Public Works (1890) Department.

RAILWAY BRANCH.

G.O., No. 1932 Ry.

DATED 4th December

[Despatch Abstract.]

Instructions given by Colonel Smith, R.E., for the guidance of the Engineer-in-Chief, East Coast Railways.— Copy of note and— recorded.

Indexed.

[P. W. Ry. 500—8-5-00.]



Photo-Zincographed in Central Survey Office, Madras.
1889.

BACK PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.

FURTHER PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.

APPENDIX to G. O. No. 754 R., dated 6th July 1889.

Read—the following papers :—

From the Tahsildar of Ellamanchili, to the Joint Secretary to Government, Public Works Department, Railway Branch, dated 31st December 1888.

I beg to enclose the Tuni Deputy Tahsildar's letter about the bandies for your honor's information.

From the Deputy Tahsildar, Tuni Division, to the Tahsildar, Ellamanchili, No. 276, dated 30th December 1888.

In acknowledging receipt of your letter of this date, I have the honor to inform you that 3,556 bandies have come from different villages to the market at Tuni to-day and that they have been carefully counted.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Railway.

Read again the following papers :—

G.O., dated 7th June 1888, No. 469 R., Public Works.

From Major M. C. BRACKENBURY, R.E., Under-Secretary to the Government of India, Public Works Department (Railway—Construction), to the Joint Secretary to the Government of Madras, Public Works Department, Railway Branch, dated Simla, 21st May 1888, No. 534 R.C.

I am directed to acknowledge the receipt of your letter No. 339 R., dated the 26th April 1888, inquiring whether the Government of India will be prepared to allot a sufficient sum and to provide a surveying staff for the commencement, in July next, of a preliminary survey for a railway from Bezváda to the south bank of the river Godávari and for a reconnaissance to be effected, by the officer in charge, of the country to the north of Cocanada. It is stated that the fieldwork from Bezváda to the south bank of the Godávari may be estimated as not likely to exceed Rs. 70,000.

2. In reply, I am to say that considering that the country is well known and open, being traversed by an old high road and by a canal, and moreover that it is believed the whole has been field-surveyed by the Survey Department, so that considerable assistance ought to be obtained from the survey map and bench marks, the Government of India is of opinion that, even if a complete survey were to be now undertaken, it ought not to cost the amount at which you have estimated the preliminary survey.

3. At present, however, in the improbability that the project will be taken up by a company, or that funds can be allotted by the Government of India, the time for a regular survey of the locality in question has not arrived. It appears only necessary that a skilled officer with a small staff should make a rough reconnaissance, and it is conceived that it should be possible to have this reconnaissance effected by a local officer.

4. Should this not be considered sufficient however, I am to say that, in order to meet the views of His Excellency the Governor in Council, an officer will be deputed for a few weeks to make the reconnaissance, his salary being debited to Imperial funds.

From Major W. H. COAKER, R.E., Officiating Joint Secretary to the Government of Madras, Public Works Department, Railway Branch, to the Secretary to the Government of India, Public Works Department, dated 7th June 1888, No. 469 R.

In reply to your No. 534 R.C., dated 21st May 1888, I am directed to express the regret of His Excellency the Governor in Council that the Government of India is not prepared to sanction a preliminary survey for an extension of the Hyderabad-Bezváda line up to the south bank of the Godávari river, as recommended in my No. 339 R., dated 26th April 1888.

2. When this decision was arrived at, the Government of India had not, it is presumed, received the Proceedings of this Government, Nos. 390-391 R., dated 10th May 1888, and I am to say that His Excellency the Governor in Council would be glad if, in the light of the further information therein contained, the decision communicated in your letter under reply could be reconsidered and funds be allotted to meet the cost of a preliminary survey from Bezváda to the Godávari south bank.

3. Should the Government of India be still unable to accede to this, I am to request that an officer of experience may be made available for the execution of a reliable reconnaissance of this tract of country, and also that it may be considered whether such reconnaissance may not be subsequently extended to Cocanada and Vizagapatam. No such officer is available locally, but the subordinate staff could, it is thought, be obtained in Madras.

G.O., dated 25th July 1888, No. $\frac{608}{A}$ R., Public Works.

From Major M. C. BRACKENBURY, R.E., Under-Secretary to the Government of India, Public Works Department (Railway—Construction), to the Joint Secretary to the Government of Madras, Public Works Department, Railway Branch, dated Simla, 27th June 1888, No. 656 R.C.

I am directed to acknowledge the receipt of the correspondence noted in the margin pointing out the necessity for the early construction of a line of railway from Bezváda to the south bank of the river Godávari, and requesting that the orders communicated in Public Works Department letter No. 534 R.C., dated the 21st May 1888, may be reconsidered.

Endorsement No. 391 R., dated the 10th May 1888, and enclosures.
Letter No. 469 R., dated the 7th June 1888.

2. In reply, I am to say that the Government of India is of opinion that sufficient evidence has not been adduced that the line, if constructed, will be a paying concern, and that, under the circumstances, a regular survey of the proposed line is not considered desirable at present.

3. I am, however, to request that it may be intimated what the best and earliest time will be for making a reconnaissance of the country referred to, in order that arrangements may be made for placing the services of an officer at the disposal of the Madras Government for the purpose of examining the country from Bezváda to the south bank of the Godávari river, and also between Cocanada and Vizagapatam.

Order—dated 25th July 1888, No. $\frac{608}{A}$ R., Public Works.

Ordered that the following telegram be forwarded to the Government of India:—

"Your letter No. 656 R.C., 27th June. There is nothing to prevent the reconnaissance being commenced at once."

(True Extract.)
(Signed) C. J. SMITH, Colonel, R.E.,
Joint Secy. to Govt., P.W.D.,
Railway Branch.

G.O., dated 5th September 1888, Nos. 612-13 D., Public Works.

From the Under-Secretary to the Government of India, Public Works Department (Railway—Construction), to the Secretary to the Government of Madras, Public Works Department, dated Simla, 4th August 1888, No. 799 R.C.

In continuation of Public Works Department letter No. 656 R.C., dated the 27th June 1888, I am directed to forward herewith a copy of each of the undernoted despatches from and to the Secretary of State for India regarding a project for a line of railway from Bezváda to Ellore in the Godávari district, and to request that the Government of India may be furnished with the statistics of the goods and passenger traffic between Ellore and Bezváda, to which Mr. Hall alludes in the last paragraph of his letter.

ENCLOSURES.

Despatch from the Secretary of State for India, to the Government of India, dated 14th June 1888, No. 65 (Railway).

With reference to my Railway Despatch No. 16, dated 2nd February 1888, I transmit herewith, for your information, copy of correspondence* which has recently passed in this country in respect to the suggested extension of a line of railway from Bezváda to Ellore in the Godávari district.

* Letter from Mr. S. Hall, dated 16th May 1888.
" to Mr. S. Hall, dated 13th June 1888.

From S. HALL, Esq., to the Under-Secretary of State for India, dated 13, Austin Friars, London, E.C., 16th May 1888.

I have the honor to address you on a matter to which my firm, Messrs. Hall, Wilson and Co. of Cocanada, have, for some time past, been endeavouring to secure attention in India, namely, the question of railway connection between Bezváda on the river Kistna and the town of Ellore in the Godávari district of the Madras Presidency.

There are at present in course of construction by the Government of India two railways converging at Bezváda, viz.—

(*a*) The Guntakal-Kistna State Railway (a metre gauge) protective work of 260 miles in length.

(*b*) A broad gauge line of about 22 miles from Bezváda to the Nizam's frontier to connect with His Highness the Nizam's Guaranteed State Railway.

At Bezváda each of these lines has a terminus situated on the system of canals irrigating the deltas of the rivers Kistna and Godávari, and these canals constitute practically the only highways connecting the railway with these deltas and with the sea-coast. It is in view of the extremely unsatisfactory character of these canals (especially of the section between Bezváda and Ellore) as highways of traffic of the extent to which such defective feeders must handicap the development of traffic on these railways, and, above all, of the serious obstruction which must occur in times of famine, that I would respectfully and earnestly urge upon the consideration of Government the carrying on of a railway line from Bezváda to Ellore, a distance of about 35 to 40 miles.

The primary function of all the canals of both deltas is irrigation, navigation being systematically and, no doubt most properly, regarded as a secondary consideration. The needs of navigation must, therefore, at all times give place to those of irrigation, and fed as these canals are by the rivers Kistna and Godávari, with water highly charged with silt (the rain-washings of the Central Provinces), the quality of the water-supply, which gives it a peculiarly high fertilizing value, militates against navigation, in that the channels are unceasingly subject to a process of silting.

As an inevitable consequence, the canals have every year to be drained for dredging for a period extending in parts to close upon three months, and even outside of that recognised period of closure interruptions from local or partial siltage are of frequent occurrence. It is in the nature of things, moreover, that irrigation should make its largest demands on the water-supply during the dry season (which also unfortunately coincides with the period of greatest activity in produce traffic) when the rivers feeding the canals are at their lowest level, with the result that there is often, in parts, insufficient water to admit of the passage of fully-laden boats.

These adverse conditions present themselves especially in the main trunk canal from Bezváda to Vizizaishweram connecting the rivers Kistna and Godávari and most conspicuously of all in the section between Bezváda and Ellore. The latter point (Ellore) marks the junction of the two systems, the Godávari feeding the canals of the eastward, while those to the westward are dependent on the Kistna, and whether from defects in the levels or from exceptional

demands for irrigation or from interruptions of the river Tummilair which, when in flood, sweeps over that section of the canal at one point, interruptions to traffic are sufficiently frequent and uncertain in their incidence to seriously affect the whole line of communication between the sea-coast and the interior during the past two years, such interruptions have been exceptionally frequent and serious, but speaking from an unbroken experience of more than twenty years, I may say that trade has always suffered severely from such interruptions and from the uncertainty as to delivery of produce arising from these causes.

The defective character of existing communications between Bezváda on the one hand and the sea-coast and the Kistna and Godávari deltas on the other must, therefore, very seriously handicap the development of trade which these much-needed railways should unquestionably effect, and in times of famine, when demands for irrigation would be specially heavy and imperative and when at same time there would be an enormously increased pressure of navigation on the canals, congestion of traffic on the Bezváda-Ellore section would certainly occur, and would operate to neutralise to a serious, possibly even to a disastrous, extent the value of the Bellary-Kistna State Railway which is constructed solely in view to connect, in times of scarcity, the fertile deltas of the Kistna and Godávari with the worst famine districts of the Madras Presidency.

I would therefore earnestly urge that the broad gauge line now in course of construction should be carried on to Ellore, thus giving access to the Godávari system of canals which are not subject in anything like the same degree to these interruptions, and I would suggest, for consideration, whether by the expedient (similar to that now in successful operation on the Great Western Railway in this country) of laying an intermediate light rail between the heavier rails at metre gauge, the extension might not be made available for the rolling-stock of the Bellary-Kistna State Railway as well as for the broad gauge vehicles of His Highness the Nizam's State Railway.

I think it probable that the latter company would view with satisfaction such an extension, and would be prepared to undertake its construction and working, in same manner as portion of the line between the Nizam's frontier and Bezváda.

I may, perhaps, further in this connection (as bearing on the expediency of adopting some means of crossing the Kistna) be permitted to suggest, for consideration, that the expedient of laying an intermediate rail at metre gauge between the broad gauge rails, if adopted on the line from Bezváda to Singareni, would permit of the Bellary-Kistna Railway's rolling-stock running right up to the coal-pit mouth, and thus obviate the double break of bulk at the Kistna, representing a loss of some 10 per cent. on the value of all coal drawn from the Singareni coal fields for that railway itself and for the other railways with which it connects at Bellary.

As regards the financial prospects of the proposed extension, I have reason to believe that statistics, compiled by Government officers, are already before the Government of Madras demonstrating that the existing goods and passenger traffic, of which it is year by year becoming more imperative that the canals should be relieved, as wet cultivation in the deltas extends and the demands on the canals for water for irrigation increase, gives promise of an immediate and paying return on the cost of a railway. It is unnecessary, therefore, for me to submit statistics here, but I may perhaps be permitted, as speaking from long connection with the trade of the district, to express to you the conviction I feel that an extension from Bezváda to Ellore, and, indeed, any extension towards Cocanada, which port the trade already naturally seeks, would pay well and at once, and would, moreover, materially improve the paying power of the Bellary-Kistna State Railway, and of the State line from Bezváda to the Nizam's frontier.

From J. E. GORST, Esq., to S. HALL, Esq., dated India office, S.W., 13th June 1888, No. 1028 P.W.

I am directed to acknowledge receipt of your letter, dated the 16th May 1888, advocating extension of a line of railway from Bezváda to Ellore in the Godávari district, and to acquaint you, in reply, that a copy of your communication has been transmitted for information of the Government of India.

Despatch from the Government of India, Public Works Department (Railway-Construction), to the Right Honorable the Secretary of State for India, dated Simla, 27th July 1888, No. 83 (Railway).

We have the honor to acknowledge the receipt of your Lordship's Railway Despatch No. 65, dated the 14th June 1888, transmitting, for information, a copy of the correspondence which has recently passed between your Lordship and Mr. S. Hall, of the firm of Messrs. Hall, Wilson and Co. of Cocanada, advocating the construction of a line of railway from Bezváda to Ellore in the Godávari district.

2. In reply, we have to state that the desirability of constructing a railway from Bezváda to the south bank of the river Godávari has already been brought to our notice by the Government of Madras in connection with a project for connecting Bezváda with Orissa by the "East Coast" Railway, and that we contemplate having a reconnaissance carried into effect this cold

weather, so as to ascertain the resources of the country between Bezváda and the Godávari river and onwards to Cocanada.

3. We will inform your Lordship of the result of our investigations.

No. 538 D.

For favor of any information that may be recorded in regard to traffic statistics between Ellore and Bezváda by canal.

OOTACAMUND, 17th August 1888.

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

To the Chief Engineer for Irrigation.

Office note from the Under-Secretary to Government, Public Works Department, Irrigation Branch, to the Joint Secretary to Government, Public Works Department, Railway Branch, dated Madras, 22nd August 1888, No. 181.

Your endorsement No. 538 D., dated 17th August 1888.

Please see the accompanying abstract of the traffic statistics on the Godávari and Kistna canals which join at Ellore, compiled from the statements of traffic on the navigable canals in this Presidency for 1886-87 and 1887-88, appended to G.Os., Nos. 120 I. and 457 I., dated 21st February and 4th August 1888, herewith forwarded.

Order—dated 5th September 1888, No. 612 D., Public Works.

Ordered that the following letter be forwarded to the Government of India.

(Here enter No. 613 D., dated 5th September 1888.)

(True Extract.)

(Signed) C. J. SMITH, Colonel, R.E., Joint Secy. to Govt., P.W.D., Railway Branch.

Letter to the Secretary to the Government of India, Public Works Department, Simla, dated 5th September 1888, No. 613 D.

With reference to your letter No. 799 R.C., dated 4th August 1888, requesting to be furnished with statistics of the goods and passenger traffic between Ellore and Bezváda, referred to in the correspondence communicated with your letter under reply, I am directed to forward, for the information of the Government of India, copies of the marginally-noted Proceedings of this Government, and to state that the figures give the traffic on the Ellore canal under "Western section, Godávari delta," and "Eastern section, Kistna delta." The latter may be assumed to represent traffic to and from Bezváda.

No. 120 I., dated 21st February 1888.
„ 457 I., „ 4th August 1888.

From Colonel C. J. SMITH, R.E., Joint Secretary to the Government of Madras, Public Works Department, Railway Branch, to the Secretary to the Government of India, Public Works Department, Simla, dated 16th April 1889, No. 65 D.

With reference to the concluding paragraph of the despatch from the Right Honorable the Secretary of State for India to His Excellency the Right Honorable the Governor in Council, dated 7th February 1889, No. 3 (Revenue), I am directed by His Excellency to request that he may be favored, at an early date, with copies of the report by Sir G. Molesworth, K.C.I.E., on the proposal for an East Coast of India Railway.

G.O., dated 8th June 1889, No. $\frac{648}{A}$ R., Public Works.

From Major M. C. BRACKENBURY, R.E., Officiating Deputy Secretary to the Government of India, Public Works Department (Railway—Construction), to the Joint Secretary to the Government of Madras, Public Works Department, Railway Branch, dated Simla, 24th April 1889, No. 326 R.C.

In continuation of Public Works Department No. 1169 R.C., dated 11th December 1888, I am directed to forward the report of a reconnaissance for the East Coast of India Railway made by Sir G. Molesworth, K.C.I.E., and Colonel C. J. Smith, R.E., and to request that, with the permission of His Excellency the Governor in Council, the Government of India may be favored with the views of the Government of Madras thereon.

2. I am also to request that, with reference to para. 6 of Mr. Walch's note (*vide* appendix F, pages 14 and 15 of the report), the Government of India may be furnished with any further information available about the road from Rajahmundry *viâ* Ellore to Bezváda, and as to the possibility of opening it for cart traffic.

Report of a Reconnaissance for the East Coast of India Railway by Sir Guilford Molesworth, K.C.I.E., and Colonel C. J. Smith, R.E.

The reconnaissance for an East Coast Railway was undertaken in accordance with the instructions conveyed in Government of India letter No. 1169 R. C., dated 11th December 1888, to the address of the Government of Madras, with a view to ascertain whether any line was practicable at a cost that would promise fair financial results, and, if so, the alignment which would best serve the following large towns:—

Rajahmundry,	Vizianagrum,
Cocanada,	Berhampore,
Vizagapatam,	Cuttack,

the requirements of the smaller ports, of the larger salt factories, and of Pooree, being met by branch lines in the event of the traffic being found to justify the outlay.

2. The questions of the famine protective capacity of such a line, and of its probable financial prospects, looking to its estimated cost, have been left to be dealt with hereafter by Government in the Revenue and Agricultural Department, for while, on the one hand, it was considered that conclusions drawn from information acquired on a rapid tour, during a very exceptional season, were likely to prove inaccurate; on the other hand, the Government have before them unusually full information from which to forecast the traffic likely to be secured by the line, as well as the results of special investigations into the circumstances and condition of the northern districts, to aid them in deciding the value of the line as a famine protective agency. The several addresses presented in the course of the reconnaissance by the leading men of several of the larger towns for submission to Government will be found in the appendices to this report.*

* See Appendices G, H, I, K.

3. The following observations are offered upon the question of the gauge to be adopted on a line extending from Bezváda to Cuttack; a question to a great extent dependent on the arrangements which may be found possible at unbridged rivers.

4. The summer supply of the Kistna river at Bezváda is such that a ferry capable of conveying rolling stock could hardly be maintained during the months of April, May and June. The utilization of the Anicut (River Weir) in any form for the transit of wagons may, owing to the necessities of the irrigation interests, be regarded as practically out of the question, and the difficulties attending the maintenance of a ferry of this description during the high freshes would be such that, if the East Coast Railway ever be made, trade and the full development of the famine policy for the protection of the ceded districts will, it seems almost certain, require that this river should be bridged.

The only satisfactory site for a rail-head on the left bank of the Kistna is upstream of the Bezváda hill, where a considerable current must be encountered when the river is in flood, and at such times great difficulty will be experienced in warping round the base of the hill, against a heavy current, boats that have entered the river through the lock on their way to the right bank.

When the river is low, there is not sufficient water for a steam ferry to cross above the island that exists about mid-river, and it would be both costly and difficult to maintain a passage through the pool immediately above the anicut.

When for the purpose of annual repairs the under-sluices have been opened, it would be impracticable to maintain a passage here or elsewhere in the river.

The character of the structure renders the construction of a permanent line either upon, or alongside, the anicut costly and inexpedient, and even were this permitted, the design of the head-works would necessitate a very costly approach from the main line. Any such arrangement moreover, though only required for perhaps two months in each year, would inevitably obstruct materially the annual repairs of the anicut.

A temporary line of railway across the river-bed between rail-heads may be regarded as practically out of the question.

The Godávari river at Rajahmundry, where deep water can, it is stated, be at all times found, and where the rise of the floods is moderate, appears to offer exceptional facilities for the establishment of such a ferry. Although, therefore, it is highly improbable that for many years to come the traffic will be held to justify the construction of such a costly bridge as would be necessary here, a break of bulk, equivalent to a break of gauge, is not inevitable at this river.

On the Mahánadi river above Cuttack, the establishment of a ferry that would obviate a break of bulk would, it appears, be attended with such difficulties that, unless the river be bridged, a break here cannot be avoided.

The question of a terminus for Cuttack is one which involves considerable difficulty, if the Mahánadi be not bridged.

Cuttack itself is practically isolated, on the one side by the Mahánadi, on the other by the Katjori river.

There is always deep water at Cuttack on both sides of the Mahánadi river, the water of which is held up by the anicut; boat communication can, therefore, be maintained at all times from a terminus on the left bank of the river with the town and also with the canals communicating with Calcutta and the coast.

The water in the Katjori, on the contrary, falls so low during the dry season that communication across it by boat is impracticable, while cartage over the sandy bed will be costly and difficult.

The Mahánadi can only be bridged at Naraj, a point some six miles above Cuttack where the river is constricted.

At this point there is apparently water all the year round, but, from information received, it would appear that between this and Cuttack the channels during the dry season are so shallow that communication by water with the town and with the canals must be restricted to boats the draft of which would not exceed two feet, and in exceptionally dry years it is not improbable that even this mode of communication may be impracticable.

The high floods of this river and the velocity of the current render the establishment and maintenance of a steam ferry capable of carrying rolling stock extremely difficult; if a bridge therefore be not constructed there would appear to be two practicable alternatives—

(1) to depend upon boat communication between Naraj and Cuttack, and should that fail, to fall back upon cartage across the sandy bed of the Katjori;
(2) to boat the traffic across the river at Naraj and carry it on by means of a railway along the left bank to a terminus thereon opposite to Cuttack.

5. Should the proposed railway communication between Sumbalpore and Cuttack, with a branch to Pooree, be constructed on the standard gauge of 5′ 6″, and the river be bridged, the question will arise whether, looking to military exigencies and to the character, the extent, and the direction of the through goods traffic, the evils of a break of gauge here would be such as to justify the additional outlay involved in the adoption of a 5′ 6″ instead of a metre gauge for some 500 miles of line.

6. Regarding the question of gauge, with reference to considerations arising at the Bezváda end of the line, on the one hand, the famine protective policy of the Government demands that no break of gauge shall be interposed between the famine area and its source of supply; on the other, the adoption of the metre gauge necessitates a break between the Deccan and its East Coast port.

The extent to which this break will be injurious to trade depends, mainly as at Cuttack, upon the direction taken by the through goods traffic and upon its amount. So far as the trade between the Deccan and the Coast is concerned, an extension of the standard gauge line by means of a third rail to Ellore, with which Cocanada is in certain water communication for at least 11 months in each year, would do much to mitigate the evil, and probably fully meet the requirements of any coal traffic that may arise between the Singareni Coal-fields and the Coast.

7. The question of gauge however, when ripe for consideration in the light of the further information awaited from the Revenue and Agricultural Department, may not improbably be affected by arrangements that will, in the meanwhile, have become necessary.

The present terminus of the standard gauge line at Bezváda practically involves a break in the communication with the coast during nearly three months in each year. Unless, therefore,

the Kistna river be bridged and the East Coast Railway be made, this line must, it is thought, be eventually extended at least as far as Ellore. Trade will doubtless press for its extension to the bank of the Godávari, and if this be conceded, the length of line involved in the decision will be reduced by some 83 miles, and the question will then present itself irrespective of the famine protective requirements of the ceded districts.

8. The following approximate estimates have been framed for Railway communication between Bezváda and Cuttack, showing its comparative cost on the standard and on the metre gauge :—

Assuming average mileage rates* of Rs. 81,000 for standard and Rs. 65,000 for metre gauge—the cost of the Kistna bridge on metre gauge, with its approaches 30 lakhs,—the cost of the Mahánadi bridge on standard gauge 33 lakhs, on metre gauge 29 lakhs, and the cost of ferry arrangements at Rajahmundry 8 lakhs.

* See Appendix A.

(*a*) An extension of the standard gauge from Bezwáda on the left bank of the Kistna river, connecting by means of a bridge over the Mahánadi, with the left bank of the river at the terminus selected by Mr. Parker for the Sumbalpore-Cuttack line, mile 507 would cost 482 lakhs, including cost of Kistna bridge and approaches on metre gauge.

(*b*) A similar extension on the metre gauge, including the cost of the Kistna and Mahánadi bridges, would cost 397 lakhs.

(*c*) An extension from Bezváda ending on the right bank of the Mahánadi, mile 495 would cost on the standard gauge 439 lakhs, and on the metre gauge 360 lakhs, including the cost of the Kistna bridge and approaches.

(*d*) An extension to join the Sumbalpore-Cuttack *main* line, mile 499 (by means of a bridge over the Mahánadi) would cost on the standard gauge 476 lakhs, and on the metre gauge 392 lakhs, including the cost of the Kistna bridge and approaches.

(*e*) Assuming the Benares-Pooree project fully carried out, the cost of an extension from Bezváda to connect with the Cuttack-Pooree branch, mile 464 would be on the standard gauge 414 lakhs, and on the metre gauge 340 lakhs ; this latter figure as before including the cost of the Kistna bridge and approaches.

The above estimates are for a line fully bridged on the basis of Ryves' Formula, adopting a coefficient of 600. Should further waterway be found necessary, it should be given by means of causeways for which the large river valleys offer suitable conditions.

9. The following branch lines would probably follow the construction of the main line :—

A branch line from Sámalkót to Cocanada, probably 2 miles in length, an essential feature in any project for an East Coast Railway. Its cost may safely be estimated at the average cost of the main line ; it would probably cost less.

A branch from Vizianagrum to Párvatipur, probably 45 miles in length ; a portion of this has already been surveyed and estimated for by Mr. Cregeen, as part of the project for a line from Vizagapatam to Raipur ; but looking to the route now recommended for the main line, further investigation is desirable in order to ascertain whether an easier gradient than 1 in 100 and a saving in mileage cannot be secured by effecting the junction at a point near Gundrèdu. The probable route for such a connection will be found indicated on the atlas sheet accompanying this report.

A branch to Gopálpur from a point on the main line, a few miles north of Berhampore ; this would be about 6 miles in length, and may safely be estimated at the average cost of the main line ; it would certainly cost less.

A branch to Pooree probably 25 miles in length. The average cost of the Naraj-Pooree line (52 miles) was estimated by Mr. Parker at Rs. 1,03,500 per mile, but the bridging on the lower section of this branch would be very heavy ; the line, however, being mainly for passengers, this might probably be largely reduced by the substitution of causeways for bridges to pass the spill of the rivers when in flood.

Other branches serving the large cultivated areas to the west of the main line will probably suggest themselves, but time did not permit of any reconnaissance in these directions. The extent of these cultivated tracts bordering the valley followed by the main line should be hereafter ascertained ; it is said to be very considerable, and the effect of branch lines into the interior, if financially justifiable, would certainly be, to enable the main line to concentrate trade at one or possibly more of the northern ports, and so lead to the improvement of the port arrangements, if not to the construction of a harbour.

10. The following paragraphs indicate the direction in which a general examination of the country to be traversed suggests that a survey, if hereafter undertaken, should follow (see atlas sheets accompanying this report) :—

Assuming that the Kistna river will be bridged ; that a steam ferry will be established at or near Rajahmundry ; that Pooree and Gopálpur will be served, if advisable, by branches ; and that the line would for the present terminate on the right bank of the Mahánadi near Naraj.

the site already selected by Mr. Parker for the bridge, the survey should follow a line somewhat as follows :—

From the eastern side of the present Bezváda station ground, as direct as the best crossing for the Budimer river will permit, to near the Ellore canal at Virally and thence to near Covur on the right bank of the Godávari river. Mile 83.

From Rajahmundry, east of the town, rounding the hills at the back, direct to Sámalkót between the canal and the town. (The branch to Cocanada would leave the main line here, near the lock and end near the light-house at Cocanada.)

From Samálkót, keeping east of the present road, to Pittápoor, thence through the hills a little north of Umsávaram, to north of and close to Tuni. Mile 147.

Here the question arises whether the main line should pass through Vizagapatam to the watershed near Nimilipal or be taken there direct, giving a branch 15 miles in length to the coast ; this latter route, presenting apparently the greatest difficulty, was reconnoitred the more closely of the two. The former route involves the construction of three additional miles of line, but the manifest advantages of placing the port and so important a town on the main line seem to outweigh other considerations.

From Tuni, therefore, the survey should follow a line to the neighbourhood of Panchadára and thence to near the Gazuváka hills on the Anakápalle-Vizagapatam road, thence across the backwater and round its northern shore to a station site between it and the town. Mile 205.

It is open to question whether the line should not pass direct to Anakápalle, apparently an important centre of trade, and thence by Gazuváka to Vizagapatam, involving possibly the construction of two further additional miles. This should be further investigated. On any of these three routes an easy line may be obtained ; the direct route, however, to Vizagapatam would probably be on lower ground and therefore involve heavier outlay mile for mile than either of the others.

From Vizagapatam, with a second line of rails as far as the junction with the main line from the south, to near Venkatapúram, thence along the left bank of the drainage to near Nimilipal and on by Alamanda and Bimasingh, skirting Vizianagrum cantonment to the west, to a station ground on the watershed west of the town. Mile 237.

From Vizianagrum down the left face of the valley to the gorge in the hills through which the present road passes, along the northern slope of the hills to the neighbourhood of Gundrèdu and thence along the valley of a tributary of the Gosthàni to the watershed a little north of Chipurupalle and on, through or near Sambham, to the watershed of the Nangulia river, through or near Siripúram and Thelára to near Antakam at the head of the backwater. Mile 303.

From Antakam, by Gopalpúram, to west of the hills near Bendy, by Peintybudra, Colam, Cunchilli and Ichápur to Berhampore. Mile 374.

From Berhampore by Chatrapur and Ganjam down to the Chilka Lake near Rambha ; thence, for the most part along the shore of the Chilka Lake, by Burcool, Gurr Kohoree, Gurr Monglijura, and Gurr Naraingur to the gap in the hills near Auragur and on to near Harirajpoor. Mile 466.

Thence to near Gurr Sesopale and on by the valley of the Dyah river, through or near Rokote to the right bank of the Mahánadi river near Naraj. Mile 495.

11. The above alignment, which has been approximately indicated on the atlas sheet accompanying this report, would, with rare exceptions, carry the line over cultivated country throughout, and mostly over rice fields. A gradient of 1 in 150 could, with light earthwork, it is believed, be secured throughout, and it does not seem impossible that even a better gradient still could be secured, as far north as Vizianagrum. The rivers present no engineering difficulties or exceptional risks ; no heavy rock-cuttings will be encountered.

The detached hills in the Vizagapatam district, which at first sight present a very formidable aspect, cause but few and inconsiderable diversions from the general direction of the line. They are generally surrounded by level plains or connected by low undulating saddles which permit of a line being taken through them without costly cuttings.

Lime appears to be everywhere procurable without a long lead, but good building stone, as far as could be ascertained, is singularly scarce, except at Bezváda, Dowlaishweram, Vizianagrum, in the valley of the Nangulia, and in the Pooree district where good laterite and sandstone are procurable. Sufficiently good stone for small bridges is available between Tuni and Anakápalle, and stone quarries will doubtless, on further investigation, be discovered elsewhere. Brick-earth is evidently in most places forthcoming, and ballast will be nowhere expensive. Labour and cart-hire appear to be abundant, and at the present time are exceptionally cheap ;* but skilled labour will probably have to be imported.

* See Appendices B; C.

12. The reconnaissance therefore has proved beyond doubt that railway communication between Bezváda and Cuttack can be secured at a moderate cost. The line will pass for a considerable portion of its length through thriving and populous localities; * it will connect the Ganjam district, where periods of scarcity are frequent, with the rich deltas of the Godávari and Kistna, and will afford it a better communication with lower Bengal and Calcutta. †

* See paragraphs 8 to 12 inclusive of Mr. Turner's report.
G.O., Madras Government No. 159 R., dated 25th February 1888.
† See paragraph 33 of Mr. Turner's report.

It can hardly fail to concentrate the export trade brought to it by its inland communications at the port offering the best natural advantages, and to lead, if not to the construction of a harbour, at least to such outlay on improvements of the port selected by the natural development of trade as would provide these northern districts with what they most want—a port that can be relied upon at all seasons of the year.

The evidence offered locally, the frequent experience of the European residents in these districts, and the records of trade alike point to the precarious character of the sea route along this coast and the lamentable incident, during the famine of 1866 when steamers, laden with food-grain, were unable to land a bag, and put back to sea with it, in view of starving multitudes, illustrates very forcibly the complete segregation at times, so far as the sea routes are concerned, of these Northern districts from the well-supplied markets elsewhere.

13. It has been suggested that a coast line might find formidable rivals in the steamers and coasting craft along the sea route.

The information that has been gathered does not support this contention, and during the reconnaissance carts were found to be carrying grain from Cocanada to Vizagapatam, and even to the port of Bimlipatam itself. As over 3,500 carts were counted at the halting stage of one large village on the Main Trunk Road, presumably, cart-hire did not at that time stand at its lowest figure; while, on the other hand, the season of the year was that most favorable to shipping operations, and the steamers were calling at the ports with great regularity.

It is believed that, if the figures illustrating the effect of the construction of the South Indian and Bombay-Baroda Railways upon the coasting trade in their vicinity be scrutinized, it will be found that, although the conditions for competition by sea are more favorable there than on the northern coast of Madras, the results prove, beyond doubt, the ability of a coast railway to compete successfully with a sea route alongside.

For passengers, it must be needless to add, the sea route could offer no inducement. Mr. Turner remarks in paragraph 17 of his report to the Madras Government on the project for an east coast-line.

"A passing remark is necessary to guard those who are unacquainted with the manners and customs of the Hindus from supposing that the existing line of coasting steamers will operate in any way to deprive the railway of passenger traffic. A sea voyage is detested by the Hindu with quite peculiar fervour. Life on boardship is inimical to his caste and to his daily habits, and moreover it is calculated that the cost of a journey from, say, Masulipatam to Calcutta *viâ* steamer, compared with that *via* rail, will be as Rs. 15 to Rs. 8. Nothing at all need be feared on this score."

14. As affording, therefore, a possible solution of the difficulties that beset the administration of the Ganjam district and as presenting a project to private enterprise at least as financially promising as many of the lines in India that have hitherto attracted private capital, this line appears to merit the very favourable consideration of Government, and certainly the support it would undoubtedly derive, in the view of the London market, from a detailed survey and an accurate estimate of its cost.

How far it may hereafter be deemed worthy of further financial support will depend upon the view taken in the Revenue and Agricultural Department of its probable effect upon trade.

Few will be found to question, with Mr. Turner's report before them, the brilliant prospects of such a line as regards its passenger traffic.‡

‡ See paragraphs 14 to 17 inclusive of Mr. Turner's report.

15. It remains to again draw the attention of Government to the present position of affairs at the Bezváda terminus of the standard gauge line.

As already stated, this line is for nearly three months in each year absolutely cut off from water communication with the Godáveri delta and with its east coast port by the intervening 38 miles of the Ellore canal, for which the summer discharge of the Kistna cannot supply sufficient water.

The extension to Bezváda having been but recently opened, figures are not forthcoming to illustrate, and it would be premature to hazard a forecast of the results of this break in communication; it cannot fail to be a very serious impediment to trade,§ An early survey for an extension on the standard gauge, at least as far as Ellore, if not to the right bank of the Godávari river, is therefore strongly recommended.

§ See Appendices D, E.

16. The difficulties attending the establishment of a steam ferry capable of carrying rolling-stock on the Kistna river have been already mentioned, the consequent break of communication between the right bank of the river and the Godáveri delta must very seriously impair the efficiency of the famine protective lines in the Madras Presidency for the purpose for which alone they were designed. Roads do not exist to remedy the defective communication, * and the cost of such roads in the delta and over black cotton soil prohibits their construction. Carts can in the dry weather find their way from village to village and for short distances with light loads, but through-traffic for long distances is barely possible and cannot be relied on.

* See Appendix F.

In times of scarcity, therefore, the area of food-supply open to the distressed districts, instead of comprising the whole of the Godávari and Kistna deltas and the rich productive country that lies beyond in the Vizagapatam district, will, for the most critical season in the year, be limited to the Western, and a portion only of the Eastern, delta of the Kistna and imports *viâ* Cocanada will be cut off.

It is a question for the consideration of the Government, therefore, having regard, first, to their famine policy; secondly, to the supply of coal to the lines in Southern India; and thirdly, to the removal of the obstruction to trade by bringing over the metre-gauge line to a transfer platform at Bezváda, whether the bridging of the Kistna river is not financially desirable. There can be no question that the bridging of this river would place the project for the East Coast of Indian Railway in a more attractive form before the London market, and might secure for Government its construction by private enterprise without further financial support.

17. In the event of the bridge not being built, the transfer of goods from bank to bank between the termini of the two railways must be effected by means of ordinary boats.

A branch from the main line north of Bezváda station to a point on the left bank of the river, possibly a mile above the anicut, will be necessary, and from this rail-head, boats will cross upstream of the island during freshes and along the face of the anicut after the completion on its crest of the rough stone wall yearly erected to retain water for irrigation.

During May and a part of June, when the river is at its lowest, and especially after the under-sluices have been opened to admit of repairs, traffic will be conducted, if at all, with great difficulty, and will probably be discontinued.

18. Time did not permit a reconnaissance of the country between Cuttack and Calcutta, and in fact such a reconnaissance was not contemplated in the instructions of the Government of India.

Direct communication by railway *viâ* the Midnapore district would undoubtedly form the most complete communication between the East Coast of India Railway and Calcutta, passing as it would through an exceedingly rich district, but the bridging of so many large rivers as are met with on this route would involve a very heavy outlay, even if the Damooda and Rooparain were crossed where beyond tidal influences are avoided altogether by carrying the line to the right bank of the Hooghly river and ferrying across to the Diamond Harbour Railway as suggested on a former occasion by Sir Bradford Leslie.

On the other hand, the existence of very fair communication by water between Cuttack, Calcutta and the sea renders the construction of a direct line of railway of less importance than would be the case if no such facilities existed.

The Kendrapara canal connects Cuttack with False Point and Chandbally near the mouth of the Brahmini river, from both of which ports sea-going steamers now ply.

In addition to this there is access by boat from Chandbally to the Coast canal which communicates with Calcutta avoiding any passage by sea, and, so far as can be judged, there would be no difficulty in connecting the Coast canal with the high level canal from Cuttack which now ends at Budrach.

The district east of Midnapore also appears to be fairly supplied with rivers and streams by means of which the produce of the district can be concentrated on the east coast canal.

With such facilities existing the construction of a very costly line of railway direct from Cuttack to Calcutta can scarcely be considered an absolutely necessary addition to an East Coast Railway, the more so that the projected extension from the Bengal-Nagpur Railway through Sumbalpur to Cuttack would, if constructed, afford an additional outlet for trade, and open to the Ganjam district the resources of the Central Provinces.

On these grounds, it is considered that for the present at least the direct railway to Calcutta *viâ* the Midnapore district need not be undertaken as a portion of the East Coast of India Railway.

GUILFORD L. MOLESWORTH.
C. J. SMITH, *Colonel, R.E.*

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A.

Comparative Estimate for the East Coast of India Railway on Standard and on Metre Gauge (41¼ lb. rail).

	5′ 6″ gauge.	Metre gauge.
Preliminary	1,000	1,000
Land	1,600	1,500
Earthwork	6,300	5,100
Bridges	16,800	13,000
Level-crossings	700	700
Fencing...	700	700
Ballast	3,400	2,000
Permanent-way	27,000	18,000
Stations	2,000	2,000
Workshops	3,000	3,000
Staff-quarters	2,000	2,000
Station machinery	1,600	1,500
Plant	1,900	1,500
Rolling stock	8,000	8,000
Establishment	5,000	5,000
Total ...	81,000	65,000

NOTE.—Bridge over Kistna river with its approaches is estimated to cost on metre gauge ... ... 30 Lakhs.
Bridge over Mahánadi river is estimated to cost—
On metre gauge ... ... 29 ,,
On 5′ 6″ gauge ... ... 33 ,,
Ferry arrangements at the Godávari are estimated to cost ... ... 8 ,,
Mileages allow 3 per cent. for possible diversions when locating the line.

B.

List of the prevailing rates for Public Works in the Ganjam District.

—	Rate.	Remarks.
Earthwork—in embankment / in cutting .. with 30 feet lead—Ordinary soil	Rs. 2¼ to 2½ per thousand ..	Three to 4 annas per thousand extra for every additional 30 ft. lead or 3 ft. lift or depth, respectively.
in embankment / in cutting .. with 30 feet lead—Gravel soil	Rs. 4½ to 5 ,, ..	Six to 8 annas per thousand extra for every additional 30 ft. lead or 3 ft. lift or depth, respectively.
in cutting .. with 30 feet lead—Rocky soil.	Rs. 6½ to 7 ,, ..	Ten to 12 annas per thousand extra for every additional 30 ft. lead or 3 ft. lift or depth, respectively.
in cutting .. Hard rock including blasting.	Rs. 37 per cent.	
Turfing—within 50 yards lead	Rs. 2$\frac{1}{16}$ per thousand ..	Nine to 10 annas per thousand extra for every additional 100 yards lead.

List of the prevailing rates for Public Works in the Ganjam District—cont.

—	Rate.	Remarks.
Burnt bricks—10″ × 5″ × 2¾″ size	Rs. 4¾ to 5 per thousand ..	Palm melded.
Lime—*Kunker* (nodular limestone)	,, 17 to 20 per cent.	
Lime—*Shell*	,, 4 to 6 ,,	
Surki	,, 8 to 9 ,,	
Masonry—*Plain*—Burnt brick and mortar	,, 12 to 14 ,,	
Calstone and mortar	,, 60 to 75 ,, ...	Kunker lime and sand mortar, or shell lime, surki, and sand mortar.
Rubble and mortar	,, 8 to 11 ,, ...	
Arch—Brick and mortar	,, 16 to 18 ,, ...	
Calstone and mortar	,, 80 per cent.	
Concrete	,, 9 to 10 per cent.	
Dry stone pitching	,, 3 to 5 ,, ...	
Concrete.—In foundations, &c.	,, 7 to 8½ ,,	
Plastering—Sand and hydraulic lime	,, 2½ to 4½ ,,	
Surki, sand and shell-lime	,, 2½ to 3½ ,,	
Pointing	,, 1½ to 2 ,,	
Well sinking.—For foundations—Brick: 3 feet internal diameter: 3 feet depth.	,, 3½ to 4 per foot	Depth.
Flooring.—Brick laid flat—and mortar	,, 3½ to 4 per cent.	
Brick on edge and mortar	,, 6½ to 9 ,,	
Terrace, 4″ thick, beaten over one brick flat ..	,, 8 to 9 ,,	
3″ thick	,, 4 to 5 ,,	
Stone flag	,, 20 to 28 ,,	
Whitewashing.—3 coats	,, 3½ per thousand.	
Roofing.—Terrace—3″ over 2 layers 12 inches square tiles 1″ thick set in	,, 11½ to 12 per cent.	
3″ over brick on edge and 2 courses of ordinary thin flat tiles (5″ square and ½″ thick)	,, 25 per cent.	
Flat and pan tile—with chunam borders	,, 8 to 11 per cent	Including sál reepers.
Timber.—Best sál—wrought	,, 1½ to 1½ per c. ft.	
Doors and windows.—Venetian, panel, glazed, including fittings	As. 12 per s. ft.	
Priming	Rs. 1½ to 1¾ per cent.	
Green painting.—2 coats	,, 2½ to 3 ,,	
Tarring.—2 coats	Re. 1 per cent.	
Road metalling.—*Gravel*	Rs. 1$\frac{6}{16}$ to 2¾ per cent.	
Stone: Hard	,, 3½ to 4½ ,,	
Ordinary	,, 2$\frac{12}{16}$ to 3¼ ,,	
Kunker	,, 2½ to 3 ,,	

N.B.—All the above rates include carriage of material, but within a mile radius only.

BERHAMPORE,
8th February 1889.

R. W. M. MACMILLAN,
Local Fund Engineer, Chatrapur Division.

C.

Table of rates in Godávari, Vizagapátam and Ganjam Divisions.

[Approximate General.]

Items.	Per	Godávari.	Vizagapatam.	Ganjam.
		RS. A. P.	RS. A. P.	RS. A. P.
Earthwork, initial rate 20 yards lead 2 yards lift	c. ft. 1,000	2 5 0	2 5 0	2 0 0
Concrete	„ 100	10 0 0	8 0 0	5 0 0
Rough stone in mortar.	„	15 0 0	9 0 0	9 0 0
Ashlar	„	50 to 60 0 0	50 to 60 0 0	50 to 60 0 0
Brick in mortar ...	„	16 8 0	12 0 0	13 0 0
„ archwork ...	„	25 0 0	20 0 0	20 0 0
Stone revetments and aprons	...	6 8 0	5 0 0	4 0 0
Stone cutter	day	0 8 0	0 6 0	0 7 0
Bricklayer or mason ...	„	0 8 0	0 6 0	0 7 0
Carpenter	„	0 8 0	0 6 0	0 8 0
Smith	„	0 8 0	0 7 0	0 8 0
Cooly man	„	0 2 6	0 2 0	0 2 0
„ woman	„	0 2 0	0 1 6	0 1 6
„ child	„	0 1 6	0 1 0	0 1 0
Teak wrought ...	c. ft.	3 0 0	3 0 0	3 0 0

D.

Statement showing the value of Export and Import Trade of the Port of Cocanada for the last 26 years (1862-63 *to* 1887-88).

Official years.	Value of Exports.	Value of Imports.	Total value of Exports and Imports.
	RS.	RS.	RS.
1862-63	**23,82,159**	**5,27,283**	**29,09,442**
1863-64	40,74,051	4,01,417	44,75,468
1864-65	56,68,244	10,90,046	67,58,290
1865-66	80,13,377	6,99,722	87,13,099
1866-67	54,34,049	15,86,834	70,20,883
1867-68	41,51,830	10,24,739	51,76,569
1868-69	69,36,386	14,82,174	84,18,560
1869-70	81,75,950	18,57,959	1,00,33,909
1870-71	83,06,939	16,85,161	99,92,100
1871-72	82,52,876	14,86,581	97,39,457
1872-73	**60,81,546**	**13,06,795**	**73,88,341**
1873-74	61,36,099	15,49,740	76,85,839
1874-75	82,61,482	18,92,506	1,01,53,988
1875-76	80,73,356	20,14,595	1,00,87,951
1876-77	1,21,02,071	20,95,984	1,41,98,055
1878-79	1,10,76,249	26,87,718	1,37,63,967
1879-80	45,87,151	22,76,292	68,63,443
1880-81	86,96,941	21,73,737	1,08,70,678
1881-82	1,09,27,105	22,38,920	1,31,66,025
1882-83	**1,22,55,330**	**21,73,309**	**1,44,28,639**
1883-84	1,25,29,761	26,98,452	1,52,28,213
1884-85	1,40,33,920	24,83,623	1,65,17,543
1885-86	1,46,78,071	27,99,702	1,74,77,773
1886-87	1,25,51,762	23,10,684	1,48,62,446
1887-88	93,77,953	23,98,404	1,17,76,357
	1,17,44,705	35,76,479	1,53,21,184

Annual average of five years—1862-63 @ 1866-67 ... ... RS. 59,75,436
Do. do. 1867-68 „ 1871-72 86,72,119
Do. do. 1872-73 „ 1876-77 99,02,835
Do. do. 1877-78 „ 1881-82 1,18,18,550
1882-83 „ 1886-87 1,51,72,466
1887-88 1,53,21,184

COCANADA,
The 11th January 1889.

A. MACNAB,
Chairman, Chamber of Commerce.

Dated 11th January 1889.

Demi-official from A. MACNAB, Esq., Chairman, Chamber of Commerce, Cocanada, to Colonel C. J. SMITH, R.E.

The tremendous drop in exports in 1886-87 (from an average during the previous four years of over 135 lakhs to less than 94 lakhs) is worth attention, for it is the direct result of defective canal communication caused by the break-down of the Dowlaishweram head-sluices. That mishap knocked something like 30 per cent. off the whole foreign trade of the district, and we have not recovered from it yet.

ENCLOSURES.

Despatch from the Secretary of State for India, to the Government of India, dated 14th June 1888, No. 65 (Railway).

With reference to my Railway Despatch No. 16, dated 2nd February 1888, I transmit herewith, for your information, copy of correspondence * which has recently passed in this country in respect to the suggested extension of a line of railway from Bezváda to Ellore in the Godávari district.

* Letter from Mr. S. Hall, dated 16th May 1888.
Letter to Mr. S. Hall, dated 13th June 1888.

E.

From S. HALL, Esq., to the Under Secretary of State for India, dated 13th Austin Friars, London, E. C., 16th May 1888.

I have the honor to address you on a matter to which my firm, Messrs. Hall, Wilson and Company of Cocanada, have, for some time past, been endeavoring to secure attention in India, namely, the question of railway connection between Bezváda on the river Kistna and the town of Ellore in the Godávari district of the Madras Presidency.

There are at present in course of construction by the Government of India two railways converging at Bezváda, viz.:—

(*a*) The Guntakal-Kistna State Railway (a metre gauge) protective work of 260 miles in length.

(*b*) A broad-gauge line of about 22 miles from Bezváda to the Nizam's frontier to connect with His Highness the Nizam's Guaranteed State Railway.

At Bezváda each of these lines has a terminus situated on the system of canals irrigating the deltas of the rivers Kistna and Godávari, and these canals constitute practically the only highways connecting the railway with these deltas and with the sea-coast. It is in view of the extremely unsatisfactory character of these canals (especially of the section between Bezváda and Ellore) as highways of traffic of the extent to which such defective feeders must handicap the development of traffic on these railways, and, above all, of the serious obstruction which must occur in times of famine, that I would respectfully and earnestly urge upon the consideration of Government the carrying on of a railway line from Bezváda to Ellore, a distance of about 35 to 40 miles.

The primary function of all the canals of both deltas is irrigation, navigation being systematically and no doubt most properly regarded as a secondary consideration. The needs of navigation must, therefore, at all times give place to those of irrigation, and fed as these canals are by the rivers Kistna and Godávari with water highly charged with silt (the rain washings of the Central Provinces); the quality of the water supply, which gives it a peculiarly high fertilizing value, militates against navigation, in that the channels are unceasingly subject to a process of silting.

As an inevitable consequence, the canals have every year to be drained for dredging for a period extending in parts to close upon three months, and even outside of that recognized period of closure, interruptions from local or partial siltage are of frequent occurrence. It is in the nature of things, moreover, that irrigation should make its largest demands on the water-supply during the dry season (which also unfortunately coincides with the period of greatest activity in produce traffic) when the rivers feeding the canals are at their lowest level, with the result that there is often in parts insufficient water to admit of the passage of fully laden boats.

These adverse conditions present themselves especially in the main trunk canal from Bezváda to Vizizaishweram connecting the rivers Kistna and Godávari and most conspicuously of all in the section between Bezváda and Ellore. The latter point (Ellore) marks the junction of the two systems, the Godávari feeding the canals of the eastward, while those to the westward are dependent on the Kistna, and whether from defects in the levels or from exceptional demands for irrigation or from interruptions of the river Tummilair which, when in flood, sweeps over that section of the canal at one point, interruptions to traffic are sufficiently

frequent and uncertain in their incidence to seriously affect the whole line of communication between the sea-coast and the interior during the past two years: such interruptions have been exceptionally frequent and serious, but speaking from an unbroken experience of more than 20 years, I may say that trade has always suffered severely from such interruptions and from the uncertainty as to delivery of produce arising from these causes.

The defective character of existing communications between Bezváda on the one hand and the sea-coast and the Kistna and Godávari deltas on the other must, therefore, very seriously handicap the development of trade which these much-needed railways should unquestionably effect, and in times of famine, when demands for irrigation would be specially heavy and imperative and when at the same time there would be an enormously increased pressure of navigation on the canals, congestion of traffic on the Bezváda-Ellore section would certainly occur, and would operate to neutralise to a serious, possibly even to a disastrous extent the value of the Bellary-Kistna State Railway which is constructed solely in view to connect, in times of scarcity, the fertile deltas of the Kistna and Godávari, with the worst famine districts of the Madras Presidency.

I would, therefore, earnestly urge that the broad-gauge line now in course of construction should be carried on to Ellore, thus giving access to the Godávari system of canals which are not subject in anything like the same degree to these interruptions, and I would suggest, for consideration, whether by the expedient (similar to that now in successful operation on the Great Western Railway in this country) of laying an intermediate light rail between the heavier rails at metre gauge, the extension might not be made available for the rolling stock of the Bellary-Kistna State Railway as well as for the broad-gauge vehicles of His Highness the Nizam's State Railway.

I think it probable that the latter company would view with satisfaction such an extension, and would be prepared to undertake its construction and working in same manner as portion of the line between the Nizam's frontier and Bezváda.

I may, perhaps, further in this connection (as bearing on the expediency of adopting some means of crossing the Kistna) be permitted to suggest, for consideration, that the expedient of laying an intermediate rail at metre gauge between the broad-gauge rails, if adopted on the line from Bezváda to Singaréni, would permit of the Bellary-Kistna Railway's rolling stock running right up to the coal-pit mouth, and thus obviate the double break of bulk at the Kistna, representing a loss of some 10 per cent. on the value of all coal drawn on the Singareni coal-fields for that railway itself and for the other railways with which it connects at Bellary.

As regards the financial prospects of the proposed extension, I have reason to believe that statistics compiled by Government officers are already before the Government of Madras demonstrating that the existing goods and passenger traffic, of which it is year by year becoming more imperative that the canals should be relieved as wet cultivation in the deltas extends and the demands on the canals for water for irrigation increase, gives promise of an immediate and paying return on the cost of a railway. It is unnecessary, therefore, for me to submit statistics here, but I may perhaps be permitted, as speaking from long connection with the trade of the district, to express to you the conviction I feel that an extension from Bezváda to Ellore, and indeed any extension towards Cocanada, which port the trade already naturally seeks, would pay well and at once, and would, moreover, materially improve the paying power of the Bellary-Kistna State Railway and of the State line from Bezváda to the Nizam's frontier.

F.

Extract from the Proceedings of the Government of Madras, Public Works Department, dated 10th May 1888, No. 390 R.

Read the following papers:—

Proceedings of the Board of Revenue (Land Revenue), dated 14th March 1888, No. 246.

Read the following letter:—

From J. M. BRYCE, Esq., Chairman, Cocanada Chamber of Commerce, to the Collector of the Godávari District, dated 3rd November 1887.

I have the honor to acknowledge receipt of your No. 984 of 25th ultimo, handing statement of intended dates of closure of canals, and asking for any remarks the Chamber may have to make on same.

Presuming the closures are unavoidable, the Chamber thinks it unnecessary to offer any special remark on the mere dates of closure, but it may not be out of place to refer here to the utter inadequacy of the means of transit of produce from the interior of such a very rich produce country to its natural outlet, which is Cocanada, and the consequent restriction placed on trade.

The closures referred to mean that at least from 1st April till end of May communication between Ellore and Cocanada, as far as transit of produce is concerned, is virtually closed, while, owing to the canal between Bezváda and Ellore being as a matter of fact unnavigable from end of February or beginning of March till middle of June, Cocanada is for at least four months of the year without means of getting delivery of certain kinds of produce; take, for instance, an article of such large production as castor-seed, the trade in which, as in other articles, would, there is little doubt, be very considerably increased were it not for the want of proper means of communication with the interior.

While the Chamber is of opinion that by a system of efficient dredging the necessity for closing the canals and interfering with business every year for so long a time might, as far as removing silt is concerned, to a great extent be avoided, and that some means might be adopted by which both canals hence to Dowlaishweram need not be closed at the same time.

Merchants have got to look on the annual stoppage of communication at a time when large quantities of produce ought to be coming forward as unavoidable, and calculations have hitherto been made accordingly; but prolonged interruptions, such as have occurred during the past two seasons owing to breaches, siltings, &c., resulting in heavy losses, must inevitably have a highly hurtful effect on the trade of this port.

What I have written points to what this Chamber considers the mercantile community would not be unreasonable in asking, viz., that Government should consider the advisability and practicability of connecting Cocanada by railway with Bezváda where the lines of the Bellary-Kistna State Railway and the British section of the Nizam's Guaranteed State Railway Company converge.

I have to add that the Chamber will feel much obliged by your putting this letter before Government with a view to some action being taken to remedy the state of matters which has obtained during the past season—a state of matters a continuance of which must result in ruining the trade of a port which, excepting Colombo, has the only safe harbour on the coast of India between Calcutta and Bombay, and moreover is a port which, with justice done to it, will play an important part in developing the trade of the country.

Endorsement by W. A. HAPPELL, Esq., Collector of the Godávari District, dated 22nd February 1888, No. 93.

Submitted to the Secretary to the Commissioners of Land Revenue for submission to Government as requested by the Chamber.

2. The failure of the eastern delta head-lock at Dowlaishweram in 1886 reduced the trade of Cocanada by about 31 lakhs.

3. There was a breach in the Ellore canal last year by which traffic was stopped for three weeks. The western delta head-sluice was also allowed to silt up, and the canals had to be closed to clear it out. Both these stoppages of traffic were unforeseen, and could not be provided for when merchants' contracts were made. So, many persons doubtless suffered heavy loss from this cause.

4. I agree with the Chamber that the proper terminus for the lines of railway mentioned is Cocanada. Nearly all the export trade which passes through Bezváda, whether from Guntúr or from Hyderabad territory, comes to Cocanada for shipment. The state of the Kistna canal is worse even than the Chamber state it to be. When I was Collector of Kistna, Local Fund contractors refused to undertake to convey heavy material along the canals after the middle of January, because heavily-laden boats were liable to be brought to a standstill by accumulations of silt in certain parts of the canals. There is not sufficient water in the Kistna to keep the canals open for effective navigation after the beginning of March, even if the difficulties in regard to silt could be overcome at a reasonable expense. On the other hand, there is always sufficient water for navigation in the Godávari, and if it was worth while to incur the expense of dredging, the canals could be kept open all the year round.

5. When the delta works are completed, it will not be necessary to close canals for more than two or three weeks each year, even if the present system of removing silt is adhered to. It would therefore be very advantageous to trade if the *ad interim* terminus of the Hyderabad Railway were fixed at Ellore instead of Bezváda. The Godávari canal system meets the Kistna system at Ellore.

6. The railway could be carried on to Cocanada without bridging the Godávari. There is water from bank to bank throughout the year at Dowlaishweram, so that trains could be taken across by steam ferry without difficulty. Colonel Hasted and Mr. Walch, to whom I made this suggestion some years ago, both agreed that it was quite feasible.

From G. T. WALCH, Esq., Superintending Engineer, I Circle, to the Chief Engineer for Irrigation, dated Dowlaishweram, 11th April 1888, No. 159 G.D.

With reference to your No. I—22 G.D., dated 21st March 1888, I have the honor to say that if all the head-sluices, their floors, aprons, &c., are each year to be *thoroughly* examined, as wisely ordered after the collapse of the central delta sluices, a closure of the canals for some appreciable period in each year is an absolute necessity. That period in the eastern division in which lie the canals from the Godávari to Cocanada is generally three weeks, but sometimes a month, and considering that a bund has to be put in the river to shut off water from the sluices, that a large mass of silt has to be removed from the front floor and aprons to admit of their thorough examination, that there are always repairs to be done to shutters, piers, floors, and rear aprons, and that then the bund in the river has to be removed, I consider the shorter period named is the very least that will suffice, whilst the longer (one month) will sometimes be necessary, as in this year, when two new vents have to be built to the head-sluices during the closure.

2. In the western division the period of closure is generally six weeks, because, in addition to the examination of the head-sluices, there are on the long (47 miles) main line of canal to Ellore many things to be done in the way of repair of aqueducts and other masonry works and clearance of silt, especially at the blind end of the canal near Ellore lock. This closure of the Ellore canal may doubtless, with good management and a considerable extra cost for dredging, be kept down, if considered necessary, to generally one month. It should be remembered that the closure takes place only during the time that the Kistna canals are perforce from want of water closed and therefore no produce is coming forward from Bezváda.

3. Of course, during the closures much clearance of silt is done in the canals, because it can be done cheaper and, especially in lock channels, much better by hand than by dredgers, but the apparent belief of the Chamber of Commerce that the closures are entirely, or even chiefly, on account of silt clearance is an erroneous one; if no silt clearance was done by hand, closures of, at all events, nearly as long as those now usual would be necessary.

4. As regards the oft-suggested arrangements "by which both canals hence (Cocanada) to Dowlaishweram need not be closed at the same time," the question is simply, would the advantage to be gained, viz., the keeping open water-traffic from the Godávari river to Cocanada for an extra three weeks or a month in each year, warrant the great cost? In considering this it must be remembered that from Rajahmundry to Cocanada there are two excellent roads, one of which passes through Dowlaishweram, and runs along side the Sámalkot canal. There would be no real engineering difficulty in providing an independent head for the Samálkot canal, but the cost would be great, not only because the excavation for the channel would have to be deep, but because separate head-sluices on the river, if not also a separate lock, would be necessary, if thorough examination of head-sluices had to be carried out as now, and it would be folly indeed to give up such examinations.

5. As your memorandum under reply only calls for remarks regarding the closure of canals, I do not, in this letter, go into other questions raised by the Chamber of Commerce, but enclose a memorandum (which I trust you will not think out to place) on the subject of the through canal-traffic of the Godávari district and the advisability of supplementing it by extension of the railway from Bezváda to the Godávari river.

Memorandum by G. T. WALCH, Esq., Superintending Engineer, I Circle, on the Canals for the combined purposes of Irrigation and Navigation with special reference to such Canals in the Godvári district and the necessity for providing other means of traffic between the Kistna and the Godávari.

It may be accepted as an axiom in canal engineering that the requirements of irrigation and navigation are conflicting, *e.g.*, for *irrigation* large quantities of water, and consequently of silt, have to be taken into a canal, and therefore the slope of the surface must be considerable; for *navigation*, the less water taken into the canal, the better, and its surface should have no slope; for *irrigation* there are times when the canal should be kept low, so that large quantities of surplus water may not have to be passed into the drainages when they are already filled by rain-water; for *navigation* the canal should always be kept up to its full level; for *irrigation* even when the river or other source of supply is low, it is often necessary to go on letting as much water as possible out of the canal to supply crops, thereby reducing the level and the depth in the canal, especially at its end; for *navigation* at such times the water should be kept in the canal to maintain as nearly as possible its full depth.

2. The canals of the Godávari delta are primarily for *irrigation*; they have been made also navigable to supplement their usefulness, and never has there been a more successful combination. Its very success, however, now threatens, especially on the through lines, to cause the secondary object of the canals to over-top and seriously interfere with the primary one.

3. The clashing of the irrigation and navigation requirements mentioned in paragraph 1 is well exemplified on the Ellore canal, which is the through line of communication between the Kistna and the Godávari river. On that canal considerable silting, inevitable when large quantities of water have to be passed through a canal from a silt-bearing river, frequently impedes traffic, whilst the necessity for keeping sufficient water for heavily-laden boats leads at times to more water being taken into the canals and surplussed out, and at other times to less water being given out of the canal to its distributaries than suits the irrigation; and it is a fact that much tempting and perfectly possible extension of irrigation from near the end of the canal has to be foregone, because it would still further add to the already great difficulty at times of keeping the navigation going.

4. On this (Ellore) canal especially the staff of this department has to attempt to serve the two antagonistic interests with the inevitable result that neither is satisfied. The one that has for its mouth-piece the powerful commercial community of Cocanada can best make its voice heard in high quarters, but district officers know that the other has much to say from an entirely different point of view.

5. The truth is that up to a certain point of development of traffic the conflicting interests can be fairly well reconciled but not beyond, *and that point has already been reached on the Ellore canal*; what then will be the case when to the existing and increasing general traffic along that canal is added the coal traffic to Cocanada?

6. There is but one solution to the difficulty, viz., the provision of other good means of communication between Bezvada and the Godávari river. *At present there is not even an ordinary road.* The extension of the railway from Bezvada to the Godávari nearly opposite Rajahmundry is exactly what is needed. It would, if run just above the system of canals, be an exceptionally easy line to make; it would pass along a well-populated and thriving country, which would give it a large passenger traffic, and it would bring large quantities of agricultural produce as well as coal to a point from which, except for a month in the year, it could be boated to Cocanada. It would form the first section (complete in itself) of the line which doubtless before very many years will be carried along the coast to join the Bengal system of railways at Puri.

From the same officer, dated Dowlaishweram, 17th April 1888, No. 184 G.D.

As an addendum to my memorandum with my No. 159 G.D., dated 11th April 1888, I have the honor to say that in the official year 1887-88 there passed through the Dowlaishweram head-lock 20,065 boats and 1,736 rafts and through the Vijeshweram lock 24,254 boats and 2,943 rafts.

Note by Colonel H. R. MEAD, R.E., Chief Engineer for Irrigation, dated Ootacamund, 2nd May 1888, No. 71-I.

With reference to endorsement No. 2284, dated 17th April 1888, transferring Resolution of the Board of Revenue, No. 246, dated 14th March 1888, forwarding an endorsement by the Collector of Godávari on a letter from the Chairman of the Cocanada Chamber of Commerce regarding the closure of the canals in the Godávari and Kistna deltas, I forward a report from Mr. Walch, the Superintending Engineer of the I Circle, and to state I fully agree with him.

2. In the Godávari district the main lines of communication are—

(1) the canal from Ellore to the south side of the Godávari river; and
(2) that from north side of the river to Cocanada.

As a rule, the closure of the first lasts six weeks, that on the second line three weeks or a month. I do not consider that on these lines a system of efficient dredging as proposed by the Chamber would shorten the closure sufficiently to justify the cost, as three weeks is, I consider, the least time that can be allowed for the thorough examination of the floors, aprons, &c., of the head-works, and a curtailment of the closure of the canal from Ellore to the Godávari to three weeks, would be of little or no use, as the Kistna canals cannot, owing to want of water, be kept open; as this is the case, the result would not justify the cost.

3. If a new separate head and lock were made for the Sámalkót canal, water communication, except in very bad years, could be maintained all the year round between the Godávari at Dowlaishweram and Cocanada; the cost of this would be very great, and I do not consider the extra three weeks' navigation would be worth the cost, especially as there is a good road available.

4. With regard to the Kistna canals we have three main lines of communication:—

(1) From Bezvada to Ellore.
(2) Do. Bezvada to Masulipatam.
(3) Do. Bezvada to Buckingham Canal.

These canals are closed, as a rule, for three months in the year, and, putting aside the necessity of closing the canals for the clearance of silt (which in the Kistna delta is a most serious item) and for repairs, the water-supply in the river Kistna is not sufficient to maintain water in the canals in ordinary season, certainly for more than ten months in the year, if as long.

5. With systematic dredging of the main canals on the Bezvada side, I believe that, with comparatively a small extra outlay, these canals, Bezvada to Masulipatam and Bezvada to Ellore, could be kept open in good and most ordinary years ten months to the great advantage of trade, but more than this cannot be hoped for. Inquiries regarding this are being made and information being collected, and it is hoped that a definite proposal regarding this may be made hereafter.

6. In conclusion, I will add that I agree with Mr. Walch in advocating a line of rail from Bezvada to the south side of the Godávari river.

G.

An address of welcome to SIR G. MOLESWORTH and COLONEL C. J. SMITH.

MAY IT PLEASE YOUR HONOURS—We, the Chairman and Municipal Councillors and the inhabitants of the town of Anakapalle, beg most respectfully to represent that it affords us great pleasure to welcome Your Honours to this town, which is of great commercial importance and which belongs to the Honorable Sir Rajah G. N. Gajapatirow. It is really gratifying to say that the district, nay the whole province, is resounding with the praises of His Excellency Lord Connemara, our popular and beloved Governor, for his condescending to depute Your Honours to reconnoitre the locality and advise as to the usefulness or otherwise of the construction of the East Coast Railway, anent which the people have memorialised the Government.

Our cordial thanks are due to Mr. Turner, our worthy district Administrator, for immense deal of good he has done to us for the construction of the pontoon bridge across the back-waters at Vizagapatam, whose name (Turner's Bridge itself) perpetuates his memory, and still more for the interest he has evinced in trying to confer upon the people concerned a blessing now prayed for, *i.e.*, the construction of the East Coast Railway.

You are aware, gentlemen, that the two northern districts of Ganjam and Vizagapatam in our Presidency have sunk in a state of lethargy, having been far away from the centres of all activity of the Presidency towns and isolated from the rest of the India Peninsula by being destitute of a railway communication. Though "the Northern Circars" is historically important, it is not keeping pace with the sister provinces in point of material progress for reasons as mentioned above. The condition of the people is, on the whole, anything but satisfactory. The education is very backward, especially in the two northern districts of the Presidency. In the Godávari and Kistna districts the natural advantage of having two large rivers and the system of irrigation works in connection with the rivers contribute a little towards the prosperity of the people. Whereas those extreme northern districts are devoid of such advantages. Fortunately for us a better day is expected to dawn upon us in the immediate future, Bezvada being connected with the other parts of the country by railway communication and the continuation of the Bezvada line being under contemplation. We do not consider, gentlemen, that we need intrude on your most precious time by giving within the small compass of this address the statistics, local and through traffic of Anakápalle, as the subjoined statement will show the particulars required in detail, nor are we to expatiate much upon the subjects of the working of the line in question proving beneficial if undertaken either by the Government or by some private agency.

In conclusion, we earnestly beg to pray that you will be strong advocates for the opening of the line prayed for, and lay before His Excellency Lord Connemara, our venerable Governor, the expediency of supplying our long-felt want and ameliorating the condition of the people at large.

Thanking you in anticipation of the favor sought for and wishing you a happy New Year's day,

We most respectfully beg to remain your most obedient servants,
The Chairman and Municipal Councillors and the inhabitants of the town of Anakápalle.

Statistics of the local and through Traffic at Anakápalle.

Description.	Goods, &c.		
	Candies.	Tons.	Cost.
			Rs.
1. Number of bandies tolled at Anakápalle 100,000	..	..	..
2. Bandies passing through Anakápalle without touching the toll-gates 500,000	..	..	..
3. Jaggery forwarded to Vizagapatam for export by merchants of Anakapálle.	40,000	8,928	8,00,000
4. Jaggery passing through Anakápalle from other villages for export at Vizagapatam.	40,000	8,928	8,00,000
5. Gingelly passing from Anakapálle to Vizagapatam for export ..	10,000	2,232	2,40,000
6. Gingelly passing through Anakápalle from other villages to Vizagapatam for export.	3,300	736	86,000
7. Paddy passing through and from Anakápalle to Vizagapatam for export.	33,000	7,366	3,00,000
8. Rice do. do. do.	16,000	3,572	2,50,000
9. Ragi do. do. do.	8,000	1,785	1,25,000
10. Myrabolans passing through and from Anakápalle for export at Vizagapatam and Bimlipatam.	25,000	5,580	2,25,000
11. Other grains, red, black, green, Bengal gram and cholum	14,000	3,562	40,000
12. Tobacco do. do. do.	1,000	225	80,000
13. Castor-oil do. do. do.	672	150	30,000
14. Gingelly-oil	672	150	30,000
15. Ghee do. do. do.	1,000	225	1,00,000
16. Minerals do. do. do.	1,000	225	2,00,000
17. Tamarind, passing	1,500	112	9,000
18. Soap-nuts	1,000	225	3,000
19. Twist, cotton	5,328	11,000	15,000
20. Saffron	5,328	11,000	25,000
21. Iron	5,000	1,125	1,25,000
22. Cotton seeds	4,000	900	16,000
23. Salt	666	148	1,00,000
24. Chillies	2,500	562	10,000
25. Spices	..	..	1,00,000
26. Kerosine-oil and matches	..	..	30,000
27. Cloths	..	..	10,000
28. Silk cloths and linen cloths	..	..	30,000
29. Horns	1,000	225	1,00,000
30. Hides	3,000	674	1,25,000
31. Wax	450	100	90,000
			40,88,000
Number of people passing through Anakápalle to Simhachalam feast 50,000	..	..	..
Do. do. Upamaka feast 30,000	..	..	..
Nukkalamma festival, Anakápallo 10,000	..	..	..

H.

Address from the leading Gentlemen of Vizagapatam, to SIR GUILFORD MOLESWORTH, K.C.I.E., Consulting Engineer to the Government of India, and COLONEL C. J. SMITH, R.E., Secretary to Government of Madras and Consulting Engineer.

On behalf of the public of Vizagapatam, we take this opportunity of giving you a right hearty welcome on your arrival in our midst in connection with the East Coast of India Railway scheme. In doing so we beg to assure you that small as our reception may be, it comes from grateful and sincere hearts. We also take the liberty of laying before you the views of our townsmen regarding the East Coast Railway scheme, so ably advocated by Mr. Turner, the popular Collector of our district. Our task is all the more easy, as his exhaustive minute has left nothing to be added. However we deem it necessary to urge the following points in support of the scheme.

While the north, west and south of India are connected by the iron-road, the Northern Circars alone are left without any facilities for rapid and easy communication with the other parts of the Empire, though the country is rich and teems with all the necessary materials for the construction and successful working of a railway. We are, however, under deep obligations to Government for having so recently extended the line up to Bezváda. But the benefit would be small, unless a further extension of the line is made, from Bezvada to Calcutta *viâ* Cocanada, Vizagapatam, Chicacole, Berhampore, Cuttack, Balasore, and Midnapore, instead of stopping at Kurdah. The line so completed from Madras to Calcutta will tap the rich districts of Nellore, Kistna, Godávari, Vizagapatam, and Ganjam and the province of Orissa.

With regard to the construction, we beg to draw attention to the facilities that exist for the supply of wood for sleepers. There are immense forests of sâl wood in the territories belonging to the Maharaja of Jeypore. Those forests can supply sâl wood both *viâ* the Godávari river to Dowlaishweram and by the Chicacole and Vamasadhara rivers for the more northern section of the line. Some teak-wood is still to be found in the Bhadrachalam and Bustar forests. Other woods, such as Saj, Ironwood, Blackwood and Bijasal, are in abundance throughout the Godávari and Mahanadi forest tracts. There is ample building stone throughout the whole line of railway, and limestone is found everywhere. Fuel is found all along the slopes of the Eastern Ghâts, which this railway will skirt in its whole length from Bezvada to Midnapore. But it is possible that the proximity of the Singareni coal-fields will enable the line to be worked by coal fuel instead of wood. Labor is cheap and abundant. Further, so far as we are able to judge, the country presents no difficulties to the railway engineer. There are no ghâts to cross or many heavy gradients; and as for the bridging, putting aside the Godávari and the Mahanadi, which will be crossed by steam ferries, there is nothing that requires any extraordinary outlay so far north as Cuttack. Between Cuttack and Midnapore, we are aware that the bridging is heavy and we have heard that the cost of construction along that section is what prevented the building of railway from Calcutta south, though the pilgrim traffic to Puri would guarantee the success of such a line. But we would venture to remark that although the bridging over so short a section between Midnapore and Cuttack might be prohibitive, the question bears a different aspect when so long a line as one from Bezváda to Calcutta is under contemplation; for the cost of the heavy bridging spread over so long a line would be materially lessened in the per-mileage calculations.

As stated by Mr. Turner, traffic both in goods and passengers is now in a very promising condition and must undoubtedly increase when through communication is established by the railway. We need hardly mention that the pilgrims visiting such celebrated shrines as Digu Tirupati near Ellore, Kotipilli near Cocanada, Upamaka near Nakkapilli, Simhachalam near Vizagapatam, Srikurmum and Arsavally near Chicacole, and Juggarnath in Orissa, not to speak of minor shrines, are not less in number than those who visit Benares in the north and Rameswaram and Tirupati in the south. Inland traffic, which is now very tardy for want of ready conveyance, would receive a great impetus by the opening of a railway in these parts and would eventually tend to minimize the famine rates of food grains. For instance, in the great Madras famine of 1876-77, when a garce of paddy sold at Rs. 150 in Vizagapatam, it was selling in Jeypore at Rs. 25 or Rs. 30, a disparity which would not have existed if there had been a railway. The various products of these parts, such as paddy, wheat, ragi, cholum, gingelly, jaggery, jute, horse gram, green gram, black gram, red gram, Bengal gram, sweat potato, tapioca, maize, myrabolans, tobacco, cotton, cocoanuts, areca-nuts, chillies, plantains and mangoes and the hill products of oil-seeds, lac, horns, hides, &c., will find an easy market in other countries, without being stored up as they are now for want of easy transport.

Apart from these considerations, the introduction of railway into these parts is of the highest importance from administrative and strategic points of view. The occasional risings of the hill tribes of Rumpa and Goodam and in the Ganjam Maliahs will be more easily suppressed. From an administrative point of view, we would bring to your notice that the inhabitants of the Northern Circars are now placed in a most unfortunate position. We would ask you to contemplate the fact that we cannot even watch our interests when they are at issue before the High Court without undergoing a sea voyage, which is most repulsive to our habits and comfort. In the south of India, not only the parties themselves but their relations and friends habitually proceed to Madras by rail to watch the progress of their suits before that tribunal, and they are enabled to do so at 24 hours' notice. There is nothing that is of more importance to all who are engaged in legal affairs, whether zemindars, or merchants or bankers or professional lawyers, than the facilities of access to the High Court. We would also here call your attention to the improvement which would be afforded by the iron-road to departmental administration. It is a well-known fact that these remote parts are not visited by departmental heads as frequently as districts bordering on the railway, and it is hardly necessary for us to say that frequent visits from the chiefs of the various departments would tend to secure better efficiency in the administration by affording opportunities to study the grievances of the people and to contemplate measures to ameliorate them. Moreover, if by chance a good officer is sent to these parts and he develops here into an able administrator, his services are immediately claimed by the head of his department for some Tamil district which

enjoys easy accessibility to head-quarters and is therefore better known to the highest authorities. The fact that these parts, with their vast and undeveloped resources so little known to the central administration, require an officer who is thoroughly conversant to deal with them is ignored. And the able administrator who has gained a thorough insight into the wants of the country is taken away and the benefit of his experience lost to these parts. The railway will, however, equalize all differences. Able officers will then be deputed to the backward districts and the iron-road will keep them in touch with the head-quarters.

The civilizing influences of the railway are so well known that they need not be dilated upon here.

We here beg to invite your attention to the various points mentioned in our memorial to His Excellency the Governor of Madras on the same subject submitted in June last.

Before concluding we wish you a happy New Year and hope that your advent in our midst will mark a new era in the progress of these much neglected Northern Circars, one of the oldest and most loyal possessions of the British in India.

I.

Address from leading gentlemen of Vizianagrum.

On behalf of the people of Vizianagrum we take this opportunity of welcoming you most heartily to this town, which was once the capital of a principality comprising a considerable portion of the Northern Circars and is now second in importance to none in the Telugu country. We beg to assure you that your arrival in our midst has given us the greatest pleasure, inasmuch as we regard it as the first step towards the realization of a hope, which we have for many years cherished, of seeing a railway introduced into the northern parts of this Presidency. The peculiar geographical situation in the northern districts of this province, which have become as it were a separate world on account of their isolated position, having a precarious means of communication with the capitals of Bengal and Madras, in the steamers that touch at our ports at distant and sometimes irregular intervals, has placed the people of these parts at a considerable disadvantage in comparison with those in the north and south, in respect of commerce, education, and other adjuncts of civilization, notwithstanding the great fertility of the soil, the industrious and thrifty habits and remarkable intelligence of the inhabitants. While the paternal Government have most kindly attended to the wants of their subjects in other parts of India in the matter of railway communication, the people of the Northern Circars have been left in the cold these many years, and grateful as we are to the Government for the railway communication which is now established between Madras and Bezváda, we cannot conceal from ourselves the fact that the Bezváda line will be of little use to us unless it is extended along the coast up to Calcutta. We feel sure that the construction of a railway along the east coast connecting Madras and Calcutta will, while removing the many disadvantâges under which the people are at present laboring, not only add to their convenience but materially increase their prosperity. Looking at the proposed railway from a financial point of view, we have little doubt that it will prove a great success, and it is impossible for us to think otherwise when we consider the impetus it will give to commerce, which is developing at a highly rapid rate in these parts in spite of a great many difficulties in the way, by connecting with the outer world large tracts of fertile land yielding immense quantities of various kinds of produce which is now stored up and wasted from want of easy means of communication between them and other parts of the country. We may also observe in this connection that the contemplated railway will have an extensive traffic in passengers going from different parts of the coast to important places of pilgrimage in the north and south, and having regard to the number of pilgrims that are daily visiting the famous shrines in this and other districts, who may be counted by hundreds of thousands, and remembering that the increased facilities of travel which the railway will afford to the Hindus, who regard pilgrimage as one of the highest religious obligations, will considerably increase their numbers, we have strong grounds for believing that the passenger traffic will prove a splendid source of income to those who will construct the railway. As for any engineering difficulties which may be apprehended in the construction of the line, we are of opinion that they are not such as should deter those who may be otherwise willing to undertake it. There are no hill ranges to be cut through, and no large rivers to be bridged, with the exception of the Kistna, the Godávari and the Mahanadi, in the case of which any incovenience arising from the difficulty of bridging them may be minimised by means of steam ferries. As for facts supporting the views expressed herein, we beg to refer you to the able and exhaustive paper drawn up by our popular Collector who has been so nobly advocating the present railway scheme, and for whose exertions we are indebted for the success which it has so far met with. The presence of a large number of people of various classes and creeds that are assembled here to give you a cordial reception, knowing that you are come on a mission promising great prosperity to them and to their descendants to the remotest generation will, we hope, convince you of the importance

they attach to the railway scheme under consideration, and we beg leave to tell you that many thousands would have joined us from the villages far and near if they had obtained information of your arrival here. We wish we could have given you a grander reception, such as one which His Highness the Maharajah would have given you had he been present at the station, whose absence we so much regret, a reception more in consonance with our feelings of gratitude to you for your reconnoitring the long tract along the sea-coast at so much personal inconvenience and purely for the benefit of the people. In conclusion we once more welcome you most heartily to this town, and pray you to convey to the Supreme Government as well as the Government of Madras our humble but sincere thanks for the favor they have done us in having entrusted the work to such able and sympathising officers whose happy advent augurs success to the scheme which is dear to the hearts of so many millions of Her Majesty's loyal subjects in this part of the British Indian Empire.

K.

Dated 21st January 1889.

Address from leading gentlemen of Berhampore to Sir GUILFORD MOLESWORTH, K.C.I.E., Consulting Engineer to the Government of India, and Colonel C. J. SMITH, R.E., Secretary to Government of Madras and Consulting Engineer.

We welcome you to Berhampore, the capital of the Ganjam district, although it might strike you as very odd that the head-quarters of the District Collector should be at Chatrapur, a small town about 12 miles further north.

The mission upon which we understand you have come to these parts, namely, the survey of a line for an East Coast Railway, is pregnant with important and enduring results to the Northern Circars both in an economical and social point of view, and we trust what you have already seen in the Godávari and Vizagapatam districts and a large portion of this district, and what you will hereafter see on your way to Cuttack, will enable you to report favorably upon the proposed line.

The comparatively small rivers that have to be crossed by the said line between the Godávari and the Mahanadi present to our unprofessional minds no difficulties of a serious nature for being bridged over, and as for the latter, we venture to propose that the plan already suggested of crossing them by steam launches may be adopted with advantage till the time and funds may be found for spanning them with strong railway bridges.

We are confident that in these parts there is an abundant supply of wood for sleepers, gravel and other materials for constructing a railway.

With an earnest hope that you will be able to advise the Government upon the feasibility and utility of an East Coast Railway for the Circars to connect them with the great network of the Indian Railway System.

L.

Proposal for an East Coast of India Railway.

The Association of Chambers of Commerce of the United Kingdom recently sent a memorial to Viscount Cross, Secretary of State for India, in favor of the more rapid development of railways in India. To this memorial Sir John Gorst replied that, although the efforts of Government, either direct or through guaranteed companies, are necessarily restricted by financial considerations and by the obligation to avoid any step which might lead to additional taxation, yet that the field of private enterprise is unlimited, and he proceeded to state that Viscount Cross was most willing to offer all reasonable facilities on the part of the Government of India to the free exercise of such an agency, and that he would be happy to receive any suggestions from the Association of the Chambers of Commerce in view to the application of the principle.

Perhaps one of the main difficulties that lies in the way of the exercise of private enterprise in the extension of the Indian Railway System is the want of knowledge of the areas that are ready for the rail. In England, as indeed in India, there are no patent facilities for arriving at accurate information on the population, trade, and resources of any particular tract of country, unless a special agency has been set to work locally to collect returns; and of course this can only be done satisfactorily and without bias by Government. Therefore if the Association of Chambers of Commerce are disposed to accept Viscount Cross' offer to help them and

to respond to his invitation of suggestions, what they would do well to ask for is a helping hand to arrive at accurate statistical accounts of any likely area where private enterprise might venture to build a railway with fair prospects of becoming possessed of a good property.

2. That many such areas exist may be true. In this paper I propose to draw attention to one such area; and I shall show that there is at least *primâ facie* reason for believing that this railway will be a good investment to the proprietors at the outset, and that in course of time it will become a first-class property.

3. I would premise that the figures I produce are all from official sources, that they were collected in the ordinary routine of official work, and that, though they may be, and doubtless are, inaccurate here and there, there is no possible reason to suppose that they are exaggerated or procured to fit into any preconceived speculation.

4. The railway with its branches will be 600 miles in running distance (485 main line and, say, 115 branch), and it will therefore afford ample scope for the establishment of a self-contained company. It will traverse a tract of land entirely unoccupied by any railway company, and it will connect the railway system of the two Presidencies of Bengal and Madras. There is now no connection between Madras and Bengal by rail, except along the circuitous route of Bombay and the North-Western Provinces. Even when the Nagpore-Bengal Railway is completed, the only way to get from Calcutta to Madras by rail will be to run west across the peninsula to the neighbourhood of Bombay and then back south-east to Madras, whereas the proposed line will hug the east coast of India along the greater part of the journey.

5. The line now proposed is to run along the east coast of India between North latitude 17° and 20°, East longitude 80° and 86° connecting Bengal and Orissa with Madras and the territories of His Highness the Nizam. The southern terminus of the line will be at Bezváda, latitude 16° 30′ 50″ North, longitude 80° 39′ East, where the Hyderabad and Madras lines are to meet and terminate; and the northern terminus will be fixed at or near Khurda, latitude at 20° 10′ 49″ North, longitude 85° 40′ 12″ East, through which place the line projected from Benares to Puri is to pass on its way to the latter terminus. This line from the North-West Provinces to Puri has recently received special attention, and reference respecting it may be made to the *Gazette of India* of 20th August 1887, where a long Resolution of the Government of India, Public Works Department No. 799 R. C., dated 12th August 1887, is published dealing with the whole project. The southern section of the Benares-Puri line will join the Nagpore-Bengal line at Panchpara. Accordingly, the route for the Calcutta passenger to Hyderabad and Madras will be the East Indian line to Seetarampur, thence *via* the Nagpore-Bengal line to Panchpara; thence along the Puri line to Khurda; and thence south along the now proposed line to His Highness the Nizam's territories and to the Southern Presidency. The distances appear to be as follows:—

	Miles.	Miles.
Calcutta to Seetarampur, about		130
Seetarampur to Panchpara, about		240
Panchpara to Khurda, about		190
Khurda to Bezváda, about		485
		1,045
Bezváda to Hyderabad *viâ* Warangal, about		220
Bezváda to Madras—		
(*a*) *Via* Bellary-Kistna State Railway and Madras line, about		550
(*b*) *Via* Nellore by road	160	
Tirupati rail	80	
Tirupati to Madras rail	84	
		324
(*c*) By trunk road (Bezváda to Madras)		272

6. The distance from Bezváda to Khurda is about 485 miles, and the branches which will here and there be required along this course are roughly calculated at 115 miles—total opening being therefore 600 miles.

7. There are no engineering difficulties along the whole line. The alignment suggested passes along canal levels from Bezváda to Cocanada, 120 miles, thence it follows the trunk road to Anakápalle, 80 miles. There are no heavy gradients or curves in this section. Leaving the trunk line at the latter place it runs 20 miles to Vizagapatam. The approach to Vizagapatam will require cuttings and curves. From Vizagapatam to Vizianagrum (36 miles), the line has

already been surveyed, demarcated and estimated by Mr. Cregeen, in connection with the Vizagapatam-Rápúr Railway, now abandoned. From Vizianagrum the line will run through an open level country to Chicacole, and then follow the trunk road as far as Khurda, passing through Berhampore, Ganjam and Rambha. I have obtained from Mr. Walch, Superintending Engineer, Northern Range, a statement of the water-ways over 150 feet span which require bridging between Bezváda and the northern frontier of the Madras Presidency, which is passed at the 435th mile from o mile at Bezváda. These are as follows :—

Supplement to the *Fort St. George Gazette*, dated 12th December 1882, pages 1 to 91, and G.O., dated 23rd September 1884, No. 940 R.

	Feet, lineal, required approximate.
In Kistna District.	
1. Badamar channel 2. Tammilaru	300
Godávari District.	
3. Yerrakala	200
4. The Godávari river	...
5. Yeluru river	350
6. Tuni river	350
Vizagapatam District.	
7. Varaha river	350
8. Sarada	400
9. Vizagapatam backwater	500
10. Chittivalasa	600
11. Nelimerla	350
Ganjam District.	
12. Nangulia	1,000
13. Vamsadara	150
14. Bahuda	2,000
15. Rushikulya	150
16. One stream in Puri division	2,000

The Godávari cannot be bridged, at all events, at present, but there will be no difficulty in crossing it by a steam ferry at Dowlaishweram. A steam ferry is provided for the Mahanadi in the estimates for the Benares-Puri line at a cost of Rs. 2,36,350. A similar ferry would be required at the Godávari.

The rates for earth-work and masonry are singularly low, as may be gathered from the following table :—

Table of Rates in Vizagapatam District.

	Per 1,000 cubic feet. Rs.	A.	P.
1. Earth-work for embankment 10 feet high, 1 anna per cubic yard ...	2	5	0
„ above 10 and under 20, As. 1-2 „ „ ...	2	11	2
„ 20 „ „ 30, „ 1-4 „ „ ...	3	1	4
„ 30 „ „ 40, „ 1-6 „ „ ...	3	7	6
„ above 40 „ „ „ 1-9 „ „ ...	4	0	9
2. Cutting soft earth, 1 anna per cubic yard	2	5	0
„ gravel, 1½ annas	3	7	6
„ soft rock, 4 to 8 annas ... ... Rs. 9-4-1 to ...	18	8	3
„ hard rock, 8 annas to 1 rupee ... „ 18-8-3 to ...	37	0	7
3. Excavating foundations as above according to depth and nature of soil—			
Concrete, Rs. 1-9-0 per cubic yard	5	12	7
Masonry roughstone, Rs. 2-2-0 per cubic yard	7	13	11
Archwork, brick in chunam, Rs. 5-4-0 per cubic yard	19	7	1
Ashlar masonry, Rs. 5 per cubic yard	19	8	3
Stone pitching, 8 annas to 1½ rupees per cubic yard according to distance of quarry ... ... Rs. 1-13-7 to	5	8	10
Brick well for foundations, 3 feet diameter and 6 feet deep, filled with concrete ... ... say ...	20	0	0
Brick well for foundations, 4 feet diameter and 6 feet deep ... „	25	0	0

8. The whole of the route along this line is densely populated. Numerous large towns lie along its course at suitable intervals. There are 24 towns along the main line, 11 of which, noted in the margin, contain from 10,000 to 30,000 inhabitants. The population of the districts through which the line will pass aggregates 8,274,882. One length, about the centre of the main line, has been taken for the purpose of ascertaining what the population is within ten miles on each side of the line. The area so selected is 137 miles in length. Deducting from this square mileage the area occupied by the Bay of Bengal, there remains 2,328 square miles, which contain a population of 1,081,307, giving an average square mile population of 464, through the centre of which the railway will pass. Taking again the whole length of the main line, 485 miles, and multiplying this by 20, giving an area of 10 miles of each side of the line, the whole area so occupied by the line will be 9,700 square miles, less the area occupied by the ocean, which is about 1,540 square miles. As near as can be reckoned, the total population of this restricted area is 2,880,480, giving an average density of population throughout the whole tract of 353 souls to the square mile. Similar calculation gives the population of the tract through which the branch from Vizianagrum to Párvatipur will run to be 527 to the square mile.

Towns.	Population.	Distance from Bezváda in miles.
1. Ellore	25,092	37½
2. Rajahmundry	24,555	94
3. Cocanada	28,856	121
4. Pithápuram	11,593	132
5. Peddápuram	11,278	124
6. Anakápalle	13,341	201
7. Vizagapatam	30,291	221
8. Vizianagrum	22,577	257
9. Parlákimedi	10,821	331
10. Chicacole	14,355	295
11. Berhampore	23,599	400
Population according to census returns taken in 1881	7,898,142	
Add normal increase of six years at 7·95 per 1,000 per annum	376,740	
Present population ..	8,274,882	

9. Along the course of this line there are a quantity of shrines, 45 * in number. In 1868, it was officially reported that these shrines were visited annually by 325,520 pilgrims. This figure does not include the pilgrims to the great Puri shrine, the most frequented place of pilgrimage in all India. The people who moved across the Chilka Lake from the area to be traversed by the railway to the last-named temple numbered, in 1864, 90,000 souls.

* *Vide* Appendix C.

NOTE.—In his No. 1363 of 22nd December 1883, Mr. Gupta, Officiating Collector of Puri, reported that the average number of pilgrims visiting the shrine at Puri for nine years from 1874 to 1882 was 210,605. But, of course, this includes pilgrims from other parts of India.

10. These figures give some idea of the local passenger or coaching traffic that may be expected to use the railway, but there is still to be considered the through passenger traffic and the sources from which it will be recruited. At the beginning of this paper, it was stated that this new railway will form a through connection between Madras and the Nizam's Dominions on the south and Bengal and North-Western Provinces to the north. The vast numbers of people that inhabit these respective areas are so prodigious as to be equalled by the population of no portion of the earth's surface, and it is really extraordinary to contemplate the fact that no railway communication exists between these masses of people except *via* the circuitous route by Bombay. We know that the southern part of the Indian Peninsula is inhabited by 49½ † millions of people, and that the delta of the Ganges with the Upper Provinces contains over 102 ‡ millions.

	Population in lakhs.
† Madras	311
Mysore	42
Travancore	24
Hyderabad	110
Coorg	2
Cochin	6
Total ..	495
‡ Bengal	{35,607,628
Behar	23,127,104
Orissa	3,730,735
Chota Nagpur	4,225,989
Feudatory States	2,845,405
North-Western Provinces	32,720,128
Total ..	102,255,989

11. The following is a sketch of the districts traversed by the railway :—

The Kistna district, which is traversed by the railway for 37½ miles from its southern terminus at Bezváda to the Godávari district frontier at Ellore is a flat country. The railway will follow the line taken by the Ellore canal, which conducts water from the Bezváda anicut on the Kistna river as far as Ellore where the canal is met which brings the water from the Godávari. The district is eminently fertile, yielding a total revenue of more than 54½ lakhs of rupees. The area under cultivation, excluding the zemindari estates, in 1883-84, was 1,907,802 acres. The staples raised are rice, maize, cotton, tobacco and indigo. Cotton, indigo and castor-oil seed are exported in considerable quantities at Cocanada, a far easier port of shipment than Masulipatam. The last-named town is, however, a very large place,

containing 35,056 inhabitants, and though the roadstead is very much silted up, it is thought that a more suitable port could be found at a place a little to the southward. It will be for the Railway Company to decide whether it will answer to run a branch line from Bezváda to Masulipatam. No mention beyond this is made of this proposal in this paper, but it will undoubtedly be a very grave question and one that merits the best examination.

The population of the whole district is 1,548,480. The ryots of the delta are well off, rice being the food of all classes. The chief towns are Masulipatam, Guntúr and Bezváda. Guntúr is the head-quarters of the cotton trade, and large quantities are exported. In 1882, 105,032 bales of 300 lb. each were despatched from Guntúr to Cocanada, 11,418 bales to Masulipatam, and 10,100 bales to Madras. Probably £100,000 sterling is remitted to the Guntúr cultivator every year in exchange for the cotton.

Godávari District.—Mileage—main line 118½, Godávari ferry 5, total 123½. The first town met on running across the border into the Godávari district is Ellore, a place of 25,487 inhabitants. The taluk of the same name is irrigated by a canal taken off the Godávari river at Vijeswaram. It is a high-level channel. There is only one lock in it, which is situated at Ellore, and by which the Kistna canal drops into it. The Ellore taluk itself contains a population of 136,875. The revenue of the taluk is Rs. 2,00,540. Ellore is noted for fine woollen carpets and saltpêtre. There is a great trade in rice and other grains. The distance from Ellore to the Godávari anicut by canal bank is 46 miles. This part of the district is flat and exceedingly fertile, irrigated by innumerable canals and channels. "Green fields of paddy extend in every direction, diversified by gardens of plantains, betel-nut, and cocoanut, and innumerable palmyras are dotted over the surface of the country." The Yernagúdem taluk, intervening between Ellore and the banks of the Godávari, contains 145,715 inhabitants. The surface of the taluk is level towards the Godávari. The right bank of this great river is reached at Vijeswaram, and its breadth at this point is 7,000 yards or 4 miles. Here is the celebrated anicut, which stretches across the river from island to island until the opposite bank is reached at Dowlaishweram. Viewed from a railroad point of view, nothing can be done but to cross it by a ferry, for the very mention of a bridge over such a prodigious expanse of water, with such a mighty flood as pours along in the monsoon season, would be enough to deter any company from undertaking this line. Fortunately, however, there is always sufficient water above the anicut to make the crossing of the river by a steam ferry quite feasible, and I am assured by competent authority that no difficulty on this head need be anticipated.

On arriving at the left bank of the river, the country becomes very densely populated. The town of Rajahmundry is 6 miles from Dowlaishweram. It contains 19,734 inhabitants. Dowlaishweram has 7,252. The population of the taluk is 128,901, and there is an enormous trade all along the banks of the Godávari.

From Dowlaishweram the railway will run most likely straight to Cocanada, though the more direct trunk route would be to avoid that port and connect it with the main line by a short branch. This is a point to be decided by the engineers. Cocanada itself is a place of the first importance, with a population of 25,856. It is the busiest and most enterprising town along the coast, and, with a railway into it, it will without doubt rival Madras in trade. For it will be the nearest point to Rangoon, and the probable effect of bringing the railway to it will be the establishment of a line of steamers running thrice a week directly between these ports, connecting the centre of India with Burma country. The distance between Cocanada and Rangoon and Calcutta and Rangoon are about the same; but it is a shorter journey from Cocanada to Bombay *viâ* Hyderabad than it is from Calcutta to Bombay *viâ* Allahabad, though possibly the new Nagpore-Bengal line will cut off the excess. So far, however, as Madras, Hyderabad and Orissa are concerned, there is no doubt at all that Cocanada will become the port for Rangoon. Steamers running to Europe will almost certainly come to touch at Cocanada; for with such a river and such a large extent of country behind it, so marvellously rich in deltaic produce and in upland seeds, not to speak of the Singareni coal-fields, there can be no manner of doubt that this will take the foremost rank of all the ports in the Madras Presidency. Cocanada will certainly be selected for the head-quarters of the administration of this East Coast Railway. Everything points to this—the excellent harbour, the commercial character of the place, the canals running through the delta, the inlet into the Central Provinces afforded by the great river; there is plenty of room for building stations, workshops, locomotive sheds, and carriage factories; there is very agreeable European society at Cocanada, with a church, club, and racquet court.

From Cocanada, the railway, leaving the deltaic and canalized country it has hitherto traversed, passes through the Pithápuram and Tuni divisions to the town of Tuni, on the borders of the Vizagapatam district. The Pithápuram zemindari contains about 371 square miles with a population of 184,018. Pithápuram town has 11,593 inhabitants, six villages have a population exceeding 3,000, and 11 other villages contain over 2,000 inhabitants.

I regret that I can find no account of the Túni division in the District Manual, or in the Madras Manual of Administration. Indeed it is not at all wonderful that no railway enterprise has yet penetrated into these coast districts,—if, that is, it is dependent on

information to be gleaned from books. The meagre topographical and statistical information which I have collected in these notes on the Kistna and Godávari districts is all that can be found in the official manuals, and until personal inspection is brought to bear on the route to be taken by the Railway, and until the specific knowledge so derived is duly transferred to paper, it is almost hopeless to expect the public to take such an interest in the scheme as will lead to investment. I am much surprised at the very insufficient accounts of these two wealthy districts that have been published under official patronage. It does not strike one at first that no books or maps about such a country as this are at all available—in the city for instance—the reflection comes with quite a shock, that we are going to ask the city capitalists to invest three or four millions of money in an enterprise of which they have no detailed ideas, and which they cannot look into because there are no sources of information available.

Vizagapatam District.—Mileage of rail throughout—main line 136, branch 50, total 186. At Tuni, the line will cross the Tuni river, which is a waterway of 350 feet. A run of twelve miles brings us to Nakkepalle. Here there is a very celebrated shrine, resorted to by pilgrims, who were numbered in 1868 and found to aggregate 8,000. Thirteen miles further on Yellamanchili is reached, a considerable village and the head-quarters of the taluk. A run of eight miles brings us to Kasimkót, a town of 7,778 inhabitants, and three miles further on is the large and flourishing commercial town of Anakápalle, with 13,341 inhabitants. Twenty miles intervene before Vizagapatam is reached. The population of this seaport town is 30,291, and for trade and importance it occupies a prominent position. Leaving Vizagapatam, the line will run along the alignment already surveyed for the Vizagapatam-Rápúr line for 36 miles, passing *en route* the important shrine of Simhachellam and the port of Bimlipatam. Possibly a small branch of three miles may be required here. Vizianagrum is a town of 22,377 inhabitants. It is the residence of the Maharajah, and a place of great prosperity and much trade in cotton goods and iron. A branch will leave the main line at Vizianagrum and run fifty miles inland to serve the town of Sálúr (11,856 population), Bobbili (14,943 population), and Párvatipur (9,933 population). The first and last towns are the emporia for the hill produce as mentioned further on. Leaving Vizianagrum, the main line runs 40 miles through Chipurupalle and Pondur to Chicacole, passing a Pálkonda road station. Pálkonda is the chief town of a taluk containing 200,000 inhabitants, the richest and most prosperous taluk in the district. At Pondur there is a wealthy society of weavers, who manufacture very excellent cloths for export to the neighbouring markets.

Entering the Ganjam district at Chicacole, the main line of Railway will follow the trunk road nearly, the mileage of which from Chicacole to the Bengal frontier is 136 miles. Probably a branch line will be required, running from Gopálpur into the Goomsur taluk, but particulars of the exact alignment are not yet available and details of this branch are entirely omitted from this paper. The main line will run from one large town to another. Chicacole has 15,000 inhabitants. From Chicacole to Calingpatam it is 16 miles, but probably a nearer station to the port will be selected, perhaps on the banks of Vamsadera river, which can, it appears, be made navigable for some distance from its mouth. "Calingapatam is the only port which has any shelter and which is not a perfectly open roadstead and unprotected between Coringa, 150 miles south, and Dharma in Orissa, 250 miles north. Communication between the shore and shipping is but rarely interrupted." Narsannapet, 14 miles from Chicacole, is a large congeries of villages containing 8,230 inhabitants. There is a large market held here in cattle and goods, and much good cloth is woven here. A further run of twenty miles brings us to Naupada, where are situated the largest salt-pans in the district. The salt from Naupada and Calingapatam furnish the supplies for Kalahandi, Jeypore, Pálkonda, Sálúr, Bustar, and the southern parts of Chattisgarh. The salt will be conveyed from these two factories by rail to Vizianagrum and thence along the branch line to Sálúr and Párvatipur, which are the emporia for the hill produce of all the lands that lie beyond the ghâts to the west (see paragraph 14). Passing through the estates of Tekkali, Tarla and Mandasa, the next port passed at a little distance will be Barwah. This port is frequented by native passengers proceeding to and from Barwah. Ichápur, 84 miles from Chicacole, is a large place of 5,528 inhabitants. Berhampore, 15 miles further north, is then reached. This is the largest town in the district of Ganjam. It contains 21,816 inhabitants. The head-quarters of a native regiment are located here. The chief industry is the manufacture of silk, and common native cloths are also woven here. Leaving Berhampore, the trunk road passes at a distance of three miles from Gopálpur, the chief port of the district. Possibly it may be well to bring the line still nearer to the port than this, for Gopálpur is a very important place. It contains only between two and three thousand inhabitants, but the trade of the port is very valuable, amounting to over 50 lakhs per annum. From Gopálpur the trunk line runs to Ganjam, 19 miles from Berhampore, where there is a large salt factory, to which traders resort from Cuttack, Sambálpore and Goomsur. Ten miles from Ganjam, Rambha is the next point touched at. Rambha is the depôt for all the trade on the Chilka lake. Finally, the railway runs skirting the lake, through the most beautiful scenery, until it leaves the

See "Manual of the Ganjam District."

Ganjam district and the Madras Presidency between the villages of Panditagáon and Barkal. The frontier is 40 miles north of Berhampore and 50 miles south of Khurda, the northern terminus of our railway. So far, therefore, as the Ganjam district is concerned, the railway runs its whole course of 136 miles touching the places of trade at Rambha, Ganjam, Gopálpur, Berhampore, Ichápur, Barwah, Naupada, Narsannapet, Calingapatam and Chicacole; that is to say, at an average distance of every 13 miles along its length, it arrives at an emporium where passengers and goods will certainly swell the traffic.

From the frontier of Ganjam to Khurda, the distance is about 50 miles. For nine months (from December 1878 to August 1879) 32,126 loaded carts, 7,997 laden bullocks, and 33,145 foot-passengers came from Ganjam to Khurda and *vice versâ*, and adding one-third for the remaining three months, we find for the whole year that the figures come to—

Foot-passengers	* 44,183
Laden carts	* 42,833
Bullocks	* 10,663

* Supplement to *Gazette of India*, 20th August 1887. Extract of letter from A. Sewell, Esq., Commissioner of Orissa Division, to the Secretary to the Government of Bengal, Public Works Department, para. 54.

From this statement it is perfectly plain that the traffic which will nourish the railway along its length from Bezváda to the Ganjam frontier, the existence of which is set forth in this paper, will suffer no abatement in the 51 miles which run beyond the Presidency into the Cuttack country.

12. From Madras to Calcutta by the existing circuitous route *viâ* the Bombay Presidency the distance is about 2,060 miles, whereas by the new east coast route it would be *viâ* Guntakal, Bezváda, Khurda, Panchpara and Seetarampur, 1,595 miles. It is therefore morally certain that the through traffic, which indeed has not yet been properly developed owing to the length of the present journey between the north and south of India, will all pass over the 485 miles of the route I am writing on. And there is another circumstance connected with the through pilgrim traffic from the north to the south and *vice versâ*, which is that almost all the shrines † venerated by the Hindus lie in profusion along the eastern coast from Benares to Rámesvaram, and not along the country now tapped by the Great Indian Peninsula and Madras Railway Companies. Data for framing estimates of through passenger traffic are unfortunately unavailable, and I can only point to the above possibilities of through traffic that are suggested by a general review of the circumstances of the case.

NOTE.—It is evident that the section between Nellore and Bezváda must be completed some day, and the question will further arise whether the coast line should not run straight into Madras from Nellore, and not *viâ* Tirupati and Arkónam. With the Nellore-Bezváda gap filled up, there will be a saving over the route *viâ* Guntakal of 280 miles, and with the direct line from Nellore to Madras, there will be a further saving of 50 miles. Besides, there is no doubt that the whole east coast line from Madras to Khurda ought to be broad gauge, and not metre gauge. If a coast line were made from Bezváda to Madras, the distance from Calcutta to Madras would be—

	MILES.
Madras to Bezváda	270
Bezváda to Khurda	845
Khurda to Calcutta *viâ* Panchpara-Seetarampur	560
	1,315

† Puri.	Tirupati.
Srikurmam.	Conjeeveram.
Simhachellam.	Srirangam.
Kottapalle.	Madura.
Kálabasti.	Rámesvaram.

13. But although I have no data to go on for through traffic between the north and the south of India, I have obtained figures to show the existing state of the local passenger and goods traffic over some of the sections of the proposed line. These will be found in statement A at the end of the paper. The computation of inland traffic is, as is well known, attended with great difficulties. Most lines in India have been exploited without any reference to the statistics of such traffic, and, generally speaking, all attempts to show favorable figures have ended in utter discomfiture. The present attempt is therefore put forward with diffidence. The figures must be taken for what they may be worth. All that can be said is that they emanate from official sources, and as they have not been specially collected for the purposes of this paper, they are not open to suspicion of bias to suit the project.

14. The sections for which figures have been procured are the following. Commencing from Bezváda the first section comprises 37½ miles, and the statements have been compiled from information given by the Engineers of the canal which runs along that distance.

The figures under passenger traffic represent the actuals for nine months and 12 days in 1886-87, together with an estimate for 80 days during which the canal was closed. For goods traffic, the figures are actuals for nine months in the year 1885-86 and estimates for three months, the period during which the canal closed in the previous year. The next section, 78½ miles, from Ellore to Cocanada is also a canal section, and the figures are likewise furnished

by the Government Engineer. These two sections lie in the Kistna and Godávari districts. In the Vizagapatam district, the sections selected for illustrating the traffic are—

	MILES.
(*a*) Anakápalle to Vizagapatam	20
(*b*) Bimlipatam to Vizianagrum	16
(*c*) Vizianagrum to Párvatipur	50
Total ...	86

NOTE.—(*a*) and (*b*) main line; (*c*) branch line.

The sources of our information for the traffic of this mileage, which is entirely road traffic, are the statements prepared by tabulators specially appointed for the purpose by Government on two occasions during the last ten or eleven years. The tabulation made in 1876 was for the Anakápalle-Vizagapatam section, and it was made for three months only. That for the other two sections, made in 1884-85, lasted throughout the year. The movement of passengers and goods along these sections has been calculated from the figures so obtained.

The fourth section, 59½ miles, is from Rambha to Khurda, but these figures were compiled so long ago as 1864 (G.O., dated 20th December 1864, No. 3642), and are therefore less satisfactory as to their value.

For the intervening sections of the line no reliable figures can be had, but those produced are fairly illustrative of the general state of passenger traffic along the whole route, and we shall not be far wrong by deducing from the above given figures a per-mileage average for the entire distance.

15. The enumeration with its deductions is for 261½ miles, *i.e.*, for 116 miles in the first 121 (reckoning 0 mile at Bezváda). Then comes a black space of 80½ miles followed by an enumerated section of 20 miles. The next enumeration covers 66 miles (16 miles of main and 50 miles of branch line). Then follows an unenumerated length of 168 miles, and the estimated sections are concluded by figures for the last 59½ miles. So far, therefore, as the main line goes, the figures represent a calculation of the existing traffic over 211½ miles out of 485 miles, and of the branches 50 miles are enumerated.

Passenger Traffic.—The figures given exhibit variations in returns running from 64,391 to 576,561. Putting the marginally-noted figure aside as undoubtedly untrustworthy, as it includes all foot-passengers, whether on a journey or not, the travelling public by canal or cart varies over the selected sections from 64,391 to 180,000. A fair average figure * for these sections is 111,627, and we may take that figure as the number of passengers per mean mile worked in these sections. The lead on the South Indian Railway is 35 miles on the average of the last five years, and this figure may be adopted for the purposes of this paper. This gives a total of existing passenger traffic over these sections per annum of 1,913,605, yielding a mean passenger traffic per mile over the 261½ miles of 111,627, against 344,000 on the South Indian Railway. The figure taken in this calculation is therefore not excessive.

Registered number of passengers, 576,561, Vizianagrum to Párvatipur Section.

* See Appendix B.

16. The question is—What will this existing traffic develop into by opening the now proposed railway? In answer, we can take the development of passenger traffic on the Madras and South Indian Railroads. On the former line, upwards of 800 miles in length, the passenger traffic developed in 16 years from 2½ millions to 6,374,000. On the South Indian Railway, after 579 miles were opened, the traffic rose from 4 millions in 1877 to 6,509,000 in 1886-87.

There are certain stated † reasons for assuming that the development of passenger traffic will be far larger on the line now proposed than on the lines alluded to above. There are—

† Madras Manual of Administration, Volume I, pages 434-435.

(*a*) The geographical character of the country served, those lines lying within the narrowest and most restricted part of the Indian peninsula.
(*b*) The absence of any leading staples of traffic in those parts.
(*c*) The poverty and simple habits of the people of the south.

Of these disabilites, the last is unfortunately also present with us in the case of the proposed line, but the first is mitigated by the position of the land, and of its connection with other lines, as explained above, and the second will be dealt with in subsequent paragraphs which touch on the goods traffic. There is therefore every reason for supposing that, as there now exists undoubtedly very considerable passenger traffic throughout the country which the railroad will traverse, such traffic will be increased and multiplied *pari passu* with the extension of the rail lines, and consequently concurrently with the expenditure of the capital. But over how many years will this extension last? For the quicker the line is opened, the greater will the through traffic be and the less the per-mile charges for establishment and other expenses.

Here we have an enormous advantage. The railway can be begun at quite four places at once without the least chance of confusion. Taking Cocanada as centre of southern 170 miles, works can be begun at the same time at Bezváda and Cocanada. Two arms can be pushed out from the latter place—one towards Dowlaishweram, the other towards Vizagapatam.‡ The canals between Cocanada and Bezváda (121 miles) given unlimited facilities for sending out the permanent way to all points along the line. Similarly at Vizagapatam all things required can be landed and two arms can be pushed out—one south to meet the advancing arm from Cocanada, the other north towards Vizianagrum—the latter section having indeed already been surveyed and planned out by an Engineer of the Government of India. The ports in Ganjam offer similar facilities for construction—for instance, from Calingapatam and Gopálpur. With these facilities of construction, it is plain that the full development of passenger traffic on the line itself can be looked for in a very short time. Little time should be lost in completing at least the southern section of the Benares, Cuttack and Puri line to secure the through traffic that will be delivered up to that line at our northern terminus at Khurda; for, it is plain that the Nagpore-Bengal line will, as soon as the Puri-Panchpara section is completed, receive an immense traffic at the latter station, both from Puri and from Khurda. It took the South India line seven years to extend from 187 miles to 654 miles open, and it was not until the full length had been opened for some years, that the passenger traffic advanced by any sensible figure. In 1878, 608 miles were opened on that line, and the figure for gross income from coaching per mile per week was taken at 60·22. In 1884 the income rose to 65·21, and in 1886 to 74·56. This points, therefore, to the profits derivable from rapid construction; and from a comparison between the two countries traversed by these respective schemes, there is little danger in taking the state of the passenger traffic on the South Indian Railway as typical of what the new line may aspire to with but moderate ambition.

‡ NOTE.—As to landing railway material at Cocanada, a member of a European firm writes as follows: "Since the middle of June up to the present time, (23rd August), that is to say, during the very height of the south-west monsoon, we have, without accident, without the slightest difficulty, and considerably within the time provided for in charter, discharged the cargoes of four large steamers consisting of sleepers, rails and other heavy materials," *i.e.*, for the Hyderabad, Warangal and Bezváda line to be sent up to the canal to the latter place from Cocanada.

17. Summing up this part of the subject, it may be concluded that the existing passenger traffic over the stated sections amounts to 111,627 persons per mean mile per annum, and that the gross income which would now be derived from the source per mile per week would be Rs. 22·36.

Further, judging from the present state of passenger traffic on the South Indian Railway, and remembering that the line proposed is more favorably situated than that railway, it may be assumed that as soon as the line is completed, our numbers will certainly rise to at least the numbers carried now by that railway, which are nearly four times this number. The figure earned by the South Indian Railway for coaching traffic per mile per week for the past year was Rs. 74·56. The figures taken therefore for the purposes of this paper are as follows:—

	No.	Receipts at two pies per mile per head.	Receipts per mile per week.
Present passenger traffic per mile	111,627	1,162	22·36
Prospective	344,000	5,583	68·90
The amount now actually earned by South Indian Railway			74·56

A passing remark is necessary to guard those who are unacquainted with the manners and customs of the Hindus from supposing that the existing line of coasting steamers will operate in any way to deprive the railway of passenger traffic. A sea voyage is detested by the Hindu with a quite peculiar fervour. Life on board ship is inimical to his caste and to his daily habits; and, moreover, it is calculated that the cost of a journey from, say Masulipatam to Calcutta *viâ* steamer, compared with that *viâ* rail, will be as Rs. 15 to Rs. 8. Nothing at all need be feared on this score. On the other hand, there is a possibility of competition for passenger traffic arising in that part of the line between Bezváda and Cocanada (121 miles) is canalized. Many objections are held by the Hindu to travel by canal—the inconvenient hours, lack of halting places and so forth.

I have also compared the population of the districts tapped by the South Indian Railway with that of the country under discussion.

*	†
1. Tanjore.	1. Ganjam.
2. Trichinopoly.	2. Vizagapatam.
3. Madura.	3. Godávari.
4. Tinnevelly.	4. Kistna.

The four * southern districts of the Madras Presidency have a population numbering 72 lakhs, while similar figures from the four † northern districts run into a total of 75 lakhs.

18. *Goods Traffic.*—The goods traffic comes next under observation. Before going into details of the existing trade over sections of the line, it will be well to preface this part of the subject with a few remarks on the general aspects of the trade of the country through which the proposed railway will pass. The first thing to be observed is the export and import trade from the ports along the line. These are the ports of Masulipatam, Cocanada, Vizagapatam, Bimlipatam, Calingapatam, Barwah, Gopálpur and False Point. Of these ports, the first in point of size is Cocanada, and there is no doubt that all the export and import traffic of the southern 171* miles of rail will set in the direction of that port. The mid portion of the line, with its branch 50 miles, total 176½† miles of line, will carry goods to and from the two ports of Bimlipatam and Vizagapatam. The remaining portion of the line—*i.e.*, the northern section from Chicacole to Khurda, 187½ miles, with branches, amounting to, say 50 miles—will deal with the trade at Calingapatam, Barwah and Gopálpur. The gross value of the trade at all these ports amount to Rs. 317 lakhs per annum, and the details for each port are given in statement below:—

	MILES.
* Bezváda to Cocanada	121
½ Cocanada to Vizagapatam	50
	171
† ½ Cocanada to Vizagapatam	50½
Vizagapatam to Vizianagrum	36
Vizianagrum to Chicacole	40
Vizianagrum to Párvatipur	50
	176½

Names of Ports.	Value of exports and imports.
1. Masulipatam	24,82,478
2. Cocanada	1,52,28,213
3. Vizagapatam	32,35,349
4. Bimlipatam	41,67,393
5. Calingapatam	10,63,092
6. Gopálpur	53,01,777
7. Barwah	63,871
8. Sonnapur	1,19,837
9. Ganjam	41,181
Total ...	3,17,03,191

19. The chief items of goods traffic are on Indian Railways—coal and coke, grain and pulses, metals, cotton, salt, seeds, sugar and miscellaneous articles of merchandise.

Coal.—The coal-fields of Singareni lie on the Bezváda-Hyderabad line, distance, 86 miles from the former terminus. Of these fields, it has been recently stated by Mr. F. W. H. Hughes, F.A.S., Deputy Superintendent of the Geological Survey of the Government of India, they are six square miles in extent, and that probably 94 million tons of coal are available within 300 feet of the surface. The greater portion is dull, hard coal, defined to be excellent steam coal capable of standing weathering and transport, compact in texture and not splitting or wasting to dust. The remainder is bituminous and good smithy coal.

In addition, Mr. Hughes says, to supplying coal for railway and ocean purposes, it will in a short space of time be the mainstay of various industries within the radius of its influence. In his report of the railways of the Madras Presidency for 1886-87, Colonel C. J. Smith, R.E., the Consulting Engineer for Railways, says (paragraph 25): "When the line from Warangal to the Singareni coal-field, which is well advanced, and the extension to Bezváda, are completed, the Singareni coal-field will, by means of the Bellary-Kistna State Railway and the Kistna and Buckingham canals, be open to all the lines in the Presidency." There is, of course, no data existing for calculating the amount of coal traffic that will pass over the section of the line between Bezváda and Cocanada (about 121 miles), but seeing that, besides supplying the railway, the latter place is the resort of all the steamers engaged in the coasting trade and of many engaged in out-port trade, and that steaming coal of Singareni can be delivered at Cocanada at a lower rate than such coal reaches any other port in India, it is apparent that the profits from this source of traffic will be considerable.

20. *Grain and Pulses.*—The number of tons of grain and pulses exported and imported at the ports along the coast line of this railway is as follows:—

Statement showing the Exports and Imports of Grain and Pulse from the principal Ports along the East Coast from Kistna to Ganjam.

Name of Port.		Exports. Grain.	Rice in the husk.	Rice not in the husk.	Wheat.	Pulse.	Other sorts.	Total.
1		2	3	4	5	6	7	8
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Masulipatam ...	Coasting trade ...	60,312	1,63,593	30,685	109	83,474	7,719	3,45,892
	Foreign ,, ...	1,417	1,08,005	375	21	917	10	1,10,745
Cocanada ...	Coasting ,, ...	41,958	80,007	84,399	...	1,03,417	312	3,09,993
	Foreign ,, ...	56,425	50,560	1,16,357	66	3,234	...	2,26,642
Bimlipatam ...	Coasting ,, ...	5,212	...	38	227	364	14	5,855
	Foreign ,, ...	...	...	3	...	...	...	3
Gopálpur ...	Coasting ,, ...	...	...	...	...	...	...	...
	Foreign ,, ...	...	...	2,739	...	...	...	2,739
Total cost ...		1,65,324	4,02,165	2,34,496	423	1,91,406	8,055	10,01,869
Total tons ...		8,266	20,108	11,725	21	9,570	403	50,093

Statement showing the Exports and Imports of Grain and Pulse from the principal Ports along the East Coast from Kistna to Ganjam—*cont.*

Name of Port.	Imports.							Remarks.
	Grain.	Rice in the husk.	Rice not in the husk.	Wheat.	Pulse.	Sorts.	Total.	
	9	10	11	12	13	14	15	16
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	
Masulipatam ... { Coasting trade.	...	...	...	...	...	...	...	This information is obtained from the annual volume of sea-borne trade and navigation for 1885-86.
{ Foreign „	...	...	...	...	...	...	...	
Cocanada ... { Coasting „	...	...	...	...	...	...	...	
{ Foreign „	...	149	...	9	732	...	890	
Bimlipatam ... { Consting „	...	...	...	...	...	...	...	
{ Foreign „	...	4,538	9,458	...	124	...	14,120	
Gopálpur ... { Coasting „	...	...	...	...	...	...	...	
{ Foreign „	51	...	3	35	383	...	472	
Total cost ...	51	4,687	9,461	44	1,239	...	15,482	
Total tons ...	3	234	473	2	62	...	774	

But these figures give very little idea of the transport of food stuffs between the inland centres of population. The linking of this new line with the Hyderabad, Warangal and Bezváda line at the last-mentioned place, where also the Bezváda-Kistna State Railway runs in, opens a communication between the rice-producing deltas of Godávari and Kistna, and the masses of population in the Southern Hyderabad country—Kurnool, Bellary and North Cuddapah. These countries, with a total population of 7½ millions, are dry grain and seeds producing districts. They will therefore take rice from the above-named deltas and send seeds in return. This illustration regarding the probable movement of food stuffs and seeds applies to other sections of the line under discussion, viz., South Vizagapatam and the eastern delta of the Godávari, mid and North Vizagapatam and Chicacole, mid and North Ganjam with Goomsur, and the Mahánadi delta.

21. The exchange of food stuffs with other commodities depends on the quantity of the former that remains for export after supplying the local population. We have estimates showing how much food grains will be available for export in 1889-90, and from the Godávari-Kistna deltas alone the amount is calculated to be 680,000 tons.

22. The question is sure to be raised as to the capability of the new line to compete with the canal traffic between Bezváda and Cocanada, distance 121 miles. Mr. Jeans treats of the general question of railways compared with canals in the twenty-sixth chapter of his new book entitled "Railway Problems." He says that notwithstanding that the conditions seem capable of being formulated with the greatest exactness, there is no phase of the railway problem that is involved in greater obscurity. Unfortunately he gives us no information on the Indian aspect of the question, as his figures and inferences deal only with the European and American facts. In the United States the canals had the high sanction and support of the several States, being for the most part State property and carried on under State administration. The railways, on the contrary, have been the out-come of private enterprise, but enterprise quite untrammelled as to its scope and movements, and free to adapt itself to the ever varying requirements of the traffic it aspired to serve and secure. The result has been an unqualified triumph for railway interest, and the canals, if they have not been placed entirely *hors de combat*, are every year showing a diminished relative extent of traffic notwithstanding enormous concessions in the way of freight charges made by the canals, which may be appreciated from the fact that the average toll taken per ton carried on the New York State canals fell from 1·24 of a dollar in 1840 to 0·17 dollar in 1880. Mr. Jeans says, moreover, that the question is not to be settled by the mere comparison of freight rates, and that unless low rates of freight are coincident with ample facilities, and especially with celerity and reliability of transport, they are not necessarily the controlling factors. In 1883-84, the rail rates between Chicago and New York 98 per cent. above those by lake and canal. Yet the traffic has been leaving the canals and clearing to the railways, the reasons being that the railways give reasonable rates; that they are not liable to be affected by weather; they deliver the grain in good condition; and they can always be absolutely depended upon. How far these views are applicable to the case of India is a matter difficult to determine. For instance, will Government permit the railway to make untrammelled arrangements to wrest the traffic from their canals? One point we may point to, and that is that the canals must undoubtedly be shut during the year for periods varying in different sections from one to four months to be repaired or from lack of water, and during such months the railway will have it all its own way. No such competition exists from Cocanada north to Vizagapatam (101 miles), and along the whole distance there will be nothing to compete with the railway but the country carts and steamers. The cost of

carrying goods by cart per mile is not less than two annas per ton, and freights by the latter owing to boat hire and dues are quite prohibitive. Even now all rice brought from the Godávari delta to the towns as far north as Vizianagrum comes by cart and not by sea.

23. Salt is another item of inland traffic that does not appear in the export and import trade returns. The following information regarding the movement of this article of consumption has been supplied by the Deputy Commissioner of Salt Revenue:—

Number.	Factories and depôts.	For local consumption.	For consumption in the districts beyond the presidency.	Total.	Remarks.
1	Ganjam and Surlá in Ganjam district.	Mds. 150,366	Mds. 272,952	Mds. 423,318	This includes the quantity of salt used for fish curing.
2	All factories in Vizagapatam district and Naupada and Calingapatam in the Ganjam district.	84,095,325	43,358	88,431,125	This includes the quantity of salt sent to French Government.
3	All the salt factories in the Godávari and Kistna districts.	532,669·15	1,5027	547,696·15	
	Total ...	1,523,988·40	331,337	1,865,325·40	
	Total tons ...	55,983·24	12,171·57	68,154·18	

24. The seeds grown are used locally for inland consumption and are exported to home and foreign markets. The details of the exports are as follows:—

Statement showing the Exports and Imports of Seeds from the principal Ports along the coast from Kistna to Ganjam.

Names of Ports.	Exports.								
	Coriander.	Cumming.	Fenugreek.	Castor.	Rape.	Mustard.	Teel or Gingely.	Other sort.	Total.
1	2	3	4	5	6	7	8	9	10
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Masulipatam { Coasting trade.	:	...	...	1,12,458	...	...	21,784	14,870	1,49,112
{ Foreign „	466	...	7	...	...	...	165	...	638
Cocanada ... { Coasting „	...	...	...	2,75,785	...	435	87,575	20,702	3,84,497
{ Foreign „	1,442	5	458	5,23,455	...	998	1,36,629	1,066	6,64,053
Vizagapatam { Coasting „	...	...	...	...	...	...	..	...	...
{ Foreign „	...	...	...	...	...	...	6,944	...	6,944
Bimlipatam { Coasting „	...	...	...	...	7,036	...	43,020	589	50,645
{ Foreign „	...	...	...	1,166	29,181	...	1,12,299	73,247	2,15,893
Calingapatam { Coasting „	...	...	...	...	...	...	...	...	...
{ Foreign „	...	...	...	...	25,595	...	37,218	13,667	76,480
Gopálpur ... { Coasting „	...	...	...	...	...	...	...	...	...
{ Foreign „	...	...	...	...	1,666	...	41,543	1,616	44,825
Total cost ...	1,908	5	465	9,12,864	63,478	1,433	4,87,177	1,25,757	15,93,087
Total tons ...	95	...	23	45,643	3,174	72	24,359	6,288	79,654

Statement showing the Exports and Imports of Seeds from the principal Ports along the coast from Kistna to Ganjam—*cont.*

Names of Ports.	Imports.						Remarks.
	Castor.	Linseed.	Mustard.	Gingely.	Other sorts.	Total.	
	11	12	13	14	15	16	
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	
Masulipatam ... { Coasting trade ...	...	...	...	...	...	...	The information is obtained from the annual volume of sea-borne trade and navigation for 1885-86.
Masulipatam ... { Foreign „ ...	...	...	...	...	...	...	
Cocanada ... { Coasting „ ...	...	...	...	...	...	...	
Cocanada ... { Foreign „ ...	...	...	75	3,324	976	4,375	
Vizagapatam ... { Coasting „ ...	...	...	...	...	...	...	
Vizagapatam ... { Foreign „ ...	...	...	...	...	...	...	
Bimlipatam ... { Coasting „ ...	...	...	...	...	...	...	
Bimlipatam ... { Foreign „ ...	...	...	...	...	4,305	4,305	
Calingapatam ... { Coasting „ ...	...	...	...	...	...	...	
Calingapatam ... { Foreign „ ...	...	...	...	...	...	...	
Gopálpur ... { Coasting „ ...	225	2	...	...	...	...	
Gopálpur ... { Foreign „ ...	...	...	...	...	811	1,038	
Total cost ...	225	2	75	3,324	6,092	9,718	
Total tons ...	11	...	4	166	304	485	

Regarding local consumption, we are again met with the difficulty arising from want of returns. All that can be said is that on the South Indian rail-road, with a similar population, railway mileage and rent-roll, an average of 50,000 tons of seeds are moved per annum.

25. *Sugar.*—The exports of sugar in the form of jaggery are as follows. There is considerable trade in this article from Vizagapatam, where much sugar is grown of a superior kind :—

Statement showing the Exports and Imports of Sugar and Jaggery from the principal Ports along the East Coast from Kistna to Ganjam.

Names of Ports.	Exports.			Imports.			Remarks.
	Sugar, refined.	Sugar, unrefined.	Total.	Sugar, refined.	Sugar, unrefined.	Total.	
	Rs.	Rs.	Rs.	Rs.	Rs	Rs.	
1. Cocanada ... { Coasting trade ...	1	17,671	17,672	...	...	...	This information is obtained from the annual volume of sea-borne trade and navigation for 1885-86.
1. Cocanada ... { Foreign „ ...	...	3,64,303	3,64,303	1,282	...	1,282	
2. Vizagapatam { Coasting „ ...	...	...	...	...	...	...	
2. Vizagapatam { Foreign „ ...	...	3,49,357	3,49,357	...	...	...	
3. Bimlipatam { Coasting „ ...	...	4	4	...	...	...	
3. Bimlipatam { Foreign „ ...	...	5,022	5,022	9	...	9	
4. Gopálpur ... { Coasting „ ...	...	...	...	3	...	3	
4. Gopálpur ... { Foreign „ ...	300	...	300	57	...	57	
Total cost ...	301	7,36,357	7,36,658	1,670	...	1,670	
Total tons ...	15	36,817	36,832	83	...	83	

26. The highlands of Jeypore will be tapped by the branch of 50 miles that will run out from Vizianagrum. Along this branch line there will be a large traffic in hill produce, such as oil-seed, myrabolams, horns, hides, rice in husk ; while the return journey will take up cotton goods, tobacco and salt. The depôts at the foot of these hills are the emporia of trade for the immense tract of country that lies between the coast and the Nagpore plateau. Jeypore, Bustar, and Kalahandy comprise an area of 30,000 square miles with a population approaching a million souls. These countries contain boundless plains fitted for the plough, with a rainfall of 50 to 70 inches per annum, requiring only silver and population to develop into regions of enormous agricultural wealth.

27. In statement B, the traffic is calculated on the same sections used for the passenger traffic. The four first sections represent canal-borne traffic in the Kistna and Godávari districts ; the next two represent cart traffic in the Vizagapatam district ; and the last section deals with the Chilka lake traffic north of Ganjam. Of the 121 miles from Bezváda to Cocanada, 5 miles, the passage over the Godávari river, is omitted, as there are no statistics available for that portion. The remaining 116 miles of canal-borne traffic give an average tonnage of 106,344 tons per mile. On the South Indian Railway the average tonnage per mile for 1886, excluding harbour material, appears to be 81,783 tons.

In Vizagapatam the two sections taken are from Anakápalle to Vizagapatam, 20 miles, and from Bimlipatam to Párvatipur, 66 miles. The time when and the periods during which the traffic was enumerated have been explained under the accounts of the passenger traffic.

The tonnage per mile on the Anakápalle-Vizagapatam section amounts to 74,235 tons, while that on the Párvatipur-Bimlipatam section amounts to 68,000 tons.

The Chilka lake traffic between Ganjam and Puri amounted in 1864-65 to 110,000 tons per mile. Comparing now these figures with those given for the South Indian Railway, it would appear that the tonnage of goods now moving along the canals is actually greater than that carried by the South Indian Railway. There can be no mistake about the canal registered traffic, and a comparison between this traffic and the figures given for the trade of the adjacent ports goes to confirm their substantial accuracy. While the canal-borne tonnage is reckoned to be 106,344 tons, the tonnage of goods exported and imported from Cocanada in 1884-85 amounted to 135,506 tons, valued at 171 lakhs. Similar returns from Vizagapatam and Bimlipatam amount to 51,000 tons, valued at 77 lakhs, the road reckoned tonnage being 66,000 tons.

28. Putting the returns from canal (including Chilka lake) traffic and those from cart traffic side by side, we have a gross average tonnage per mile for the former of 107,583 tons and for the latter of 69,387 tons. With our present knowledge it is impossible to state how much of the canal-borne goods traffic will be secured by the railroad. We can only bear in mind Mr. Jean's remarks quoted above, and add to that opinion the fact that the canals are closed during certain months of the year.

(NOTE.—See also Mr. Walch's remarks further on.)

These months are the hot-weather months, that is the very time when the annual movement of grain, seeds, &c., is at its height. It may be fairly argued that, if in America, notwithstanding State support and perennial water communication, railways have prospered at the expense of the canals ; similar results, so far as goods traffic is concerned, will develop themselves in India, for the movements of merchandise by canal or railway are not governed by climatic or racial idiosyncrasies. The question of rates is a trade question ruled by general laws of economy which are the same here as in other parts of the civilised world. The question of time and the dictum that to the Hindu time is of no value, does not apply to the bargains of the merchant, however much it may apply to the movements of private persons. But in the latter case, as has already been pointed out, other considerations come into play which will doubtless cause preference being given by the passenger to the railway over the canal.

29. There is of course no question at all that the existing cart traffic over long leads will pass to the railway directly it is opened. Now the tonnage figure adopted per mile for the cart traffic is 69,387. The corresponding figure for rail-borne goods traffic on the South Indian railroad for 1886, exclusive of harbour material, is 81,783 tons per mile.

We therefore find that the existing cart traffic over the route of the proposed railway is only 12,396 tons less than the present per mileage tonnage of rail-borne traffic on the South Indian Railway, or, in other words, that an increase of 20 per cent. in existing traffic will bring up the cart traffic to the level of the railway traffic.

30. The figures taken therefore for goods traffic over this line are—

——	Tons.	Receipts at 8 pies per ton per mile.	Receipts per mile per week.
		Rs.	Rs.
Present canal traffic	107,583	4,483	86
Do. cart do.	69,387	2,891	56

31. Since writing the above paragraphs, I have ascertained from Mr. Walch, the Superintending Engineer at Dowlaishweram, that there is little probability of Government imposing any restriction on the competition that will ensue between the canal and the railway for the carriage of goods between Bezváda and Cocanada. He says that the canals in the Godávari are primarily irrigation canals, and that the idea of getting *direct* returns from navigation has been long given up. Indirectly they contribute to the prosperity of the country by enabling the producer to get his crops to market and port. So also the charges for navigation have amply paid for locks and other works connected with the water traffic. From another source it is stated that the rates paid by the merchants at Cocanada for canal-borne goods are very high—as high as 5 pies per ton by mile. A European merchant at that port says that the canal navigation is so unsatisfactory that the trade of the port must be destroyed unless railway extension to it is carried out. In the appendix, table D exhibits the present tariff by canal boats between Cocanada and Bezváda.

32. I regret that I have not been able to enter so fully into the detail of passenger and goods traffic of the Ganjam district as has been attempted in the case of the Godávari and Vizagapatam districts. There is a vast amount of traffic in hill produce and salt between the littoral parts of that district and the inland countries. With the Resolution of the Government of India dealing with the Benares-Puri lines, I find a paper by Mr. Risley, C.S., Assistant Commissioner of Manbhoom, in which it is stated that the salt from Ganjam penetrates as far inland as Lohardugga where it meets and divides custom with English salt imported *vid* Calcutta. It is probable, seeing that the railway distance from the East Coast salt pans to all the inland country from Nagpore to Puralia is shorter than the distance from Calcutta, that the whole population of that enormous extent of country will be supplied by the coast salt. Mr. Risley says that Chota Nagpore will take 600,000 maunds of salt and Chatisghur, with two million inhabitants, will probably take half that quantity. The Ganjam salt pans will therefore become of the first importance, and great development in the demand for salt may confidently be looked for by Government. The carriage of salt by the railway will be a very important item in the traffic returns for the northern portion of the line. It will be observed that the value of the sea-borne trade of Gopálpur is over 50 lakhs. At Cocanada 171 lakhs of goods represented 135,506 tons. Adopting this ratio of value to weight for Gopálpur (no other course of information being available), we find that the tonnage of goods in and out of that port amounts to nearly 34,000 tons per annum.

33. The railway policy of the Madras Government is guided to a large extent by considerations respecting the precautions necessary to guard districts against famine. The line now advocated is not principally a famine line. The scheme professes to take rank as a paying project. But it must not the less be lost sight of that, in point of fact, the railway will secure the district of Ganjam from famine; and it will be remembered that within the last century there have been in Ganjam four periods of famine and scarcity. The last famine was in 1866. From January to October the district was given over to all the tribulations of famine and to the campaign against it. The Government spent over three lakhs of money in the combat, and 16,707 people are reported to have succumbed to the visitation out of a population of 303,779 (*Ganjam District Manual*). In 1878 there was great fear of a famine. Distress was caused by high prices, and though the supply of grain did not fail, the people had no money for purchasing food (*Ibid.*).

In the report of the Famine Commission, part II, page 172, where mention is made of certain tracts at present unprovided with railways, and at the same time difficult of access and liable to suffer from drought, a coast line of railway in the absence of canals in recommended to connect Calcutta with Cuttack and the deltas of the Godávari and Kistna and Madras beyond.

34. Not in the least degree wishing to institute invidious comparison it is yet hardly possible to close this paper without a pardonable glow of satisfaction at the very different circumstances which environ this proposal for an East Coast Railway from those surrounding the Benares-Puri project.

That line relies for success, so far as passenger traffic is concerned, on the conveyance of pilgrims to and from Puri. There is little local traffic. There are no centres of population; no large towns adjacent to each other; no trade; no civilization. The section of the line from Panchpara to Narajon, the Mahánadi (170 miles) passes through a country with a population of only 335,917 souls, 103 miles of which are cultivated well, fairly and partially, while the remaining mileage is mostly waste and jungle. Sambalpore, with a population of 11,020, is the only considerable town, and with the exception of seven large villages, passed *en route*, the people live "in clusters of huts of no very great number." The country is wild, unredeemed from waste, unpopulated, and at least half a century behind the littoral districts of the Eastern Coast. That is a line where pointsmen will have to be protected against tigers, and where wild buffaloes will scratch their backs against the telegraph posts. The Northern Circars are, on the other hand, fully developed and densely populated. Trade flourishes and all the aims and ends of civilization are as carefully fostered, and administration is as costly and minute as in any of the districts close around Madras or Calcutta.

As I have said above, it is not possible to find a stretch of country similar to this, and hitherto unappropriated by any Railway Company within the peninsula of India; and more may yet be said, for it is quite certain that there is no such opening for railway enterprise now available in any country in the world.

VIZAGAPATAM,
3rd October 1887.

(Signed) H. G. TURNER,
Collector.

STATEMENT A.

Statement showing the Passenger Traffic on the proposed line of Railway from Bezváda to Khurada, 485 miles in length.

Particulars of each section.	Length of the line in each section.	Number of passengers.	Income from passenger traffic at 2 pies per mile per head.	Income from passenger traffic per mile per week.	Remarks.
	MILES.		RS.	RS.	
Bezváda to Ellore	37½	(*a*) 68,739	747	14·36	(*a*) These figures represent the actuals for 9 months and 12 days in 1886-87 furnished by the Government Engineer in charge of the canal and the estimated traffic for 2 months and 19 days.
Ellore to Chettipetta weir ..	40½	(*b*) 88,789	924	17·76	(*b*) These figures represent the traffic for 1885-86, and are furnished by the Superintending Engineer in charge of these canals.
Chettipetta weir to Vijeswaram.	6	(*c*) 102,361	1,066	20·50	(*c*)
Godávari river	5	..	..	..	
Dowlaishweram to Cocanada ..	32	(*d*) 64,391	670	12·88	(*d*)
Cocanada to Anakápalle ..	80½	..	..	..	
Anakápalle to Vizagapatam ..	20	(*e*) 113,244	1,178	22·65	(*e*) Represents cart-borne passengers enumerated in 1874-75.
Vizagapatam to Bimlipatam ..	20	..	..	..	
Bimlipatam to Parvatipur ..	66	(*f*) 576,561	6,006	115·50	(*f*) These figures are taken from returns maintained by tabulators employed in 1884-85 by Government in connection with the Vizagapatam-Rápur Railway project. They include all foot-passengers.
Vizianagrum to Rambha ..	168	..	..	..	
Rambha to Khurada	59½	(*g*) 180,000	1,875	36·06	(*g*) These figures are taken by the Superintending Engineer in 1863-64 (*vide* G.O., 28th December 1864, No. 3642), and represent boat passengers by Chilka lake.

(*b*) To the Superintending Engineer's figure 17,894 passengers are added on account of traffic from 1st April to 15th June 1885 and from 15th to 31st March 1886, during which the canal was closed.
(*c*) To the Superintending Engineer's figure 7,874 are added on account of traffic from 15th to 31st March 1886 and 1st to 15th April 1885.
(*d*) To the Superintending Engineer's figure 4,127 are added on account of traffic from 21st April to 15th May 1885, during which the canal was closed.

STATEMENT B.

Statement showing the Goods Traffic on the proposed line of Railway from Bezváda to Khurada, 485 miles in length.

Particulars of each section.	Length of the line in each section.	Goods in tons.	Income from goods at 8 pies per mile per ton.	Income from goods traffic per mile per cwt.	Remarks.
	MILES.		RS.	RS.	
Bezváda to Ellore	37½	85,321	* 3,555	68·36	* See remarks in column 6 of statement A.
Ellore to Chettipetta weir ..	40½	100,805	(*a*) 4,200	80·76	(*a*) To the Superintending Engineer's figures 20,293 tons are added on account of traffic from 1st April to 15th June 1885 and 15th to 31st March 1886, during which the canal was closed.
Chettipetta to Vijeswaram ..	6	122,920	(*b*) 5,121	98·48	(*b*) To the Superintending Engineer's figures 9,455 tons are added on account of traffic from 1st to 15th April 1885 and from 15th to 31st March 1886, during which the canal was closed.
Godávari river	5	..	..	..	
Dowlaishweram to Cocanada ..	32	134,882	(*c*) 5,620	108·07	(*c*) To the Superintending Engineer's figures 8,646 tons are added on account of traffic from 21st April to 15th May 1885, during which the canal was closed.
Cocanada to Anakápalle ..	80½	..	..	..	
Anakápalle to Vizagapatam ..	20	74,235	3,093	59·48	
Vizagapatam to Bimlipatam ..	20	..	..	..	
Bimlipatam to Párvatipur ..	66	67,918	(*d*) 2,829	54·40	(*d*) Besides these goods, 309,458 miscellaneous articles, such as gunny-bags, cocoanuts, bamboos and timber logs were taken along this line.
Vizianagrum to Rambha ..	168	..	..	..	
Rambha to Khurada	59½	110,000	* 4,583	88·13	

STATEMENT C.

Abstract statement showing the estimated income from Coaching and Goods Traffic on the proposed line of Railway from Bezváda to Khurada with a branch from Vizianagrum to Párvatipur.

Particulars of each section.	Length of the line in each section.	Number of passengers.	Goods in tons.	Income per mile from			Income per mile per week.			Net profits on a capital outlay of rupees per mile assuming them to be two-fifths of gross revenue.		
				Passengers at 2 pies per mile per head.	Goods at 8 pies per mile per ton.	Total.	From traffic.	From goods.	Total.	Rs. 65,000 per mile.	Rs. 75,000 per mile.	Rs. 85,000 per mile.
				RS.	RS.	RS.	RS.	RS.	RS.	RS.	RS.	RS.
Bezváda to Ellore ..	37½	68,739	85,321	747	3,555	4,302	14·36	68·36	82·72	2·64	2·24	2·02
Ellore to Chettipetta weir	40½	88,789	100,805	924	4,200	5,124	17·76	80·76	98·52	3·15	2·73	2·41
Chettipetta to Vijeswaram	6	102,361	122,920	1,066	5,121	6,187	20·50	98·48	118·98	3·80	3·30	2·91
Godávari river ..	5	..	..	..	..	..	..	..	..	..	..	..
Dowlaishweram to Cocanada ..	32	64,391	134,882	670	5,620	6,290	12·88	108·07	120·95	3·87	3·35	2·96
Cocanada to Anakápalle	80½	..	..	..	..	..	..	..	..	..	..	..
Anakápalle to Vizagapatam ..	20	113,244	74,235	1,178	3,093	4,271	22·65	59·48	82·13	2·63	2·28	2·01
Vizagapatam to Bimlipatam	20	..	..	..	..	..	..	..	..	..	..	..
Bimlipatam to Párvatipur	66	576,561	67,918	6,006	2,829	8,835	115·50	54 40	169·90	5·43	4·71	4·16
Vizagapatam to Rambha ..	168	..	..	..	..	..	..	..	..	..	..	..
Rambha to Khurada.	59½	180,000	110,000	1,875	4,583	6,458	36·06	88·13	124·19	3·97	3·44	3·04

(Signed) H. G. TURNER,
Collector.

APPENDIX A.

	Distance in miles.
Kistna District.	
Bezváda to Ellore	37½
Godávari District.	
Ellore to Vijeswaram	46½
Godávari river	(5)
Dowlaishweram to Cocanada	32
Cocanada to Tuni	40
Total ...	123½
Vizagapatam District.	MLS. FT.
Tuni to Nakkapalli	12 1
Do. to Yellamanchili	13 5
Do. to Kasimkót	11 7
Do. to Anakápalle	3 0
Do. to Aganampudi	9 0
Do. to Vizagapatam	11 0
Do. to Simhachallum Do. to Sontiyam Do. to Vangalapalem Do. to Lingannapeta Do. to Vizianagrum	... ... 36 0
Do. to Chípurupalle	19 0
Do. to Pundur	11 0
Do. to Chicacole	10 0
Total ...	136 5

	MLS. FT.
Ganjam District.	
Narsannapet	14 0
Kottahommali	10 0
Naupada	10 0
Pata Tekkali	10 0
Kasibugga	9 1
Haripuram	8 7
Kanchali	9 7
Ichápur	12 1
Berhampore	15 0
Chatrapur	14 3
Ganjam	4 5
Rambha	10 2
Panditagon	8 0
Total ...	136 2
Cuttack District.	
Barkut	7 4
Sanakalla	10 1
Tangi	10 0
Jenkiah	11 0
Khurada	12 6
Total ...	51 3
Total.	
Kistna district	37 4
Godávari do.	123 4
Vizagapatam do.	136 5
Ganjam do.	136 2
Cuttack do.	51 3
Total ...	485 2

(Signed) H. G. TURNER,
Collector.

APPENDIX B.

Particulars of each section.	Length of the line in each section.	Number of passengers per mile.	Goods in tons per mile.	Total unit mileage under passenger.	Total ton mileage.	Remarks.			
Bezváda to Ellore.	37½	68,739	85,321	2,577,712½	3,199,537½				
Ellore to Chettipetta weir ..	40½	88,789	100,805	3,595,954½	4,082,602½				
Chettipetta to Vijeswaram ..	6	102,361	122,920	614,166	737,520				
Dowlaishweram to Cocanada ..	32	64,391	134,882	2,060,512	4,316,224	MILES. 175½	Canal-borne traffic ..	Total. 18,880,884	Average. 107,583
Cocanada to Anakápalle ..	116	..	..	..	..	86	Cart-borne traffic ..	5,967,288	69,387
Anakápalle to Vizagapatam ..	20	113,244	74,235	2,264,880	1,484,700	261½		24,848,172	95,021
Bimlipatam to Párvatipur ..	66	..	67,918	..	4,482,588				
Vizianagrum to Rambha ..	..	..	..	..	..				
Rambha to Khurada ..	59½	180,000	110,000	10,710,000	6,545,000				
Total ..	..	..	..	21,823,225	24,848,172				

(Signed) H. G. TURNER,
Collector.

APPENDIX C.

STATEMENT showing the number of Shrines, &c., in the districts of Kistna, Godávari, Vizagapatam and Ganjam, and the number of pilgrims visiting them.

District.	Name of the festival, fair, &c.	The date or dates on which each festival is held.	Average number of visitors.	Remarks.
Kistna.	1. Bandar town festival.	15th full moon in the month of Chittri	5,000	These figures are taken from the Proceedings of the Madras Government, Public Department, dated 17th November 1868, No. 1421.
	2. Mohorum	14th and 15th decreasing moon of Magham	5,000	
	3. Sivaratri (Pedakullapalli).	Full moon in the month of Vysakum	8,000	
	4. Srikukalam festival ...	From 3rd to 6th increasing moon of Magham	3,000	
	5. Vellatur festival ...	From 11th to 14th decreasing moon of Magham	5,000	
	6. Sivaratri (Aravapelli).	From 9th increasing moon to 15th of Chittri	8,000	
	7. Guntúr festival ...	Do. do. do. ...	5,000	
	8. Yenamadala festival...	From 7th increasing moon to 15th of Phalgunam	4,000	
	9. Mungalageri festival.	14th and 15th decreasing moon of Magham	1,500	
	10. Sivaratri (Kottapa Konada).	From 7th increasing moon to 15th of Vysakum	60,000	
	11. Ponnur pilgrimage ...	14th and 15th decreasing moon of Magham	2,000	
	12. Sivaratri (Amrávati).	24th December of every year ...	2,000	
	13. Festival (Cherungepuran).	14th and 15th decreasing moon of Magham	2,000	
	14. Festival (Bezváda) ...	Full moon of Vysakam ...	8,000	
	15. Festival (Vallur) ...	10th increasing moon of Asrija.	5,000	
	16. Festival (Jaggiapeta).	14th increasing moon of Vysakum	3,000	
	17. Festival (Vedadri)	Five days, commencing 14th decreasing moon of Magham.	1,000	
	18. Sivaratri (Mukteswaram).	From 11th decreasing moon of Pushya to 7th increasing moon of Magham	6,000	
	19. Festival (Agnipalli)...	From 11th decreasing moon of Pushya to 2nd increasing moon of Magham	10,000	
	20. Festival (Weyone) ...	11th to 15th decreasing moon of Magham	4,000	
	21. Festival (Ailur) ...	In the early part of February...	4,000	
Godávari.	22. Antravedi festival (Narsápur taluk).	21st February	10,000	
	23. Kotipalli festival (Rámachandrapur taluk).	From 10th to 15th of the increasing moon in the month of Chittri	50,000	
Vizagapatam.	24. Marriage ceremony of Varaha Lakshami Nrusinhaswami.	The third and two following days of the increasing moon, month Vysakum	5,000	
	25. Chendanayatra or Sandalwood-powder ceremony of Varaha Lakshami Nrusinhaswami.	From 2nd to 12th of the increasing moon in the Persian month of Mohorum	9,000	
	26. Mohorum feast ...		10,000	

Statement showing the number of Shrines, &c., in the districts of Kistna, Godávari, Vizagapatam and Ganjam, and the number of pilgrims visiting them—*cont.*

District.	Name of the festival, fair, &c.	The date or dates on which each festival is held.	Average number of visitors.	Remarks.
Vizagapatam—*cont.*	27. Marriage ceremony of Padmanabhaswami.	From 11th to 15th of the increasing moon in the month of Phalgunam	120	
	28. Sivaratri feast (Poonyageri).	From 12th to 15th of the decreasing moon in the month of Magham	10,000	
	29. Sivaratri	On the 14th and 15th of the decreasing moon in the month of Magham	5,000	
		Do. do. do. ...	8,000	
	30. Oottaravahiniyatra ...	From 11th to 15th of the increasing moon of Phalgunam	8,000	
	31. Marriage ceremony of Venkataswaraswami.	From 1st to 10th of the increasing moon of Asviyujan ...	2,000	
	32. Dasara feast	For three days after Pongal feast	200	
	33. Theerthum	On the 11th and two following days of the decreasing moon in Phalgunam	7,000	
	34. Feast of three goddesses—Nukalamma, Chikkalamma, Duddu Atchamma.	Once in two years from 25th November to 10th December.	1,000	
	35. Paramatamma feast ...	From 1st to 10th of the increasing moon of Asviyujan ..	6,000	
	36. Ramalila Vootsavam or Dasara feast.	14th and two following days of the decreasing moon in the month of Magham	2,000	
	37. Sivaratri	From 2nd to 10th of the increasing moon of Ashadam ...	5,000	
	38. Car feast of Jaganathaswami.	From 11th to 15th of the increasing moon of Phalgunam	4,000	
	39. Dolotsavam	No fixed date, but for 15 days a year	1,200	
	40. Village goddesses' feast.	From 2nd to 11th of the increasing moon in Ashadam ...	3,000	
	41. Car feast	Do. do. do. ...	2,000	
	42. Do.	From 3rd to 11th July ...	500	
	43. Do.	Five days in every year, from the 11th of Phalgunam Sudda, *i.e.*, about February	15,000	
	44. Dolayatra			
Ganjam.	45. Sivaratri	The three last days in every year of the month of Magham, *i.e.*, about the end of February	10,000	
		Total ...	325,520	

(Signed) H. G. TURNER,
Collector.

APPENDIX D.

TABLE of rates by Canal Boats between Cocanada and Bezváda.

Articles.	From Bezváda to Ellore.	From Bezváda to Dowlaishweram.	From Ellore to Dowlaishweram.	From Bezváda to Cocanada.	From Ellore to Cocanada.	From Dowlaishweram to Cocanada.
	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
Castor seed, gram and seeds, bags 164 lb. ..	0 1 6	0 3 0	0 1 6	0 4 0	0 3 0	0 1 3
Cotton in bales, 300 lb.	0 4 0	0 8 0	0 4 0	0 8 0	0 8 0	0 3 0
Do. 400 ,, ...	0 5 0	0 10 0	0 5 0	0 10 0	0 10 0	0 4 0
Tobacco in bundles, 190 lb.	0 2 0	0 4 0	0 4 0	0 6 0	0 4 0	0 2 0
Coriander in bags, 164 ,, ...	0 2 0	0 4 0	0 4 0	0 6 0	0 4 0	0 2 0
Chillies in bundles, 300 ,, ...	0 5 0	0 10 0	0 5 0	0 15 0	0 10 0	0 4 0
Skins per bale	0 4 0	0 8 0	0 4 0	0 12 0	0 8 0	0 4 0
Ghee, oil, in casks	0 8 0	1 0 0	0 8 0	1 4 0	0 8 0	0 4 0
Gunnies per bale	..	..	..	1 8 0	1 0 0	0 8 0
Piece-goods per bale	..	..	..	..	1 0 0	0 8 0
Twist per bale	..	..	..	..	1 0 0	0 6 0
						0 6 0

(Signed) H. G. TURNER,
Collector.

No. 197 D.

For favor of his views on para. 2 of Government of India letter, No. 326 R.C., dated 24th April 1889, herewith with all papers and plans.

(Signed) C. J. SMITH, Colonel, R.E.,
Joint Secy. to Govt., P.W.D.,
Railway Branch.

18th May 1889.

To the Chief Engineer for Irrigation.

Note by the Acting Chief Engineer for Irrigation.

As it is now many years since the roads in the Godávari and Kistna districts passed out of the hands of the Department of Public Works, I cannot give any detail information about the present state of the so-called "road" between Bezváda and the Godávari river; it may best be obtained from the "District Boards." I believe, however, that I am quite correct in saying * that as a continuous road suitable for cart traffic it does not exist, that the greater part of it is merely an unmetalled and unbridged track.

* See also para. 6 of memorandum which accompanied letter as Superintending Engineer, I Circle, No. 159, dated 11th April 1888, with Proceedings of Madras Government, No. 391 R., dated 10th May 1888.

2. In the Local Fund budgets of the two districts for the current year appear the following items which I believe apply, and are all that apply, to the line of communication in question :—

Kistna District Budget.

Improving road from Bezváda to Perikeed—

	RS.
Estimate	
Expenditure to end of March 1889	80,100
Estimated expenditure in 1889-90	9,980
Maintenance of road, Bezváda to Perikeed (26 miles)	3,000
	2,600

Godávari District Budget.

Constructing road from Perikeed to Ellore (about 11 miles)—

Estimate	
Expenditure to 31st March 1889	None.
Estimated expenditure, 1889-90	Do.
Constructing road from Ellore to Bhimadole (about 12 miles)—	
Amount of estimate	2,000
Expenditure to end of March 1889	7,900
Estimated expenditure, 1889-90	3,000
Maintenance of trunk road (between the Godávari river and Ellore) (about 47 miles)—	3,500
Estimated expenditure in 1889-90	4,000

3. It would thus appear that portions of the road are under construction and improvement in a desultory manner, and that the maintenance grant for the whole distance from Bezváda to the Godávari river, some 85 miles, is only Rs. 6,600.

4. From my general knowledge of the state of affairs and of the country, I believe it would cost at least 10 lakhs of rupees to make a first-class road between the two places, and for the objects with which we are dealing none but a first-class road need be considered.

5. But, even were such a road constructed, would the objects aimed at be obtained? They would not. Whilst the canals were open (about nine months in the year) not a single passenger, not a ton of coal, not a bag of grain or oil-seed, not a bale of cotton or piece goods, would be carted from Bezváda to the Godávari or from the Godávari to Bezváda, and the canals between the two points would not be relieved of the traffic which, as already * pointed out, is even now too great for them and which when augmented by the stimulus that the railway to Bezváda will create, and by the Singareni coal transport to its sea-board outlet, Cocanada, will gorge the canals and will seriously interfere with the irrigation dependent on them.

* See memorandum above referred to.

6. And even when the canals were shut, but little of the merchandize that wished to pass between Bezváda and its sea-port, Cocanada, would be able to bear the cost of cartage; it would merely accumulate at the depôts to be poured on to the canals in an overwhelming stream when they reopened.

7. I have no hesitation in saying that a railway to Cocanada is an absolutely necessary sequence to the construction of the two lines to Bezváda where they are now, as it were, left hanging up in the air.

(Signed) G. T. WALCH,
Ag. Chief Engineer for Irrigation.

OOTACAMUND,
20th May 1889.

Forwarded to the Joint Secretary to Government, Railway Branch, in accordance with his request, dated 18th instant.

(Signed) G. T. WALCH,
Ag. Chief Engineer for Irrigation.

20th May 1889.

Draft telegram from the Joint Secretary to the Government of Madras, Public Works Department, Railway Branch, to the Secretary to the Government of India, Public Works Department, Simla, dated 31st May 1889.

Your letter No. 326 R.C., April 24th. This Government deems early construction of extension to Cocanada of supreme importance and urges early further extension to Vizianagrum as remunerative line. This Government will pay from Provincial balances cost of survey as far as Bengal frontier on condition that amount be refunded if a company undertake construction and that India provides survey staff next December to complete in one season. Letter will follow later.

Order—dated 8th June 1889, No. $\frac{648}{A}$ R., Public Works.

Ordered that the following despatch be addressed to the Secretary of State for India.

(True Extract.)

(Signed) C. J. SMITH, Col., R.E.,
Joint Secy. to Govt., P.W.D.,
Railway Branch.

Despatch from the Right Honorable the Governor in Council, to the Right Honorable the Secretary of State for India, dated Ootacamund, 8th June 1889, No. $\frac{9}{648}$ R.

Adverting to para. 3 of your Lordship's despatch No. 3, Revenue, dated 7th February 1889, on the subject of the threatened scarcity in Ganjam, we have the honor to forward, for your Lordship's information, copy of a telegram we have to-day * sent to the Government of India on the subject of our proposal for carrying the railway northwards from Bezváda.

* 31st May 1889.

2. Our views on this proposal will be set forth at length later on in a letter to the Government of India, which shall be likewise forwarded for your Lordship's information.

Read also the following papers :—

Telegram from the Secretary to the Government to India, Public Works Department, to the Joint Secretary to the Government of Madras, Public Works Department, Railway Branch, dated 15th June 1889.

Your telegram 31st May. How many officers do you consider necessary for East Coast Survey ?

Telegram from the Joint Secretary to the Government of Madras, Public Works Department, Railway Branch, to the Secretary to the Government of India, Public Works Department, Simla, dated 20th June 1889.

Your telegram 15th instant. East Coast Railway Survey we estimate that four survey parties under a Superintending Engineer could survey and finally locate line Bezváda to join Bengal-Nagpur Extension to Puri in six months to which working season for major portion is limited. Staff required for direction one Superintending Engineer and one Assistant ; and for field work four Executives, twelve Assistant Engineers, and six Upper Subordinates with eight Native Surveyors.

Telegram from the Secretary to the Government of India, Public Works Department, to the Joint Secretary to the Government of Madras, Public Works Department, Railway Branch, dated Simla, 29th June 1889, No. C. 126.

If urgently necessary to supply relief works in Ganjam, do you see your way to getting the line of railway proposed for East Coast laid out and earthwork started from Cuttack along Chilka lake to Ganjam and then by Gopálpur to Naupada could you lay down line to be taken or, if country is easy, could officer be trusted to select best line between these points ? Can you supply officer and survey establishment for the work ?

Telegram from the Joint Secretary to the Government of Madras, Public Works Department, Railway Branch, to the Secretary to the Government of India, Public Works Department, Simla, dated 4th July 1889.

Your telegram C. 126, 29th. Only portion of East Coast line, north of Naupada, that could perhaps safely be located without further investigation is about 45 miles between Harirajpur and Burcool in Orissa ; here earthwork will be exceptionally light. This Government considers that for present purposes sufficient relief works are otherwise forthcoming ; should present monsoon fail, line in Ganjam can be located in time for consequent relief operations.

ORDER—dated 6th July 1889, No. 754 R., Public Works.

Ordered that the Government of India and the Secretary of State for India be addressed.

(Here enter No. 755 R., dated 6th July 1889.)

(True Extract.)

(Signed) C. J. SMITH, Colonel, R.E.,
Joint Secy. to Govt., P.W.D.,
Railway Branch.

To the Consulting Engineer for Railways.
" Revenue Department.
" Chief Engineer for Irrigation.
" Financial Department.
" Military "

Exd. J. Henricus.
Spare Copies

RAILWAY.

Govt. of {1889} Madras.

PUBLIC WORKS.

Dated July, 6th.

Recd. *Encl.*

G.O., 6th July 1889, No. 754 R.

JULY.

East Coast Railway

Ordered that the Government of India and the Secretary of State for India be addressed in respect to the starting of the — as a famine-relief work.

PUBLIC WORKS DEPARTMENT.

Railways.

No. 755 R.

FROM

THE JOINT SECRETARY TO THE GOVERNMENT OF MADRAS,
Public Works Department, Railway Branch,

To

THE SECRETARY TO THE GOVERNMENT OF INDIA,
Public Works Department.

SIR,—I am directed to acknowledge the receipt of your letter No. 326, R.C., dated 24th April 1889, asking for the views of the Government of Madras upon the report of a reconnaissance of the East Coast Railway line by Sir Guildford Molesworth and Colonel C. J. Smith, R.E., and in reply to offer the following observations.

2. The proposed railway may be considered either as a local line or as a through communication between the northern and southern provinces of India by the East Coast. In the latter aspect, it is no doubt important and was contemplated as one of the main arterial lines of India; but at the present time, it would, if constructed, leave so much to be done to complete the through communication that it suffices to note the fact.

Considered as a line to serve local interests, it will eventually be divided into three sections:

(1) Bezvada to Coconada 124 miles with a bridge over the Kistna;

(2) From Samalcottah through the Vizagapatam district to Vizianagram 127 miles, with a possible branch to Parvatipur about 50 miles;

(3) From Vizianagram through Ganjam and Orissa to Cuttack 258 miles, of which about 188 lie within the Madras Presidency.

3. With regard to the first of these sections I am to say that in the opinion of His Excellency the Governor in Council, its construction is a necessary consequence of the opening of two lines of railway converging at Bezvada. These lines must have an outlet to a seaport and cannot stop at the edge of the rich and populous tract—the Kistna and Godavari deltas—which they were designed to tap, and with which, in the absence of a railway continued to the coast, their communication even by canal is, and must continue to be, very inefficient. Such a railway could be taken either to Masulipatam or Coconada, but the latter is obviously to be preferred. Its trade is now to that at Masulipatam as 3 to 1, it is a much better port and a line to it will draw to itself the produce of both deltas, instead of one, and that the smaller, which would alone be served by a line to Masulipatam. The proposed railway to Coconada will, the Government does not doubt, prove remunerative, serving as it will one of the richest and most progressive tracts of country in India, and furnishing an outlet for the produce of the interior brought down to Bezvada by the Hyderabad and Bellary-Kistna lines.

Besides paying in itself, it will largely increase the traffic on these two lines, in both of which the Government possesses a considerable interest, and will augment the value of the Bellary-Kistna railway as a famine protective work.

4. The alternative communication, on which the Government of India seemed disposed to rely, *viz.*, the navigable canals and road communication between Bezvada and the Godavari at Rajamundry, will, this Government unhesitatingly asserts, prove inadequate. The latter does not exist. The great northern trunk road between these points is only, except for a short distance from Bezvada, an unmetalled and unbridged track, and to complete it as a first class road would cost, such are the difficulties of road construction in that region, at least 10 lakhs of rupees. This outlay would be almost entirely thrown away; because the road would not be used at all, while the canals are open, cart transport costing 2½ annas per ton per mile, against 5 pies by canal boat; and but little, while the canals are closed, as most of the produce for transport would either be hurried into the canals before the closing, or held over till they reopened. The Kistna canals are closed for three months for want of water, and the canal from the Godavari to Ellore for six weeks for clearance and repairs; so that water communication can be counted on for nine months only, and the failure occurs at the season when most produce is being moved. It will be seen from Mr. Walch's note, printed with the reconnaissance report, that even now the extent to which the canals are used for navigation impedes their usefulness to serve for their primary purpose, and prevents extension of irrigation to an appreciable degree, thus entailing some loss upon the State. The canal traffic will receive a great stimulus from the opening of the railways to Bezvada and the injurious effect upon irrigation will therefore be intensified in the future. If however, the proposed railway is constructed, there can hardly be a doubt that it will draw to itself the bulk of the through traffic, even if the rates for goods and passengers were far higher, which they need not be, than those now charged for water transport.

5. The opening of the Hyderabad line will create a largely increased demand for East Coast salt which will now probably regain the ground from which in recent years it has been driven by rail-borne salt from Bombay. The salt factory of Pennugudúru, close to Coconada, is capable of indefinite extension, and the salt from it, together with the produce of the deltas, will furnish loads for the wagons which will bring the cotton, seeds, and coal from the interior to the sea port. The reconnaissance report shows that the line can be constructed at a moderate mileage rate, and that favourable conditions exist for the establishment of a steam ferry across the Godavari.

6. The foregoing considerations furnish in the opinion of the Governor in Council, an unanswerable case on its own merits for the immediate construction of this section of the proposed East Coast Railway; but a further argument in its favour is, that it, together with a bridge over the Kistna, is essential to enable the Bellary-Kistna Railway to fulfil its purpose as a famine protective line. The

* 28th July 1883, No. 114.

* Despatch from the Government of India to the Secretary of State, submitting the project for sanction, shows that rail communication across the river Kistna was deemed requisite for the efficiency of the line; that a light bridge upon the anicut was then considered practicable; and that the eventual necessity for a permanent bridge was recognized as probable. The idea of a bridge upon this anicut cannot be entertained; any kind of temporary line on or alongside of it might jeopardize the work and would interfere with irrigation interests by hindering the temporary dams annually erected; and even if permitted in the face of these objections it could only be used for a very limited period in each year. The reconnaissance report also shows that for want of water a ferry could not be worked in the dry season. The existing means of conveying traffic across the river are very imperfect and insufficient and would probably fail at a critical time when the full power of the railway would be wanted to convey grain to famine stricken districts. The

Governor in Council is for these reasons most strongly of opinion that a permanent bridge across the Kistna is required if only on protective grounds; and the case is greatly strengthened when the interests of the coal traffic, which may be expected from Singareni and on which the economical working of the Bellary-Kistna and Madras railway North-west line depends, are taken into account.

7. The second section of the East Coast Line is also recommended on the ground of its probable paying character. The tract of country through which it will pass is rich and populous, and the figures given in Mr. Turner's Memorandum may be accepted as showing the existence of a traffic undeniably great at present. Figures of the kind are, it must be remembered, always but a poor index of what may be hoped for when the line is opened and a set of conditions vastly more favourable thereby introduced. The marginal figures taken from the last census report show the population per square mile of the tracts affected, some of which are among the most populous in India. There is a considerable movement of labour between the most populous parts of Vizagapatam and the Godavari and Kistna deltas at certain seasons, and there is good reason to anticipate a large coaching traffic on this section of the proposed line. The facts stated in the reconnaissance report and in Mr. Turner's Memorandum as to goods traffic tend to a similar conclusion. As to competition by the sea route no apprehension need be entertained. There is no seaport and hardly any local coasting trade between Coconada and Vizagapatam, and the proposed line is, besides, carried well inland. As to the coasting steamer trade, as affecting both this section and the more northern portion of the East Coast Railway, it may confidently be stated that the railway will defeat the sea route. The disinclination of the natives for sea voyages, the high freights, the risk and uncertainty, and above all the excessive landing and shipping charges, will turn the scale in favor of the railway. The case of the Bombay and Baroda railway shews that in circumstances much more favourable than obtain on the East Coast, a sea route cannot compete with a coast railway in this country.

	Population per square mile.
Pittapur	341
Tuni	208
Golconda	607
Sarvasiddi	380
Aunkapalli	421
Vizagapatam	602
Vizianagram	551
Gajapatinagar	336
Salur	1,257
Bobbili	607
Parvatipur	1,224
Palkonda	1,214

8. The proposed branch from Vizianagram to Parvatipur has been already surveyed and will serve the richest part of the Vizagapatam district. His Excellency the Governor in Council is clearly of opinion that a branch in this direction, whether from Vizianagram or from some point further north, ought to form part of the main project. Parvatipur and Salur are important depots for the trade between the Central Provinces, the hill tracts, and the coast; and a line to serve them would secure a large and probably remunerative traffic. Whether the main line cannot be carried further west than the alignment proposed and a shorter branch, which will better serve traffic between Parvatipur and the north, cannot be devised, is a question which can only be resolved by detailed survey.

9. The deltaic and the Vizagapatam sections form about half of the East Coast project and this Government has no hesitation in recommending that immediate measures be taken for the construction of the line so far, whether as a State line or under a private company; but the advisability of undertaking the third or Ganjam-Orissa section depends mainly in the opinion of His Excellency in Council on the probability of the establishment of through railway communication between south and north by the connection of Cuttack with some point on the Bengal-Nagpore line.

Taken by itself this section is not likely to prove remunerative; as the Ganjam District, though populous, is poor and backward. For a considerable distance the line will be forced by the hills to within a few miles of the sea and close to the Chilka lake. The chief arguments for its construction are, that it will serve to protect the district of Ganjam from famine and tend to develope the whole

country, but the circumstances of the Ganjam District in regard to famine protection will be improved by the completion of the Rushikulya project and the protective argument, taken alone, will hardly, in the opinion of the Governor in Council, be sufficient to justify so large an undertaking as the construction of 258 miles of railway.

The northern portion, that from Berhampore to Cuttack or Kurda, will be the most valuable from a protective point of view, as, owing to the usual conditions of prices and to the preference of the people, grain will in seasons of scarcity be drawn to Ganjam from the north, rather than from Vizagapatam or Godavari. Besides pilgrim traffic, which will doubtless be large, there will be a good salt traffic from Ganjam to Orissa on the north, and also from the factories at Naupada and Calingapatam southwards to Parvatipur for the Central Provinces. There will of course be considerable administrative advantage in the establishment of regular and certain communication with a district so remote and needing so much attention; and the construction of the line would enable the Government to abolish Berhampore as a Military Station, a measure much desired in the Military Department. If the Ganjam Orissa section of the East Coast Railway were alone wanting to complete a through communication, its construction would become an essential necessity and if a private company were to be formed to undertake the whole line from Bezvada to Cuttack, it would, in the opinion of the Madras Government, merit the usual assistance and support from the Government of India for this section as well as for the other two.

10. On the question of gauge, the Kistna bridge should be of the metre gauge. As regards the rest of the line the arguments in favour of the standard gauge appear to His Excellency in Council to preponderate, notwithstanding the increase of cost, amounting for the whole project to 80½ lakhs. Were there any likelihood that the railway would not eventually be extended beyond Vizianagram, financial considerations and the advantage of unbroken metre gauge communication between the Ceded Districts and their source of supply might possibly dictate the adoption of the metre gauge, but the extension northwards will doubtless be only a matter of time. The branch from the Bengal-Nagpore line to Pooree will no doubt be on the standard-gauge, and as at the southern end more traffic will come to the line from the standard-gauge Hyderabad line than from the narrow-gauge Bellary-Kistna line, the adoption of the standard gauge throughout appears advisable.

11. His Excellency the Governor in Council is so much impressed with the importance of railway extension in the Northern Circars, that, with a view to further this object, he is prepared to meet the cost of a complete survey, either of the whole East Coast line or of a portion, as the Government of India may decide, from the accumulated balance of Provincial funds; on the understanding that if the project is taken up by a private company, the cost of the survey shall be charged to the capital raised and repaid to the Provincial funds. The Government of India has already been informed by telegraph of this offer, and I am to express a hope that the Government of India will see fit to accept it, and to arrange for the vigorous prosecution of the work during the next working season. I am to add, with reference to my telegram dated 31st May 1889, that, in the opinion of this Government, the Superintending Engineer who is to supervise the survey should be detailed for the work a couple of months at least before the field work begins.

I have the honor to be,
Sir,
Your most obedient servant,
(Signed) C. J. SMITH, Colonel, R.E.,
Joint Secy. to Govt., P.W.D.,
Railway Branch.

OOTACAMUND,
6th July 1889.

RAILWAY.

Gobt. of {1889} Madras.

PUBLIC WORKS.

Dated July, 6th.

Recd. *Encl.*

G.O., 6th July 1889, No. 754 R.

JULY.

East Coast Railway

Ordered that the Government of India and the Secretary of State for India be addressed in respect to the starting of the —— as a famine-relief work.

RAILWAY.

Gobt. of {1889} Madras.

PUBLIC WORKS.

To

THE SECRETARY TO THE
GOVERNMENT OF INDIA.

Dated July, 6th.

Recd. *Encl.*

G.O., 6th July 1889, No. 755 R.

JULY.

East Coast of India Railway.

Offering certain observations upon the report of a reconnaissance of the—————by Sir Guildford Molesworth and Colonel C. J. Smith, R.E.

RAILWAY.

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Offering certain observations upon the report of a reconnaissance of the———————by Sir Guildford Molesworth and Colonel C. J. Smith, R.E.

Copy of Notes and instructions made by Colonel Smith for the guidance of the Engineer in Chief East Coast Railway

Govt. of

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To

The

Dated July, 6

Recd.

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Notes

The alignment from the Bezwada Station will probably be determined mainly by the selection of the best site for crossing the Budimer river; the country is level and open and the line must keep north of the Ellore canal all the way.

No difficulty in finding good station site at Ellore on or near parade ground with goods siding and wharf wall below the lock.

Country still level the whole way to 30th mile of canal.

Line should, apparently, leave the canal a mile or two beyond Goondagole and run as straight as practicable to Chagulloo thence to ferry on the Godaveri.

Wadapillee appeared from the information given to offer the promise of deepest water all the year round on the right bank of the Godaveri (but this has since been questioned) and the creek at the back of Dowlaishwaram Hill the best terminus for the left bank.

It appears that there is insufficient water in the hot season for a ferry immediately at Rajahmundry itself.

There did not appear to be much wet cultivation to cross between Bezwada and Wadapillee within site of the canal country however is cultivated and level throughout.

The crossing among the tanks between Bemedavole and Kovvur must be left for future decision after examination and survey a fairly direct line seems practicable.

From Rajahmundry the line must go to Samulcottah (1) to shorten branch to Coconada. (2) to keep in touch with canals. (3) to serve Samulcottah itself. A direct line to Kattipudi would make that place the station for Coconada and the whole delta.

Line can be taken between Samulcottah and the canal, station might be on the high ground in rear of Samulcottah near old lines with siding to canal wharf.

Coconada branch must take off immediately after crossing the stream that passes under the canal and run straight to Coconada Light House or thereabouts.

From Samulcottah to Pittapoor and perhaps beyond, the line will run over wet cultivation, after that over fairly level ground with easy gradients to Tuni. Before reaching Tuni the line will pass through a gap between hills near Chamavaram and thence to west of Tuni.

The line after leaving Tuni can pass to the west and clear of the range of hills through which the road to Nakkapilli passes and to the west of the Pedagummalur Hill and to the west again of the little hill alongside the road opposite Lopaka on the map and thence to the gap between the hills a mile or so south of Yellamanchili which appears to be an obligatory point.

From Yellamanchili the line will run near Ameansaibetta (on map) keeping to the west of the Sarada river close to Kasimkota and will cross the river

river upstream of the Anakapally Road Bridge.

A direct line might be taken from Juni to Punchadara at foot of a large range of hills to the west of it (crossing the trunk road not far north of Kamproln (on map)) and thence to a river crossing near Jungalam (on map) to join in with Cregeen's trace. Such a line would run close to the east of the Pennamudka Hill and pass through a gap between hills apparently near Pairavadda on the map. This line although adopted for the report is not recommended as it avoids Anakapally.

The line can be taken and is recommended from Anakapally by Aganampudee to join Cregeen's trace by the same river crossing as above; but as at this time the direct course from the main line from Anakapally to Vizianagram was favored, the river crossing was not actually inspected.

The following traces were considered:-

1. As above mentioned from Juni to Vizagapatam by Pancha dara.

2. Juni to Anakapally, thence by by Aganampudee to Vizagapatam.
3. Juni direct by Anakapally to Vizianagram - with a branch to Vizagapatam either from a point a mile or two north of Sabbavaram Bungalow or from Kottavalsa.
4. Trace No 2 is recommended continuing the main line from Vizagapatam to Kotavalsa or thereabouts.

For trace No 3 direct from Anakapally to Allamanda the following appear to be obligatory points.

1. A saddle between the hills near or somewhat north of the village Gundavadpalem (on map)
2. The shoulder of a long range of hills near Luggachettipalem.
3. The saddle a little west of Bodavulsa - a hill with a small pagoda on it.
4. The shoulder of the range ending at Rajaputrepalem.
5. The small tank north of Nimilipal (due west of Datte) this appears to be the lowest point of the water shed

From

From this watershed near Nimilipal the line may take either of two directions in approaching Alamanda, a low level or a high level one, the latter would gradually work back to the direction of the present old road and pass to the east of Alamanda Hill; the former would run on a lower contour and pass to the west of Alamanda town. From either the line would apparently best make for a point close to the west of the twin hills near Kuttur, which is close to and at the foot of these hills, about the middle of them, not as shown on the map. The line will pass close to and east of Bimasunghi to a small hill on the left bank of the river where rock foundation will be obtainable but a straighter line than this may be possible.

From this bridge site to Vizianagram the line can be taken either on a high level contour to pass between the Cantonment and the large tank or on a lower level to skirt the parade ground to the west of it, and gradually rising to the watershed near the Tannery to the west of which a fairly good station ground can be found a little at a mile from the Cantonment

Cantonment and within 1½ miles of the clock tower. Such a station ground would meet the probable expansion of the town in this direction and facilitate the crossing of the head of the valley down the north side of which the line must descend to the gorge. From this gorge the line has to ascend to the watershed near Chipurupilly; it might either apparently keep east of the road for some miles and then cross it a few miles south of Chipurupally or rounding the hill at the gorge keep at its foot on the right bank of the river as far as the neighbourhood of Gundredu, there cross the river and ascend the valley to a point within a mile north of Chipurupally. thence pass near Sambhana to the lowest point of the next watershed near a village called Vendota, passing a mile or more north of Bhimavaram (on the map) not far from Naduvalasa and Lutchmursimpuram, but the names on the map could not be identified on the ground. The point for crossing the watershed appeared to be within a mile of the foot of the conical hill forming the northern extremity

extremity of the range. The country between the gorge and this point requires careful investigation. The Barometer appeared to suggest a difference of level between Sompi at the mouth of the gorge and Chipurupally of 260 feet.

A gap in the hills south of Chipurupally and east of the road was inspected but the distance from the gorge to it appeared too short to permit of an easy gradient through it and the country north of it between it and Sambham is not promising.

There are three traces worth investigating (1) one west of the road altogether by Gundredu (2) one east of the road crossing it about 4 miles south of Chipurupally and continuing west of the road to one mile north of Chipurupally. (3) One east of the road passing through the aforesaid gap and making for Sambham. The first seems most promising, the third the least so.

From near Bhimavaram on the watershed between the Gosthani and the Nangulia rivers, the line has to make for the lowest point of saddle ground between the Nangulia

Nangulia and the Vamsadhara rivers.

This appears to be near a small pariah village called Krishnapuram Malapalem, a mile or so north of Chintāda on the map.

Such a line would pass near Siripuram.

From the Krishnapuram Malapalem the line can go pretty straight to Thelara and passing north of the Pedda Bomady Hills must make for the rocky ridge 1/2 a mile or so south of Antākam (on map) skirting the hills near Podapalāk (on map) any trace inland (to the west) of this appeared beset with difficulties.

The line from Antākam will skirt the swamp - pass east of the high ground near Gopalpuram, and on to near Jalagam (on map) near the road from Naupada to Rajunathapuram (Jetkali) thence to the Bendigeddy river keeping west of the Bendy Hill range.

There appears to be a watershed not delineated on the map between Pala Jetkali and Bendy with two hills on or near it, close

to

extremity of the range. The country
between the gorg
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which the line would probably
pass but the probable alignment
was only judged from the road.
The reconnaissance was directed
towards a brace passing east of
Bendy Hill range.

After crossing the Bendy
river the next obligatory point is
the watershed near a village
called Peintlybudra.

It appears as if a brace could
be found to the west of the present
trunk road and crossing it some-
where south of Kassibugga, round-
ing the base of the Peintlybudra
Hill and crossing the watershed
beyond, either just above the larger
of two tanks (pretty close together
and on about the same level), or
just above the smaller one or
possibly, following the larger valley to the
east of these not far from Bada-
paudoo. The line must make
its way down one of the affluents
of the Mohindratanya.

The hydrographic details on
Prominance sheet are at fault
the watershed the brace from Kassibugga
and the Nanjud to Cunchilli will
has to make for more investigation
watershed sufficed for on
the

the reconnaissance. The watershed
should be visited at the point above
indicated and experimental levels
run thence north and south.

The Mohindratanya will be
crossed west of the Trunk road
and thence the line can be taken
to east of the high ground near
Colam up to the watershed near
the public bungalow at Cunchilli.

On leaving Cunchilli the line
will apparently keep to the west of
the trunk road making for the
eastern face of the Itchapoor Hill,
between which and the village it
will pass.

From Itchapur the line has to
rise to rather a difficult watershed
near Manekapoor (on the map) where
there is a rocky saddle to be cut
through. The brace should apparently
keep west of the road to somewhere
near Purshutoopoorum then cross the
road and work up the valley to the
east of it and cross saddle
keep east of the watershed Ber-
hampore is reach on the map this dif-
ficult country fi and Bendy the road.

Beyond near it, close and before
reaching Chatrapur to is a diffi-
cult watershed to be crossed.

The

The point to make for appeared to be a small hamlet of which the name could not be ascertained, about ½ mile west of the road about abreast of the 9½ mile, near Soondera pully. To gain this point the line will probably have to be kept south of Berhampore and east of the trunk road until near the northern most of the two roads connecting Gopalpore with the trunk road; thence it will be kept west of the trunk road.

From this watershed the line has to descend to the Rushkuliya river in probably a distance not exceeding seven miles - it will apparently pass at the foot of the spur on which stands a Bungalow and descend along the high ground on which runs the trunk road, keeping to the west of it, to a bridge side not far upstream of the present ford.

The watershed between Berhampore and Chatrapur will require thorough investigation before the line is laid out beyond the former town.

From the Rushkuliya river the line can run pretty straight

to

to Hoomma beyond which it will cross the road and work up to and down the watershed from the neighbourhood of Soobliah (on map) to the Chilka Lake keeping east of the road. Passing between Minchin's bungalow and the lake it will skirt the latter, at a short distance from the shore making for the western shoulder of a whale backed hill on a promontory through or over which the line will probably pass. It will then skirt the lake closely to the passage through the Tornalah isthmus and thence run along the margin of the lake probably cutting into spurs here and there to provide material for banking the little bays.

It is possible that a straight line through the lake across the island avoiding the detour by Casapoor might cost less, this is worthy of consideration. It will then round the head of the bay between Warradameslee and Casapoor near which it will begin to rise, running pretty parallel

to

to the shore at first until sufficient height is attained to cross the undulations of which there appear to be four between Cossipoor and Balantrā. The line will be in alternate bank and cutting but apparently of moderate character.

From the neighbourhood of Balantrā the line will again descend to the Chilka Lake which it will skirt running generally parallel to the Trunk road round the end of the hill range and closing on the Lake near Potbero colāh (on map) and thence to Rahonbede.

Passing between the Chilka Lake and Potberocolah and between Chatrapur and Noyree it will make for Gurrkohorie or a little west of it over a low crossing of the saddle connecting Kohoree with a small hill in the direction of Soonakulla (on the lake) and thence to Monghijura where it must pass between the hills and the lake.

From Monghijura the line can be taken pretty straight to the shoulder of the hill near Cossipore, not far from Rantrāpoor.

From this the line will probably have to travel westward of a direct line to near Gurr Narsingurr to keep it above the inundation line of the river Dyah.

Thence it should sweep round on the best ground available to get the best section for mounting the low watershed close to the South of Benapongree and thence along high ground out of reach of Dyah floods up to the watershed near the hill at Suragur (on map).

The line will probably cross the watershed in the neighbourhood of a village named Borapuddha or between it and Haripur (neither marked on map).

From this the line will sweep round on tolerably high ground to keep it above Dyah floods and enable it to mount to the next watershed near Hariarpoor after crossing which it will enter the basin of the Koosmooteree river.

From Hariarpoor the line will

will make for Bobaibeshwar and to be pass probably either between the village and the Fort or through the Fort, and follow a contour above inundation level to near Gopenaut Gopersaud and thence bey or near the Rokole probably through the extremities of the spurs to Naraj on the river bank

The line can it is thought be flagged out for a preliminary survey (the first through trial line) from Bezwada to the right bank of the Godavery as soon as the position of the Ferry terminus on the right bank of the Godavery has been provisionally settled.

Some inspection will be necessary at Rajahmundry and Dowlaeshwaram to determine provisionally the ferry terminus on the left bank of the river, and then the line can be flagged out to Samulcottah and Coconada and on by Pittapoor to Tuni and also beyond this by Anakapilly and Yganampudee to the river crossing into Vizagapatam.

Between Vizagapatam and the watershed near Nimelapal preliminary inspection is necessary but the preliminary survey can, it is thought, be aligned at once, without survey for diversion, thence to Vizianagram and probably on even further north down to the gorge and by Gundredu to Chipurupally, but from the gorge to Bhimavaram two other trial lines should, I consider be run.

From Bhimavaram it is plain sailing right away to Bendy. The first trial line can hardly go wrong if it follows the trace described.

From Bendy northward the line will require careful investigation, with probably one or two trial lines at the Peintybudra watershed, at the watershed near Manekapore (beyond Ichapur) and again at the watershed between Berhampore and Chatrapur.

At each of these watersheds the best point for crossing should be first determined and the line then be flagged out north and south from each of them, I do not anticipate that much survey work will be necessary to determine the best trace: but the line should be laid out from thence not to them and

I believe, much time in starting the
survey parties will be saved, if the
Engineer-in-Chief first gives his
attention to these points, after start-
ing the parties on the straight for-
ward work South of Vizianagram.

If there is a good monsoon
much of the country will be under
crop; I believe, until January, in
which case the survey parties will
be employed on the watersheds
indicated and on the upper lands
until the crops are cut.

Sd. C.J.S.

No. 2021
114

WALTAIR. November 21st 1890.
22

From

THE ENGINEER-IN-CHIEF, EAST COAST RAILWAY.

To The Consulting Engineer
for Railways
Madras.

Sir

In compliance with Works Railways telegram, dated 18th instant, I have the honor to forward herewith, a copy of notes and instructions given by Colonel Smith, for my guidance.

I have the honor to be
Sir,
Your most obedient Servant

J. B. Walker

Engineer-in-Chief
E. C. Ry
21/11

REGISTER
No. 935
FILE
No.

Ex. 1.

Ex.
P/o 1148/90

Form No. 2.

PUBLIC WORKS DEPARTMENT.

OFFICE OF CONSULTING ENGINEER FOR RAILWAYS,

Madras, 28th November 1890.

Letter from the Engineer-in-Chief, East Coast Railway No. 2021/114 dated 21st November 1890

forwarding a copy of note and instructions given by Col: Smith for the guidance of the Engineer in chief.

No. 853

SUBMITTED ——— to ——— Government.

A.D.G. Shelley Captain R.E.
for offg: Cons: Engr for Rys.

Form No. 3.

From

THE CONSULTING ENGINEER

FOR RAILWAYS,

MADRAS.

No. 853

Dated 28th November 1890.

Received

No. of Enclosures.

Subject.

Submitting copy of Notes and Instructions given by Col. C. J. Smith R.E. for the guidance of the Engineer-in-Chief, E.C. Ry

For perusal.

Recorded.

B
No 1932 R Dy 4th Dec/90.

Form No. 3.

11TH NOVEMBER 1890, No. 1767 R., PUBLIC WORKS.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Railway.

Read again the following paper :—

G.O., dated 9th October 1890, No. 1494 R., Public Works.

Order—dated 9th October 1890, No. 1494, R., Public Works.

The Consulting Engineer for Railways is requested to obtain from the Agent and Manager, Madras Railway, information with regard to the cost at which that Company would carry out the survey for a broad gauge line of railway from Bezváda to Masulipatam.

(True Extract.)

(Signed) T. GRACEY, Lt.-Col., R.E.,
Offg. Joint Secy. to Govt., P.W.D.,
Railway Branch.

Read also the following papers :—

From the Collector of the Kistna District, to the Joint Secretary to Government, Public Works Department, Railway Branch, dated Masulipatam, 16th October 1890, No. 7531.

In compliance with your request, I have the honor to forward copy of a memorandum (with five spare copies) which I have drawn up to supply Colonel Lindsay, R.E., the Agent and Chief Engineer, South Mahratta Railway, with the information he desired as to the prospects of an extension of the South Mahratta Railway across the river Kistna, *via* Bezváda, through the delta to Masulipatam. A map of the line the extension should take is also enclosed.

2. I would venture to urge strongly upon Government the advisability of an immediate survey of this extension. It is an essential to the completeness and finality of the South Mahratta Railway east of Guntakal as a famine protective line. It will not only give this famine protective line a long base through the grain-producing delta, but will also afford a stretch through a rich country of 50 miles that will probably pay well and form a satisfactory termination to the non-paying line through Kurnool and the uplands.

3. The line whether constructed by the South Mahratta Railway or by the Madras Railway will be an incalculable boon to the eastern delta of the Kistna district. The Western delta will be traversed by, and will prosper exceedingly through, the railway extension from Bezváda to Nellore and Madras. The Eastern delta between Bezváda and Masulipatam with a still greater area under irrigation requires the railway extension to Masulipatam for its full and prosperous development.

ENCLOSURE.

MEMORANDUM on a proposed extension of the South Mahratta Railway to Masulipatam.

The temporary terminus of the South Mahratta Railway in the Kistna district is now opposite Bezváda on the right bank of the river Kistna where alone it abuts on the delta. The two hundred odd miles of this railway through the Kurnool and Kistna districts were constructed as a famine protective line and not as a remunerative commercial undertaking. Any proposed extension therefore that renders this line more effective for famine protection is justified by the Railway's *raison d'etre*, and if such extension promises at the same time to be commercially remunerative in a way that no other portion of the line ever can be, it is deserving of a careful consideration.

2. The construction of the Kistna bridge at Bezváda has now been formally commenced. This great bridge—to be three-quarters of a mile in length—is prominently connected with the East Coast Railway which is eventually to run from Madras *viâ* Bezváda to Cuttack and Calcutta. It should, however, be borne in mind that it was originally approved in 1883 by the Secretary of State as a necessary continuation of the South Mahratta, or as it was then called—the Bellary-Kistna—Railway. It will be railed for both broad and narrow gauge.

3. The first effect of the bridge will be that all traffic on the South Mahratta Railway will pass over the bridge to and from Bezváda and that a station for goods and passengers must be provided on that side of the river. From this point the East Coast Railway passes away to the north-east, skirting the Ellore canal and the fringe of the Eastern Kistna delta, into which, however, it does not enter.

4. The Eastern delta irrigates over 2,20,000 acres of rice land and this area will steadily increase to a maximum of 2,70,000 acres or over 400 square miles. It is tapped by one main navigable canal to Masulipatam and a branch that connects it with the Godávari canal system. The main canal runs for half its length near and parallel to the river and is thus of less use for the export of grain than it would be if it passed more centrally through the delta.

5. The railway extension has a great tract of rice-growing country invitingly open to it, which is not served by a navigable canal. The line would pass through a series of important towns and villages, and would finally reach Masulipatam, the capital of the district, after a course of 50 miles, which is almost the same length as that of the main canal.

6. A reference to the map will show that the railway should leave Bezváda by crossing the Ellore canal as soon as practicable. Ample room is available for additional sidings and wharves if more be needed. The line will run between the Ellore and the Ryves canal till it crosses the high road about the ninth mile not far from the villages of Nidamannur (population 1,150), Velpur and Done-Atkur. Five miles further on it reaches Tenneru (p. 1,180). Five miles further is Ventrapragada (p. 2,582), and after another five miles comes Gudiváda (p. 4,040), the chief town of the taluk. Then follow Angalur (p. 1,700) and Vinnakota (p. 1,800) at six miles distance, next at about the same distance is Kowtaram (p. 2,400) on the branch canal. Vadlamannad (p. 1,100) comes next, and then seven miles from Kowtaram is the large business centre of Peddana (p. 4,400). Thence to Masulipatam is six miles.

7. Every village above named lies in the midst of a richly-irrigated rice-growing country which is steadily increasing in population and in wealth, and lacks nothing so much as means of communication. The nature of the soil—a black silt—renders road-making costly and difficult. Railway feeders are therefore more suitable to the conditions of the delta than through lines of high road.

8. Masulipatam, the chief town of the district, and its port would be the terminus of this branch of the South Mahratta Railway. At the census of 1881 it was a town of 7,709 houses with a population of 35,000. The houses now newly numbered for the approaching census have increased to 10,480, and taking the same average number of occupants per house as before, the population should now stand at 48,000. The town is the official head-quarters of the district and holds the Judge's and District Munsif's Courts, the Collector's and Deputy Collector's cutcherries, the District Registrar's and other public offices, which cause a large flow of people on public and private business. There are several flourishing Mission agencies under the Church Mission Society. In educational institutions it possesses the Noble College about to be raised to the first grade, a Hindu High school, a normal Training school for the whole district, and minor scholastic agencies for male and female education.

9. The port of Masulipatam is inferior as far as natural facilities are concerned, steamers and ships have to lie six to seven miles out, as at Cocanada and Tuticorin, and there is a bar to cross. But the port has been undeservedly neglected in the past, and it is only within the last two years that an iron shed has been erected by Government to shelter goods from wind and weather. It has been asserted that the bay is shoaling up, but the investigations of the late Port officer, Mr Fletcher, do not support this view; the anchorage for ships and steamers is no further out than of old, and it is shown that whereas the cargo boats of 1858 carried only 12 tons, the present boats carry from 16 to 25 tons, so that there is no shoaling up of the bar.

10. In spite of neglect and natural defects, the trade of Masulipatam has steadily increased for many years past as the following figures will show :—

—	1870-71.	1875-76.	1880-81.	1885-86.	1887-88.	1889-90.
Tonnage..	47,000	1,37,000	1,80,900	2,22,900	3,42,000	Not given.
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Imports	13,49,978	29,67,129	22,96,706	27,36,369	29,48,082	34,56,046
Exports	4,76,060	11,68,229	10,91,641	8,12,052	15,17,101	12,38,443
Total ..	18,26,038	41,35,358	33,88,347	35,48,421	44,65,183	46,94,489

There is a large export trade in rice to Negapatam and Ceylon mainly in native craft and there seems every likelihood that this special trade will continue to increase. Masulipatam, will be the nearest port from Secunderabad to Burmah and the quickest route for the passage of troops. It is also the nearest port for the supply of Singaréni coal either to Government or to the public.

11. The tonnage of goods carried on the canal between Masulipatam and Bezváda in 1889-90 was 32,989 tons; the passenger traffic for the same period was 70,014, mainly between the terminals. This latter would all be taken by the railway and largely increase owing to greater convenience and saving of time. There would also be added the passenger traffic between the intermediate stations. The passage by canal takes less or more than 24 hours according to whether it is down stream or up. The boats are very crowded and inconvenient. The railway would give farmers the power to hold back their rice in their own granaries till such time as is most convenient to sell, instead of being obliged to get rid of it during the three months when the delta is dry and passable for carts. It must be remembered that all the canals of the district are closed for three months from March to May inclusive, during which time all traffic is by road. The road traffic returns between Bezváda and Masulipatam for the year 1889-90 are as follows :—

	Goods. MDS.	Passengers.
Bezváda	4,19,687	34,543
Masulipatam	3,55,101	32,561
Total .	7,74,788	67,104
Average ...	3,87,394	33,552

12. There are Salt factories at Manganapudi, 7 miles north of Masulipatam, which yield 2,00,000 maunds per annum, all of which is now taken inland either by canal or on pack bullocks.

13. Mr. Furnivall, the late Agent and Chief Engineer of the Nizam's State Railway, in a note on a proposed extension of that line to Masulipatam was "strongly of opinion that the line will pay well. The line would be very level and would consequently be worked very cheaply." His rough estimate of the total cost including stations, rolling-stock and establishment was Rs. 64,000 per mile of *broad* gauge, or 32 lakhs for the 50 miles.

14. In conclusion, it may be remarked that the railway extension now discussed occupies a totally different position from that of any other portion of the South Mahratta Railway east of Guntakal. That line was made as a protection against famine; it runs through uplands that depend on the rainfall for existence, and it is not likely to be financially remunerative for a long period. The extension to the sea completes the line as a famine protective work by giving it a base of 50 miles through a rich and never-failing rice country. Furthermore, as the delta is rapidly increasing in wealth, in population, and in the productive area under irrigation, and as the terminal points are the important towns of Masulipatam with over 40,000 inhabitantsand Bezváda with over 15,000, there is every prospect that Mr. Furnivall's forecast will prove accurate.

15. The extension would complete all the railway schemes that have been proposed for the Kistna district and would give a still stronger impetus to the progress of the district which is now by means of its great delta irrigation, its canals and its railways, entering on a remarkable career of prosperity, and which already has a land revenue of 49½ lakhs of rupees or considerably more than any other district in the Madras Presidency.

16. The Board of Revenue in a report on the financial aspects of this line as a branch of the East Coast Railway (B. P. 113, 24th April 1890, Revenue Settlement) remark :—

"A consideration of the existing traffic along the present lines of communication between Bezváda and Masulipatam and of the further circumstances that the proposed line of railway between these towns will run for its whole length of 49 or 50 miles through a rich and exceptionally well-irrigated country, with a large population, that it will connect Masulipatam, a town with a population of 35,000 inhabitants, and already possessed of a large export trade, with a railway tapping the Nizam's country and another tapping the Ceded Districts, the Board has no

hesitation in stating its conviction that the line would be a financial success in itself and would further improve the financial prospects of any line with which it was connected."

Masulipatam,
7th October 1890.

(Signed) A. T. ARUNDEL,
Collector.

From the Consulting Engineer for Railways, dated Madras, 24th October 1890, No. 716.

From the Acting Agent and Manager, Madras Railway Company, to the Consulting Engineer for Railways, dated Madras, 21st October 1890, No. 6630/1091.

[Your endorsement No. 925, dated 10th October 1890, to Proceedings of Madras Government, No. 1494 R., dated 9th October 1890.]

I have the honor to inform you that the cost of surveying a broad gauge line by this Company's officers from Bezváda to Masulipatam is estimated by the Chief Engineer at Rs. 143 per mile, for a distance of 44 miles equal to in all Rs. 6,292.

2. The survey could be undertaken by the party now at work on the Madras-Gúdúr survey immediately on completion of that work, which may be expected to be in about two months' time.

Submitted to Government, with reference to Proceedings of Government, No. 1494 R., dated 9th October 1890.

Order—dated 11th November 1890, No. 1767 R., Public Works.

The Government observes that the distance from Bezváda to Masulipatam is 50 miles and not 44 as stated by the Agent and Manager, Madras Railway, and the total cost will therefore be, at Rs. 143 a mile, Rs. 7,150 and not Rs. 6,292.

2. The estimate for Rs. 7,150 is sanctioned, and this amount will be met from Provincial revenues. The Financial Department will therefore make the necessary arrangements to have this sum placed at the disposal of the Agent and Manager, Madras Railway.

3. The Agent and Manager, Madras Railway, will be requested to proceed with the survey on the lines laid down in the letter from the Collector of Kistna read above, and copy of the plan submitted therewith will be forwarded for his guidance in making the survey.

4. A copy of these Proceedings will be forwarded for the information of the Government of India.

(Here enter No. 1768 R., dated 11th November 1890.)

(True Extract.)

(Signed) T. GRACEY, Lieut.-Colonel, R.E.,
Offg. Joint Secy. to Govt., P.W.D.,
Railway Branch.

To the Consulting Engineer for Railways.
" Examiner, East Coast Railway Accounts.
" Examiner, Guaranteed Railway Accounts.
" Examiner, Public Works Accounts.
" Financial Department.
" Revenue Department.
" Engineer-in-Chief, East Coast Railway, for information.
with reference to his telegram, dated 22nd August 1890.

Collector of Kistna.

Endorsement—dated 11th November 1890, No. 1768 R., Public Works.

Forwarded.

(By Order.)

(Signed) T. GRACEY, Lieut.-Colonel, R.E.,
Offg. Joint Secy. to Govt., P.W.D.,
Railway Branch.

Exd. P. L. Pereira
Spare Copies

RAILWAY.

Govt. of {1890} Madras.

PUBLIC WORKS.

Dated November, 11th.

Recd. *Encl.*

G.O., 11th Nov. 1890, Nos. 1767, 1768 R.

NOVEMBER.

Survey for a broad gauge line of Railway from Bezvada to Masulipatam

Forwarding copy of Proceedings sanctioning the estimate for a survey for a broad gauge line of railway from Bezváda to Masulipatam and issuing certain instructions as to the prosecution of the survey.

P. W. DEPARTMENT.

READ the following:—

Petition from the Inhabitants of Masulipatam praying that the Southern Mahratta Railway may be extended from Bezwada to Masulipatam

FOR ORDERS.

I presume the petitioners may be informed that His Excellency in Council has arranged with the Madras Railway Company for making a survey for a broad gauge line from Bezwada to Masulipatam

JHS 23/11/90

Ld. 24/11/90

CL 19/4/80

FOR ORDERS.

No. 1940 R

PUBLIC WORKS DEPARTMENT,

RAILWAY BRANCH.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

UNDER date the 4th December 1890.

READ the following

Petition from the inhabitants of Masulipatam } H.E. No — of 1st. Nov 1890

Dft 28/11/90 The petitioners are informed that His Excellency the Governor in Council has arranged with the Madras Railway Company for making a survey for a railway line from Bezwada to Masulipatam.

Dr 4/12/90

SS 24/11/90

D. R

To The Petitioners 5/12/90

SECRETARIAT
17 NOV 90
GOVERNMENT

MASULIPATAM,
15th NOVEMBER 1890.

To

HIS EXCELLENCY
THE GOVERNOR IN COUNCIL
OF FORT SAINT GEORGE.

MAY IT PLEASE YOUR EXCELLENCY,

The inhabitants of the town of Masulipatam humbly request that your Excellency in Council may take into consideration the following facts which illustrate the question of the extension of a Railway line to this place.

2. Masulipatam is the chief town of the Kistna District. It is the commercial centre of the District and the courts and public offices are situated here. It is also an important Mission and educational centre.

3. The scheme of rail-roads which has been sanctioned will touch only the outskirt of the highly cultivated and populous Kistna Delta. Masulipatam is the natural outlet for the produce of the Delta which finds its way by sea to Negapatam and Ceylon. Your Excellency's petitioners are, therefore, anxious that the present opportunity be taken to obtain sanction for a line which will bring the produce of this Delta to the coast.

4. Your Excellency's Private Secretary in his published narrative of your Excellency's recent visit to this District spoke of Masulipatam as a decaying port. Your Excellency's petitioners regret that Mr. Rees wrote this remark without verifying the statistics and they beg to submit the following figures showing the trade of this port for the past five years:

Year.	Exports.	Imports.
1885-86	Rs. 27,34,124	Rs. 8,13,607.
1886-87	„ 29,67,524	„ 11,01,924.
1887-88	„ 29,34,638	„ 15,17,101.
1888-89	„ 30,61,542	„ 12,40,688.
1889-90	„ 34,56,046	„ 12,38,443.

5. When the Kistna Bridge is completed the Southern Mahratta Railway will run from the Bezwada bank of the river. The line would be rendered more efficacious as a famine preventive line and would be certainly more remunerative if it were continued through Gudivada to Masulipatam. This line would pass through the following large villages in the midst of an irrigated area which will never be served by any navigable canal.

Kowtaram	2,400	Inhabitants	Gudivada	4,040	Inhabitants.	Vadlamannad	1,100 Inhabitants.
Nidamanur	1,150	Do.	Angalur	1,700	Do.	Pedana	4,400 Do.
Tenneru	1,180	Do.	Vinnakota	1,800	Do.	Masulipatam	40,000 Do.

6. The line presents no physical obstacles and could be cheaply worked. The period of the year when there is most traffic is the hot season when the canals are closed. Both for goods and for passengers, there is every prospect of remunerative traffic.

7. Your Excellency's petitioners therefore pray that this question which deeply concerns their welfare may be fairly considered upon the merits after full enquiry and that it be not dismissed with the hasty assumption that Masulipatam is a decaying port.

8. The port of Masulipatam is used by the mercantile community and has advantages over other ports on this coast. Goods are loaded at a wharf into decked sailing boats which carry the goods safely to ships in the roadstead. If your Excellency had ever honoured this port with a visit, it would not have been necessary for your Excellency's petitioners to bring these facts to notice. The figures which have been quoted show that Masulipatam is a flourishing port and your Excellency's petitioners pray that its claims may be considered without prejudice.

And your Excellency's petitioners will ever pray.

K. Venkatasubbaiah Merchant
Sd. Subbarayudu
Proprietor Zemindar
Sd. Gadhanji B.A.
Pleader
A Gulbarjee
C.M.S.
C.M.A. Clarke
Principal - Noble College.
H.J. Tanner
Rugby - For Master
Noble College.
J.C. Wavell C.M.S.
W. Ramadastulu
Teacher, Noble college
Sd. Rao Sahib Suntrey
Sd. B. Venkatareddi Naidu
Sd. Venkata Subba Row Naidu
B. Sinayya, C.M.S.
Venkatachellem
Pensioned Deputy Collector
P. Venkatappayya
Govt. Pleader
Sd. Venkatasubbiah
Vakil & Court
P.E. Padfield. B.D. Clk.
Principal C.M.S. Divinity School
Witness R.S. Aitkinson - C.M.S.

K. Ramaswami Iyengar,
Lecturer, Noble College.

S. V. Rao
Asst Noble college.

N. V. Rangacharyulu
Assist. Noble College.

K. Adinarayanamurti
Asst. Master
Noble college

D. Ramamurti
D.D

V. Jagannadham

Bh. Samudrayya.

K. Venkata Siva Ramayya

Mamidi Veeranna Patnaikuni

Kanka Venkata Ratnam

Koochibhotla Ramakrishnaiah
Maddari Rama Rao.
Koochibhotla Lachimy Narasimharao.

M. Gnaneswara Rao

(by order) Khalpally Khailasapaty
the son of V. Subrayajugabhooshanam

Bapayya
Maria Mohla College.
Imayapula Lakshmanaya
K. Venkatasamayya
G. Bairagi
M. Narasimha.
S. Muthia Iyer.
Ch. Subbarayudu
K. Sadasivam Pantulu
K. Vijayaramaraju
Daniel
P. V. Ratnam
V. Bhogappayya Sastrulu
V. Venkataramayya
K. Jaggayya
Mehatta Narayanaswami
Kata Ramulthy Ramabramham
Pilly Subbarayudu
Pilli Venkata
Matta Narasimham
Pulakurty Rajaliyam
Cloths Merchant
Talluri Appadoru
Yaradapalli Subbarao
Tokalli Brahmanandam
Kotchina Nyapathi Ramam

Agastyaraza Subbaraw — Asst. Collr. Mysulipatam

Kastala. Sûrinayya — F. A. Student

Velagapudy. Sambasadasivarau Do.

K. Hanumantarao. — F. A. Student

J. Gopalakrishna Rao. — Matriculation Class.

S. Gangayya — do.

K. Varadachari — Fa. Senr do.

J. Kaliana Ranier — Class V.

M. Somayajulu. — Class VI.

M. C. Ramayyasastry.

D. Sitaramayya

P. Anjaneyulu.

N. Kulumba Rayudu

Mohmed yacob

V. Ramakrishnayya — Tutor to Mirdlapuram Zamindars

M. Nagacharyulu. — Class F. A. I.

A. Venkata-Ramayya — do

B. Venkata Ramanayya — F. A. I.

M. Perazew. — F. A. I.

V. D. Rajeswaru — Telugu teacher Noble College

J. R. Kalyanaraman — Senior F. A. Student.

V. Ramakrishna Rao. — F. A. I.

N. Venkataramayya — F. A. I.

R. Narsimharow — F. A. I

Bhaska — F. A. I

G. h. Seshayya. — F. A. I

Challa. Ramakrishnayya — F. A. Student

Kunnuradty Narasimhulu — Class IV

Bitana Bhotla Lakshminarayana — Class V

Thigarla, Sita Ramaswamy — Class VI

A. Venkatacharyulu — F. A.

Gellawradyu. Ramachendrayya

S. Ranganaiah

S. Seshaiah

V. Ramayandas.

L. Lakshminarayana Row

Chandra Suryanarayana

N. Swa Ramayya.

M. Somayajulu

Agastyaraza Hanumanta Row

Rajah. Suranani. Venkatapurushothama

jagannatha Gopal Row Bahadur zemeandar of Jellylavaram.

Manapaka Butah Rama Naidu

Yekkala. Sundararamayya.

Dasari Venkata Krishna Row

Prabhala, Venkatanarasimham

Jadiconda. Vencata Rongayya

Kamuny. Krishnarao

Kanukolanu. Lakshmipathi Rao.

Agastyaraju. Symala Row.

Sankara, Ramachendra Rao.

Chilaca Venkatalubba Row

Kanchanapalli Anandaroo.

Golleyapudi Varadaraw

Anikala. Srinivasa Row.

V. Srinivasa

D. Kameswara Rao.

Ch Venkatachalapathi

Velagalaty Nagabhushanam

Pedamatty Rajanayya

M. Venkatarattnam.

A. Ramachandra Rao

Madhusudanam

L. Sriramamurty

Bh. John Venkatappa Row.

Andrew Peterson

V. Sitaramayya