura, he decided on adopting a line to the North of the river Vygar, in preference to that which he had first taken, on the South.

South. By this line, there is the
advantage of having a better site for
the station, both from proximity to
the town, from having level ground,
and facilities for drainage. The
crossing of the Vygar on this line is
favourable, from there being no
where more than 10 feet of sand
over the rock; while by the other
line, the sand was found to be 20
feet in depth, for 6 chains in length,
rendering the foundations of a bridge
very expensive. Likewise on the
North of the river, the land to be
taken up is much less expensive,
being more than half, dry land or
waste, instead of all irrigable land,
as

95 13
is on the South bank. Between the
Persimullaz and the Lower Pulney
Hills, the valley is contracted to a pass
scarcely one mile in width, so that
the position of the line is fixed without
any choice. The ground rises
regularly for 15 miles from the Vygar
river, to the summit, and then
falls gradually again for 7 miles to
Dundigul. The earthwork required
is very light, in fact only such as is
necessary to allow for drainage
openings.

Mr Logan has
adopted much the same line; the
station at Madura being placed by
him

him, close to the town on the west side,
and the route on the North bank
of the river being chosen in preference
to that on the South. From Dinidigul,
towards Trichinopoly, the location of
the line, by Captain Smith's present
report, is determined by the narrow
gorge between the hills near Tyaloor.
From this ridge, the line passes
round the foot of the Taikmullay
hill, and then enters on the descent
into the plain round Trichinopoly,
at 8 miles beyond the Taikmullay hill,
the direction of the line becomes
guided by the course of the Arriam
river, which 4 miles from Yellangakoorchy
occupies the gorge between two detached
hills.

97 14
hills. After rounding the hill, and
passing the village of Minnerparai,
the line follows the right bank of
the Arriam, for 6 miles; then leaving
it, crosses the ridge close to the village
of Colattoor; and finally after crossing
the Corvaur river, enters the Canton-
ment of Trichinopoly, joining the
Great Southern line on the high-
ground to the South of the town, where
it is proposed to build the new
station.

7. As regards the
produce of the country, that will be
affected by the Railway, information
has been recorded, that the bulk of
local traffic in Madras District
is

is from the west to the main stream,
passing North and South, that is
from Sravancore through Tirunelveli,
to Madurai; there being hardly any
trade with the portion of the District
to the East of the town of Madurai,
except in salt and salt fish.

The cotton grown in the South of Coimbatore,
and North West part of Dindigul
Taluk, is conveyed to Tuticorin or
Palancottah, by Dindigul. The
Madurai district receives supplies
of betel nut, curry-stuff, pepper,
rice and oil, by Palghat and
Dindigul, from the West coast.

From Madras, Salem and Bangalore,
trade is carried on, in cloths,

cotton

cotton-twist, iron, hides, English goods,
potatoes, wheat, sugar, &c., to Trichinopoly
and for the Southern districts of
Madurai and Tirunelveli. Salt,
which is now brought from the East
Coast of Madurai, will be conveyed
in large quantities from Tuticorin,
and will be supplied by the rail road,
through Madurai to the Coimbatore valley,
to Dindigul, and the Coimbatore
District. The Coimbatore valley grows
grain, garlee, mustard, oil-seeds,
wood, bamboo, fruit; and these
products find their way, both through
the Dindigul valley northwards to
Madurai, and into the Tirunelveli country.
Tobacco is grown about the Palghat Taluk,

and

and in the North West part of
Tinnevely, round Streeveliputtur
and Shreegazi, whence it is conveyed
to Dindigul and Trichinopoly.

In contrast with
the numerous products on the West
of Madras, the produce of the
country lying to the East and
North-East is almost entirely
^{no cotton at all is grown,}
grain, and there is an absence of
those soils which are favourable to
the production of cotton, tobacco &c.
In Madras, there is a large manu-
facture of cloths, which are
exported to Tinnevely and Travancore,
while cloths are also sent from
Tinnevely into Madras to be dyed.

Jaggery

16
Jaggery is sent from the south to the
North parts of Tinnevely, also on to
Madras, and Coimbatore. Cotton
seed is exported from Tuticorin, and
also travels northwards, on its way
to the Trichinopoly and Tanjore districts.
Cuminos, onions, chillies,
oil-cakes, rice, and paddy, are the
principal exports from Tuticorin to
Columbo: the traffic on land in
timber, gude, and salt-fish, though
not as yet extensive, is likely to be
much developed by the construction
of the Railway.

The export of cotton
from Tuticorin has been estimated at
12,000 tons in the year; and the total

amount

amount of goods passing North and South between Madras and Tinnevely, and Tuticorin, at 212,000 tons per annum. From the statistics

furnished, in 1868, there was fair promise in the opinion of the Government, that the traffic in goods alone, would nearly pay 5 per cent on the cost of construction: supposing the length of the line to be 125 miles, and the expenditure £7000 per mile. The length of the line, as now surveyed, is 107 miles; but as detailed estimates are not yet furnished, the cost of the Southern Section of the Railway, cannot at present be compared with the expected receipts.

G. O. No 2510
dated 5th August
1868

103 13
8. Over the whole length of the line from Trichinopoly to the two Southern points; there is no really heavy gradient, and with the exception of a curve of 52 chains radius at the ^{junction} Munniachee and another of 40 chains radius on quitting the Vygar bridge on the North side, there is no curve proposed of less than 1 mile radius.

The country traversed, no where presents any real difficulties for the Engineer to contend with. Between Trichinopoly and Madras, the ruling gradient cannot be less than 1 in 100, owing to the height of the ridge, seven miles to the South of Dindigul, and the fall from thence, in

in the valley of the Vygaz river.

From Madura, to Tuticorin and
Tinnevely, the ruling gradient need
not be more severe than 1 in 200.

On the sections now forwarded,
some gradients are shown steeper
than this: but from Captain Smith's
discussions with Mr. Logan while
going over the ground, I anticipate
that in the detailed estimates, these
gradients will be reduced.

The site of the bridge
over the Chittaur river, $11\frac{1}{3}$ miles
out of Tinnevely, has been judiciously
selected, below the point where a
large stream called the Oopau
falls in, so as to avoid a second
bridge

105/14
bridge; and as high up the river as
possible, on account of the rise to the
ridge near Munnachee. Beyond
Huddumbore, the line has to be
diverted from the straight, and skirt
along the west side of a range of low
hills to Coivilputty. The Patore river
is crossed at a point a little below
the bridge on the high road: and
Mr. Logan proposes a bridge of
20 spans of 50 feet. After passing
through Tereumingaleem, and
Videputty, the line runs close to
the foot of the Sekunder Mullai, a
detached hill 4 miles from Madura,
where excellent building stone is
obtained. The Madura station
ground

ground is close to the Western extremity
of the town, but clear of all buildings;
the bridge over the Vygarj river is
designed of twenty-one, 50 feet spans.
The line follows up the Vygarj valley,
for 14 miles to Pholavandun; and
then changing direction to the
North, runs round the Piroomulay
hills, with a heavy ascent of 1 in 100
for 3 miles, to attain the elevation of
the ridge at the head of the valley.
From this ridge, there is a descent,
now in the Canney drainage basin,
to Dandigul, where the station is
placed on the East side, about
1½ mile from the Native town.
From the Shaloor gorge, there is a
descent in 4 miles, with gradients

107 19
of 1 in 100 and 1 in 110, to Coivilputty.
Four miles North of Yellanga koorchay,
the Arriant river occupies another
gorge, but it appears feasible to
make a new cut for the diversion of
the stream, and thereby save the
alternative of building two bridges
over the river, or else running a
tunnel through the side of the
hill. Below the Samudsum tank,
where a breach in the bund has
formed a channel, which the river
is inclined to follow, in divergence
from its own course, the river
must be retained in its original
bed. Beyond this point, the line
is laid out to avoid as much as
possible

possible, by easy curves, the numerous tanks, till it joins the main line at Trichinopoly.

9. Some alterations will be made in details of the exact location of the line, such as shown in para 7 of Captain Smith's report: while also the drainage areas are being more fully investigated, in order to determine finally the waterway to be given at different places; but these matters and the reduction of some of the gradients, do not affect the general alignment, and I consider it unnecessary to keep back this report, as all information will be furnished shortly, with

101 20

with the detailed estimates.

10. There are only 2 bridges of any magnitude, on the extension, viz over the Vygaz, and Patoot rivers, where it is proposed to allow 21 and 20 spans of 50 feet. I am not altogether satisfied, that larger spans would not be advisable, so as to reduce the obstruction in the waterway, during heavy floods. Both of these rivers are dry for many months of the year: and ordinarily no floods of any depth come down. The banks are tolerably well defined, as to the usual amount of drainage: but occasionally, after heavy falls of rain on the hills, the

the fresher rise very rapidly, and the water not being contained in the normal section of the river bed, there being also no protective embankments, the river spreads over the country where low along the edge: there is consequently a great accumulation of water where the stream is impeded as by the embankments leading up to a bridge. This was strongly exemplified, during the storm in November 1869, when the Satoor bridge gave way. This bridge consisted of 17 arches of 40 feet span: and the waterway was not near sufficient to carry off the great flood. I have referred this question

21
question for Mr. Logan's further consideration.

11. At Tinnevely, the terminal station is placed, quite to the West of the town, at a distance of 2 miles, from the bridge over the Tambapoorney, and 4 miles from the Native town and Cantonment of Palamcottah, while the approach to the Station will be, by the very narrow roads in the town of Tinnevely. Mr. Puckle has not yet expressed his opinion; but I am in communication with him, regarding the site. Another station is provided, only a mile off, at Tetchanellur, which would be a general passenger station for

for Palamcottah, just as Perambore
has been for Madras. Tetchanellur
is at the point where the trunk
road branches off both to Tirunelveli
and to Palamcottah, and is about
the same distance from Palamcottah,
as the West side of Tirunelveli.
All traffic from the South of the
river, must cross by the bridge, which
it is hoped, will be restored, before
the Railway is opened; and this traffic
will be greater than that from any
other quarter; for all from the East, and
North will have the railway already,
and there is left, only the Western
traffic to be accommodated, such as
comes from the North side of the
river. A station close on to Tirunelveli
will

13 22
will be of great convenience to the
merchants of the town; but from the
short distance to Tetchanellur, it
seems questionable whether two
stations are required, in such close
proximity; and if not, which of the
two places is, on all considerations
to be preferred. Not being prepared
to make a distinct recommendation to
the Government, just now, I will
take care to do so, in my next report,
when submitting the estimates.

I have the honour to be,
Sir,
Your most obedient servant
21st January 1871 } *Wm. Lundy* } Captain R.E.
Madras }
Acting Consulting Engineer
for Railways.

No 457. sent off at 10 o'clock
by express. enclosed to you
with a quantity of the most
valuable specimens of the
Secretary to the
Govt. of India. I enclose also
a quantity of the most
valuable specimens of the

J. D. S.

The Secretary to Government,
P. W. Department,
Fort St. George

January 1871

Study No. 33.
4569457-14569

Trace of the Professor's

reference of the C. of A. to
said provisions of the C. of A.

black, together with

and persons of the whole family
and a part of the functions of the

preferred to the more direct
one to Madras. I am directed
herewith to forward a letter
from the Acting Comr. Engineer
for Railways submitting
the reports of his Deputy
and of the Chief Engineer on
the trace of the proposed
extension, accompanied
by working surveys and
sections.

Capt. Pendergast's full
review of the correspondence
which has taken place
during the last ten years
regarding this extension
makes it needless for the
Madras Government to
do more at present than
briefly describe the direction

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proposed to be followed and the
considerations on which it has
been selected.

Starting from Trichinopoly
the extension will be carried
almost in a direct line by
Munierparai and Sylor to
Rudiyul, and thence, sweeping
round to the south eastward
past Amanakinnor into
the valley of the Vignay it
will follow the course of that
river by Sholyandaw and
crossing the Vignay nearly
opposite Madras will pass
close to the westward of
the town where there will
be a first class station 97
miles from Trichinopoly.
From Madras the line will
run in a south easterly

direction to Eroosungalur
and thence, trending almost
directly south, it will pass
Vidupatty and Sabar and
follow the direction of the
Trunk Road up to Caril-
patty from which point it
will be carried by Kud-
dumbur to Tuticorin
throwing off a branch at
Keel Munniashee to the town
of Quimvelly. The length
of the line from Madras
to Tuticorin will be 99
and of the branch to Quim-
velly 18 miles, while the
distance of Keel Munniashee
to Tuticorin will be 19 miles.

The papers which
have been laid before the
Govt of India with my letter

already referred to, will show
that although in the selection
of a point from which the
extension should leave the
main line of the Great
Southern of India Railway,
the Government were at
first in favor of Aracoo,
they have reason to change
their opinion, and to give
the preference to Kichinspilly,
as soon as it became appa-
rent from the terms of the
agreement which the Sec-
etary of State has entered
into with the Carnatic Rail-
way Company for the con-
struction of a first class
Railway from Arcium to
Siddalore, that such a
line could not stop there

and must in the nature of
a thing be carried in allo-
a manner to form a junction
with the Great Southern
of India Railway. The
point of junction will,
the Madras Government
think, be Tanjore, and
the most convenient loca-
tion for the bifurcation
from the main line of
the Southern Extension
of the Great Southern of
India Railway to afford
the greatest accommodation
to through traffic, which
will then become impor-
tant, would therefore be
that place. But a Rail-
way from that place
Southward via Madras

+ Vide No. of Madras Govt
14 Feb 88, No 520.

1214
would run through so poorly
populated country and
would be of no little advan-
tage to the local traffic
which, consisting prin-
cipally of goods trains, will
abundantly, it is believed, fol-
low the route by sea which
it now takes from the
neighbouring ports of
Negapatam, Karikal, &c.
as to make the selection
of Tanjore undesirable.
Caroor, on the other hand,
although well situated with
respect to the general require-
ments of local traffic
is, in the opinion of the
Madras Govt, too far to
the westward to form a con-
venient point for the

departure of the extension from
the main line in the event
of the connection with the
latter of the Carnatic Rail-
way be far to the eastward
as Tanjore, and after the
fullest consideration, His
Excellency the Governor in
Council has had no hesi-
tation in deciding in favor
of Trichinopoly, which from
its position and the im-
portance of the town is
in His Excellency's judgment
more eligibly situated than
either of the other places for
the point of bifurcation of
any branch running to
the southward provided,
as is proposed, it follows
the route of Brindis and

Secy of Madras Govt.
16 May/70. No 1257

1235
thereby opens an outlet from
that valley and affords ac-
commodation to the large
traffic from the westward
which passes that way
towards Madras and the
Coast.

From Madras a di-
rect line to Tuticorin would
carry the Railway through
the poorest part of the Tinne-
vely District, where the
lands mostly belong to
Zemindars and there are
no large towns. It would
no more than skirt the
great cotton fields as well as
the productive countries
through which the trunk
road

road has been carried, and
would necessitate the con-
struction of a lengthy branch
to bring it into connection
with the important town
of Tinnevely, the rich
valley of the Tambrapoorney
and the traffic which may
be expected from the west-
ward. For these reasons
the Madras Govt. so long
ago as the 5th August 1868, on
taking the question of the
direction in which Railway
Extension should be carried
South of Madras, recorded
in their Proceedings of
that date No. 2570, of which
a copy will be found

1256
amongst the papers now sub-
mitted, their opinion that
the extension should follow
generally the direction of the
trunk road as far as Khytar
from which it would turn
southward to Tuticorin and
throw out a branch to Tinne-
velly. This route has not
been materially deviated
from in laying out the line
but, for the constructive and
other reasons which are
fully explained in the
accompanying reports, it
will be seen that the exact
alignment has been inclined
to the eastward from about
the 160th mile so as, leaving
Khytar to the west, to carry

the line direct to Keel Gramachee
19 miles from Tuticorin as
the point of bifurcation of
the branch to Spinnervelly.
So aligned the Railway will
pass through a more popu-
lous tract than if it were
carried to Kybar; and the
distances from Madras to
Tuticorin and from Tuticorin
to Spinnervelly will be less
than if a more western
trace were adopted, while,
at the same time, a lower
summit level will have
to be surmounted. Through-
out, there are no engineering
difficulties to be overcome.

1277
Only two streams of any mag-
nitude have to be bridged,
namely, the Vigar and the
Tahar. For the former 21
girder openings of 50 feet and
for the latter 20 openings of
the same size will suffice.
The gradients are not severe,
for while that between Tri-
chinopoly and Madras will
not rule more than 1 in 100,
between Madras and Tuticorin
it will be only 1 in 200, and
with the exception of two curves
at the Keel Gramachee junc-
tion and on quitting the
Vigar Bridge of 52 and
40 chains radius, respective-
ly, there will be no curve
of less than one mile.

radius. The earth work will
not be heavy, and both
stone and lime are to be
found within easy distance
of the line.

The extension will be
divided into 14 Districts of
an aggregate length of 215.576
as follows:-

From Trichinopoly to Madurai comprising Districts 1 to 6 and 6 miles of District 7	M. C. L.
	97. 32. -
From Madurai to Keel Mainiachee comprising 6 miles of District 7, Districts 8 to 11 and 12 1/2 of District 12	79. 65. 12
From Keel Mainiachee to Tuticorin comprising 2 1/2 of District 12, and District 13.	19. 10. .
From Tuticorin to Srirangapatnam comprising 2 1/2 of District 12, and District 14.	18. 58. 64

As regards the
prospects of traffic, the returns

are encouraging. The Congress
details at some length the
sources from which it is
likely to be principally
derived, and looking to the
flourishing condition of the
Districts to be traversed
and to the large amounts of
cotton and various merchandise
which pass to and fro through
the country the line will
occupy, the Madras Govt.
are confident that few
better locations for a Rail-
way could be found, and
they have no reason to
doubt that as good a trace
as can be selected has been
adopted.

Under

and the section of the
Telegraph.

W.B.

Desp^d 16/2/71 into a
Copy of G.O. 2570 of 1868 & 26
Copies of G.O. 456 of 1871 -
The Ordnance Dept. desp^d 17/2/71
30 plans desp^d 20/2/71 in a box
per steamer "Lento".

Under these circum-
stances I am desired to regret
that the Govt. of India may
be moved to give their early
sanction to the location of
the extension as now proposed,
in order that, pending the
submission of the detailed
plans and estimates and
such discussion of the
question of gauge as may
arise, measures may at
once be taken for ac-
quiring possession of the
necessary land for the
erection of bungalows
for the Engineering Staff,
for the opening of quarries,
the collection of materials,

and

Pro. 20 Oct/62 at 580 - Rail & Dept.

" 2 - 197 - 20-21.

" 4 - 66 67.

" 25 - 586 @ 588

" 14 Feb/68 - 348 @ 350

" 5 Aug - 108-109

" 17 Sept - 321-322

" 16 May/70 - 224-228

" 30 Aug - 487 @ 489.

" 7 Sept - 106-107

" 5 Oct - 80-81

" 14 - 208-209

" 25 Jan/71 - 383 @ 355

Great Southern
Railway from
to Tuticorin

Memorandum No 314

Govt. of 1871 Madras.

PUBLIC WORKS.

To the Consulting Engineer
for Railways
And
To the Secretary to the
Govt of India

Further No. 1471 of
16 Feb 71.
1871 271
939-540-3/31-3-71
987-3-4-71
1000-15-6-71

Date

Recd

Encl 4

G O. 14 Feb 71, 4569457

Nos. 328-329, 330

(Order)

of Extension - Passing
orders on reports, tracings
& sections of the Eastern
of the Great Southern
India Railway from
Tuticorin to
Chettur.
forwarding
with annual reports
and other surveys and
plans relating to
the

C.S. 10/11