GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Railway.

Read the following papers :—

From H. G. TURNER, Esq., Collector of Vizagapatam, to the Chief Secretary to Government, dated Vizagapatam, 3rd October 1887, No. 2293.

I have the honor to forward with this letter a memorandum, which I have compiled, on the subject of a railway designed to run through the Northern Circars connecting Bezváda on the south with Khurda on the north, or, more generally, a design for connecting Madras with Bengal by an East Coast Railway.

I respectfully request that Government may be pleased to accept the paper, which is drawn principally from official sources. Mr. Walch, Superintending Engineer, has kindly helped me with suggestions, and Colonel Fraser, R.E., has been so good as to prepare the map which accompanies this report.

2. The present time seems to be very suitable for bringing the proposal for this railway prominently forward, and if I am so fortunate as to secure the acquiescence of Government in this view, I earnestly trust that they may be pleased to give the project their staunch support and endeavour to get the Government of India to place it in the first line of the railway projects now before them.

3. For the two railways which the Supreme Government have recently bestowed so much time and patronage upon, that is, the Bengal-Nagpore Railway and the Benares-Puri line, will both benefit most enormously by the line now proposed. The southern section of the latter line will be used by all the passengers from the Northern Circars, from lower down the coast and from inside the Hyderabad frontiers. From the southern section of the Puri line they will pass over long sections of the Nagpore-Bengal line, whether they go west to Nagpore, east to Bengal, or north to Benares.

4. Similarly, in the south there are two railways which will almost look on this line as their foster-mother. The Bellary-Kistna line and the Hyderabad-Warangal line (tapping the Singareni coalfields) both meet at Bezváda. They discharge their goods and passengers there on the bank of a canal which is dry for several months in the year. Can there be any doubt that there must be a line from Bezváda to Cocanada, the largest seaport on the East Coast ?

The line now proposed will form in point of fact the connecting link between Bengal and the North-West Provinces on the north and Haiderabad and Madras on the south.

5. As to the local possibilities of such a line, what comparison can there be between it and the other lines alluded to above ? Here we have an old settled tract of country about 500 miles in length, nearly every mile of which is cultivated. Rich cities are found at suitable intervals, with a sea-borne trade reckoned in millions sterling ; with deltaic tracts yielding thousands of tons of food, bordered the whole way by fine uplands abounding in oil-seeds, timber and jungle products. It is hardly possible to suppress a sigh of envy at the display of lines doubled and trebled along the provinces of Bengal, the North-West and the Punjab ; at the double system of lines in the Mahratta country and at the permeation of lines throughout the south and central Madras, while the Northern Circars, the oldest, the riches, the most densely populated tract in India, remains to this day destitute of any rail communication with the outer world.

6. Nor are there, as will be seen, any engineering difficulties whatever all along the line; the water to be bridged is singularly little, considering that the drainage of the country appears to be crossed at right angles. There are no heavy gradients, no ghâts, morasses, or forests. The facilities for constructing the line are unexampled, the country is perfectly open, and it teems with labor. All along the line of railway are sea-ports where material can be landed and pushed up and down the track. The coast tracts are perfectly free from fever, and provisions are cheap. Roads are found everywhere. In the adjacent forest are tons of sál wood fitted for sleepers, the building stone is excellent and lime abundant.

7. What is urgently required is for Government to send down a few parties of surveyors to prepare surveys and estimates. Then let the result of these surveys be published in the the *Gazette of India*, so that this line may, like the Benares-Puri line, be put before the world under the *imprimatur* of Government.

Transferred to the Public Works Department (Railway Branch).

(By Order.)

(Signed) W. S. MEYER,
Assistant Secretary to Government.

4th November 1887.

ENCLOSURE.

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 propreitors 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 Nagpur-Bengal line at Panchpara. Accordingly, the route for the Calcutta passenger to Hyderabad and Madras will be the East India line to Seetarampur, thence *viâ* the Nagpur-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.
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*) *Viâ* Bellary-Kistna State Railway and Madras line, about ...	550
	MILES.
(*b*) *Viâ* 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-Raipur 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 waterways over 150 feet span which require bridging between Bezváda

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

and the northern frontier of the Madras Presidency, which is passed at the 435th mile from O mile at Bezváda. These are as follows:—

	Feet lineal required approximate.
In Kistna District.	
1. Badamer channel } 2. Tammilaru }	300
Godávari District.	
3. Yerrakalma	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	1,000
14. Bahuda	150
15. Rushikulya	2,000
16. One stream in Puri division	150

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 earthwork 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. Earthwork for embankment 10 ft. 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
	Per 100 cubic feet. RS. A. P.
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	18 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 ft. diameter and 6 ft. 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 for 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-West Provinces to the north. The vast numbers of people that inhabit these respective areas are so prodigious as 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 *viâ* 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 canal 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 lastnamed 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.

2. *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 saltpetre. 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 Dolaishweram. 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 six 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 28,856 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 the 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 *viá* Hyderabad than it is from Calcutta to Bombay *viá* 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 coalfields, there can be no manner of doubt that this port 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 canalised 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 eleven other villages contain over 2,000 inhabitants.

I regret that I can find no account of the Tuni 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 intesest 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.

3. *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 12 miles brings us to Nakkapalle. 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 8 miles brings us to Kásimkót, 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-Raipur line for 36 miles, passing *en route* the important shrine of Simhachellam and the port of Bimlipatam. Possibly a small branch of 3 miles may be required here. Vizianagrum is a town of 22,577 inhabitants. It is the residence of the Maharaja, 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 50 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 Chípurupalle 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 Calingapatam it is 16 miles, but probably a nearer station to the port will be selected, perhaps on the banks of Vamsadara 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 11). 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 2 and 3 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, Sambalpore, 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 Ganjam district and the Madras Presidency between the villages of Panditagaon 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 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.

See "Manual of the Ganjam District."

From the frontier of Ganjam to Khurda the distance is about 50 miles. From 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, paragraph 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.

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 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	485
Khurda to Calcutta *viâ* Panchpara-Seetarampur	560
Total ...	1,315

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 Peninsular 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.

* Puri.	Tirupati.
Srikurmam.	Conjeeveram.
Simhachallum.	Srirangam.
Kottapalle.	Madura.
Kalastri.	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 the distance.

The figures under passenger traffic represent the actuals for 9 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 9 months in the year 1885-86 and estimates for 3 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 blank 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 2¼ 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. These 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 disabilities, 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) give 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 Indian line 7 years to extend from 187 miles open 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 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 this 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:—

	Number.	Receipts at 2 pies per mile per head.	Receipts per mile per week.
		Rs.	Rs.
Present passenger traffic per mile	111,627	1,162	22·36
Prospective	344,000	3,583	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) which is canalised. 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 amounts 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.
	Rs.
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 Singaréni lie on the Bezváda-Hyderabad line distant 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, that 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 Singaréni coal-field, which is well advanced, and the extension to Bezváda are completed, the Singaréni 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 Singaréni 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
Masulipatam .. Coasting trade ..	60,312	163,593	30,685	109	83,474	7,719	345,892
Masulipatam .. Foreign trade ..	1,417	108,005	375	21	917	10	110,745
Cocanada .. Coasting trade ..	41,958	80,007	84,399	..	103,417	312	309,993
Cocanada .. Foreign trade ..	56,425	50,560	116,357	66	3,234	..	226,642
Bimlipatam .. Coasting trade ..	5,212	..	38	227	364	14	5,855
Bimlipatam .. Foreign trade ..	..	..	3	..	..	..	3
Gopálpur .. Coasting trade ..	..	..	..	..	..	..	..
Gopálpur .. Foreign trade ..	..	..	2,739	..	..	..	2,739
Total cost ..	1,65,324	402,165	234,496	423	191,406	8,055	1,001,869
Total tons ..	8,266	20,108	11,725	21	9,570	403	50,093

Name of Port.	Imports.							Remarks.
	Grain.	Rice in the husk.	Rice not in the husk.	Wheat.	Pulse.	Other sorts.	Total.	
	9	10	11	12	13	14	15	16
Masulipatam .. Coasting trade ..	..	..	..	..	..	..	..	This information is obtained from the annual volume of sea-borne trade and navigation for 1885-86.
Masulipatam .. Foreign trade ..	..	..	..	..	..	..	..	
Cocanada .. Coasting trade ..	..	..	..	..	..	..	..	
Cocanada .. Foreign trade ..	..	149	..	9	732	..	890	
Bimlipatam .. Coasting trade ..	..	..	..	..	..	..	..	
Bimlipatam .. Foreign trade ..	..	4,538	9,458	..	124	..	14,120	
Gopálpur .. Coasting trade ..	..	..	..	..	..	..	..	
Gopálpur .. Foreign trade ..	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 Bezvádа line at the last-mentioned place, where also the Bezvádа-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 $7\frac{1}{2}$ 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 Bezvádа 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 outcome of private enterprise, but enterprise quite untrammelled as to its scope and movements and free to adopt 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 were 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 2 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.
		MAUNDS.	MAUNDS.	MAUNDS.	
1	Ganjam and Surlá in Ganjam district.	150,366	272,952	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 tht quantity of sale sent to French Government.
3	All the salt factories in the Godávari and Kistna districts.	532,669·15	15,027	547,696·15	
	Total ...	1,523,988·40	331,337	1,865,325·40	
	Total, Tons ...	55,983·24	12,171·57	68,154·81	

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 gingelly.	Other sorts.	Total.
1		2	3	4	5	6	7	8	9	10
Masulipatam ..	C.T. ..	..	..	..	112,458	..	..	21,784	14,870	149,112
	F.T. ..	466	..	7	..	..	..	165	..	638
Cocanada ..	C.T. ..	..	..	..	275,785	..	435	87,575	20,702	384,497
	F.T. ..	1,442	5	458	523,455	..	998	136,629	1,066	664,053
Vizagapatam ..	C.T. ..	..	..	..	..	..	..	..	..	..
	F.T. ..	..	..	..	..	..	..	6,944	..	6,944
Bimlipatam ..	C.T. ..	..	..	..	..	7,036	..	43,020	589	50,645
	F.T. ..	..	..	..	1,166	29,181	..	112,299	73,247	215,893
Calingapatam ..	C.T. ..	..	..	..	..	..	..	..	..	..
	F.T. ..	...	..	..	..	25,595	..	37,218	13,667	76,480
Gopálpur ..	C.T. ..	..	..	..	..	..	..	..	..	..
	F.T. ..	..	..	..	..	1,666	..	41,543	1,616	44,825
Total, Cost ..		1,908	5	465	912,864	63,478	1,433	487,177	125,757	1,593,087
Total, Tons ..		95	..	23	45,643	3,174	72	24,359	6,288	79,654

Names of ports.		Imports. Castor.	Linseed.	Mustard.	Gingelly.	Other sorts.	Total.	Remarks.
		11	12	13	14	15	16	17
Masulipatam ..	C.T. ..	..	..	..	..	..	..	This information is obtained from the annual volume of sea-borne trade and navigation for 1885-86.
	F.T. ..	..	..	..	..	..	..	
Cocanada ..	C.T. ..	..	..	75	3,324	976	4,375	
	F.T. ..	..	..	..	..	..	..	
Vizagapatam ..	C.T. ..	..	..	..	..	..	..	
	F.T. ..	..	..	..	..	..	..	
Bimlipatam ..	C.T. ..	..	..	..	..	4,305	4,305	
	F.T. ..	..	..	..	..	..	..	
Calingapatam ..	C.T. ..	..	..	..	..	..	..	
	F.T. ..	..	..	..	..	..	..	
Gopálpur ..	C.T. ..	225	2	..	..	811	1,038	
	F.T. ..	..	..	..	..	..	..	
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.	
1. Cocanada ..	C. T.	1	17,671	17,672	..	..	..	This information is obtained from the annual volume of sea-borne trade and navigation for 1885-86.
	F. T.	..	364,303	364,303	1,282	..	1,282	
2. Vizagapatam ..	C. T.	..	..	..	..	..	..	
	F. T.	..	349,357	349,357	..	..	..	
3. Bimlipatam ..	C. T.	..	4	4	..	..	..	
	F. T.	..	5,022	5,022	9	..	9	
4. Gopálpur ..	C. T.	..	..	..	3	..	3	
	F. T.	300	..	300	57	..	57	
Total, Cost ..		301	736,357	736,658	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-seeds, 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 lie 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 rail-road. We can only bear in mind Mr. Jeans' remarks quoted above and add to that opinion the facts 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 rail-road 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 *viâ* 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 2 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 source 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 expecting 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 3 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 is 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 comparisons, 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 Pañchpara 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 ailway 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*), (*c*), (*d*) 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	
Godávari river	5	..	..	..	
Dowlaishweram to Cocanada..	32	(*d*) 64,391	670	12·88	
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 Párvatipur ..	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-Raipur 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., 20th Dec. 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	
Vizianagrum to Rambha ..	168	..	..	..	
Rambha to Khurada ..	59½	110,000	* 4,583	88·13	

(*d*) Besides these goods, 309,458 miscellaneous articles, such as gunny-bags, cocoanuts, bamboos and timber logs, were taken along this line.

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 passenger 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 Vijesweram	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.

Kistna District.

	Distance in miles.
Bezváda to Ellore	37½

Godávari District.

	Distance in miles.
Ellore to Vijeswaram	46½
Godávari river	(5)
Dowlaishweram to Cocanada	32
Cocanada to Tuni	40
Total	123½

Vizagapatam District.

	Miles.	Fur.
Tuni to Nakkapalli	12	1
Do. Yellamanchili	13	5
Do. Kasimkóta	11	7
Do. Anakápalle	3	0
Do. Aganampudi	9	0
Do. Vizagapatam	11	0
Do. Simhachallum, Do. Sontiyam, Do. Vangalapalen, Do. Lingannapeta, Do. Vizianagrum	36	0
Do. Chipurupalle	19	0
Do. Pondur	11	0
Do. Chicacole	10	0
Total	136	5

Ganjam District.

	Miles.	Fur.
Narasannapetta	14	0
Kottahommali	10	0
Naupada	10	0
Pata Tekkali	10	0
Kasibugga	9	1
Haripuram	8	7
Kanchali	9	7
Ichapur	12	1
Berhampore	15	0
Chettrapur	14	3
Ganjam	4	5
Rambha	10	2
Panditagon	8	0
Total	136	2

Cuttack District.

	Miles.	Fur.
Barkut	7	4
Sanakalla	10	1
Tanghi	10	0
Jenkiah	11	0
Khurada	12	6
Total	51	3

Total.

	Miles.	Fur.
Kistna District	37	4
Godávari „	123	4
Vizagapatam „	136	5
Ganjam „	136	2
Cuttack „	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 Vijesweram.	6	102,361	122,920	614,166	737,520	
Dowlaishweram to Cocanada.	32	64,391	134,882	2,060,512	4,316,224	
Cocanada to Anakápalle.	116	..	..	..	..	
Anakápalle to Vizagapatam.	20	113,244	74,235	2,264,880	1,484,700	
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	

Miles.		Total.	Average.
175½	Canal-borne traffic	18,880,884	107,583
86	Cart-borne traffic	5,967,288	69,387
261½		24,848,172	95,021

(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 ...	.....	5,000	
	3. Sivaratri (Pedakullapalli).	14th and 15th decreasing moon of Magham.	8,000	
	4. Srikukalam festival.	Full moon in the month of Vysakum.	3,000	
	5. Vellatur festival.	From 3rd to 6th increasing moon of Magham.	5,000	
	6. Sivaratri (Aravapelli).	From 11th to 14th decreasing moon of Magham.	8,000	
	7. Guntúr festival...	From 9th increasing moon to 15th of Chittri.	5,000	
	8. Yenamadala festival.	From 9th increasing moon to 15th of Chittri.	4,000	
	9. Mungalageri festival.	From 7th increasing moon to 15th of Phalgunam.	1,500	
	10. Sivaratri (Kottapa Konada).	14th and 15th decreasing moon of Magham.	60,000	
	11. Ponnur pilgrimage.	From 7th increasing moon to 15th of Vysakum.	2,000	
	12. Sivaratri (Amravaty).	14th and 15th decreasing moon of Magham.	2,000	
	13. Festival (Cherungepuram).	24th December of every year ...	2,000	
	14. Festival (Bezváda).	14th and 15th decreasing moon of Magham.	8,000	
	15. Festival (Vallur).	Full moon of Vysakum	5,000	
	16. Festival (Jaggiapeta).	10th increasing moon of Asrija ...	3,000	
	17. Festival (Vedadri).	14th increasing moon of Vysakum.	1,000	
	18. Sivaratri (Mukteswaram).	Five days, commencing 14th decreasing moon of Magham.	6,000	
	19. Festival (Agnipalli).	From 11th decreasing moon of Pushya to 7th increasing moon of Magham.	10,000	
	20. Festival (Weyone).	From 11th decreasing moon of Pushya to 2nd increasing moon of Magham.	4,000	
	21. Festival (Ailur).	11th to 15th decreasing moon of Magham.	4,000	
Godávari.	22. Antravedi festival (Narsápur taluk).	In the early part of February ...	10,000	
	23. Kotipalli festival (Rámachandrapuram taluk).	21st February	50,000	
Vizagapatam.	24. Marriage ceremony of Varaha Lakshami Nroosinhaswami.	From 10th to 15th of the increasing moon in the month of Chittri.	5,000	
	25. Chendanayatra, or Sandalwood powder ceremony of ditto.	The third and two following days of the increasing moon, month Vysakum.	9,000	
	26. Mohorum feast...	From 2nd to 12th of the increasing moon in the Persian month of Mohorum.	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	
	30. Oottaravahiniyatra.	Do. do.	8,000	
	31. Marriage ceremony of Venkataswaraswami.	From 11th to 15th of the increasing moon of Phalgunam.	8,000	
	32. Dasara feast ...	From 1st to 10th of the increasing moon of Asviyujan.	2,000	
	33. Theerthum ...	For three days after Pongal feast.	200	
	34. Feast of three Goddesses—Nukalamma, Chikkalamma, Duddu Atchamma.	On the 11th and two following days of the decreasing moon in Phalgunam.	7,000	
	35. Paramatamma feast.	Once in two years from 12th November to 10th December.	1,000	
	36. Ramalila Vootsavam or Dasara feast.	From 1st to 10th of the increasing moon of Asviyujan.	6,000	
	37. Sivaratri ...	14th and two following days of the decreasing moon in the month of Magham.	2,000	
	38. Car feast of Jaganathaswami.	From 2nd to 10th of the increasing moon of Askadam.	5,000	
	39. Dolotsavam ...	From 11th to 15th of the increasing moon of Phalgunam.	4,000	
	40. Village Goddesses feast.	No fixed date, but for 15 days a year.	1,200	
	41. Car feast ...	From 2nd to 11th of the increasing moon in Askadam.	3,000	
	42. Do. ...	Do. do.	2,000	
	43. Do. ...	From 3rd to 11th July	500	
	44. Dolayatra ...	Five days in every year, from the 11th of Phalgunam Sudda, *i.e.*, about February.	15,000	
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	

APPENDIX D.

TARIFF of rates by Canal Boats between Cocanada and Bezváda.

Articles.	From Bezváda to Ellore.	From Bezváda to Dowlaish-weram.	From Ellore to Dowlaish-weram.	From Bezváda to Cocanada.	Form Ellore to Cocanada.	From Dowlaish-weram to Cocanada.
	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
Castor seed, gram & 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 ,,	0 4 0	0 8 0	0 4 0	0 8 0	0 8 0	0 3 0
Do. do. 400 ,,	0 5 0	0 10 0	0 5 0	0 10 0	0 10 0	0 4 0
Tobacco in bundles 190 ,,	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 bundle 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 8 0
Gunnies per bale	..	..	..	1 8 0	1 0 0	0 8 0
Piece-goods per bale	..	..	..	..	1 0 0	0 6 0
Twist per bale	..	..	..	..	1 0 0	0 6 0

(Signed) H. G. TURNER,
Collector.

From A. T. ARUNDEL, Esq., Collector, Kistna District, to the Chief Secretary to Government, dated Mylavaram, 3rd November 1887, Extra No. 158.

I have the honor to address Government on the subject of the extension of the Bellary-Kistna State Railway and the Nizam's State Railway to the sea-port of Masulipatam.

2. These two lines of railway connect (1) the Bellary-Kurnool country and (2) Hyderabad and the Nizam's dominions, including the Singaréni coal-fields, with the canal systems of the Kistna and Godávari at Bezváda.

3. Under present arrangements, the Bellary-Kistna State Railway ends on the west bank of the river Kistna just opposite Bezváda. It is expected that this railway will supply itself and portions of the Madras Railway with coal for fuel. With the river Kistna unbridged, every ton of coal must be enhanced in price by the cost of a double break of bulk. The Nizam's State Railway will bring the loaded trucks to Bezváda. There the coal will be discharged into cargo boats, ferried across the river and a few hundred yards down the western canal, and then loaded up on the trucks of the Bellary-Kistna Railway. The cost of this double break of bulk will be, I am credibly informed, a loss of 10 per cent. of the coal itself, besides a porterage of 6 or 8 annas per ton. During three full months of the year (March, April, May), the canals are closed. All coal traffic must then cease, and the supplies of this fuel to all lines concerned will be cut off.

4. Before leaving this subject, I would note that, if the river Kistna were bridged, the cost of one break of bulk of coal would be saved. The second break of bulk would remain owing to the difference in the gauge of the lines. This too could be removed by laying a third rail on the Nizam's line to Singaréni, so that the coal trucks of the Bellary-Kistna State Railway would load at the pit's mouth and run through to their destination in Kurnool, Bellary or elsewhere, with no break of bulk at all.

5. What is true of the increased cost of coal traffic, owing to the barrier of the river Kistna, is equally true of all goods brought by either of the two railways to be forwarded by the other. The connection of the two railways by throwing a bridge across the river Kistna will save the cost of a break of bulk for all traffic common to both.

6. A still more weighty reason for the construction of the bridge arises from the fact that the Bellary-Kistna State Railway is sanctioned by the Secretary of State as a *protective work against famine* (see paragraph 4, Secretary of State's despatch, No. 120, dated 4th October 1883, quoted in G.O., No. 425 R., dated 13th June 1887). The delay in shipping goods across the river, always tedious and only to be done by day, is many times multiplied during the dry months of the year when the canals are

closed. Goods have then to be taken by cart some miles down the river and across a mile of sand and water at a passable ford. In time of famine all difficulties would be intensified and would greatly detract from the attainment of the special protective object of the railway.

7. The eventual construction of a bridge across the river Kistna has been accepted by the Secretary of State as part of the proposed scheme of the Bellary-Kistna State Railway. The despatch above quoted runs—

"2. * * * It is proposed to place the eastern terminus on the right bank of the Kistna, opposite to Bezváda, in order to bring it eventually, by means of a light bridge, into communication with the proposed southern extension of the Nizam's State Railway, thereby obtaining access to the Singaréni coal-fields."

* * * * *

"4. I sanction the construction of this railway as a protective work, as proposed by your Excellency's Government." * * * *

8. Although the construction of a bridge has been approved by the Secretary of State, it may be as well to mention here the only practicable alternative, namely, a steam-ferry to convey loaded trucks bodily across the river. The cost of such a ferry, I understand, may roughly be estimated at 12 or 13 lakhs of rupees, or about a third of the cost of the bridge, which, I believe, may be set down at about 37 lakhs. The cost of working the ferry, including hydraulic lifts and steam-dredgers for the river-bed, would be very high. There is, however, another reason which must put the ferry scheme out of discussion. The Railway, as I have already pointed out, is a protective work against famine. With a steam-ferry, not more than two loaded trucks could be ferried across at once. The time required for the whole process of transporting two trucks from the rails on one side of the river to the rails on the other would be little less than an hour. Working night and day for any long period is practically impossible, but, supposing it could be done, not more than 40 trucks per day could be transported. During time of famine, therefore, the Bellary-Kistna State Railway, built specially as a protective work, could not, during the hot season, draw from the Godávari and Eastern Kistna deltas more than 40 trucks of grain stuff per day for despatch into the distressed districts.

9. My object in thus rehearsing the arguments that tell for the construction of the bridge is to urge that the works should be undertaken at no distant date.

10. I pass now to the second branch of the subject, namely, the connection of both railways with the sea.

11. There are two ports which at once suggest themselves; the first is Cocanada, the second is Masulipatam. Cocanada is much superior to Masulipatam as a port, but its distance from Bezváda is about 100 miles, while Masulipatam is only 40, and there is, for practical purposes, the insuperable barrier of the river Godávari which is about four times the width of the Kistna. In the "dim and distant future," railway extension will probably include Ellore, Rajahmundry (with a three or four mile bridge over the Godávari), Cocanada and Vizagapatam. For the present, however, this scheme must remain *in nubibus*.

12. There remains the port of Masulipatam or Bandar, the chief town of the district, with a population of 40,000. The silt deposits of the river Kistna have, in the course of centuries, shoaled up the bottom for some miles out to sea, and steamers usually anchor about seven miles out. There is a bar not far from the mouth of the creek that leads to the landing wharf, but this is passable at all times except during a severe north-easterly wind in the monsoon. So far as I am able to judge, the port of Masulipatam owes its unfavorable reputation mainly to the remembrance of the great cyclone of 1864 and to the time taken in sailing from ship to shore. The obvious cure for the latter evil, which, however, chiefly affects passengers, is the use of a steam tug. The practical utility of the port is shown by the fact that the steamers of the British India Steam Navigation Company touch there twice a week in each direction, and that the exports and imports for 1886-87 were Rs. 30,47,44 and Rs. 12,11,425, respectively. The number of native craft calling at the port in the same year was 205. There were also two steamers freighting for Europe direct.

13. The distance of the port of Masulipatam from the terminus of the railway at Bezváda is, as the crow flies, nearly 40 miles. This line, however, could not be recommended for a railway. In the first place it would be in direct competition with a navigable canal for nine months in the year. In the second place, it would run too near the river and would thus be cut off from numerous sources of traffic which a better line would afford.

14. The true line for the railway extension from Bezváda to Masulipatam lies in a north-easterly curve through the delta taluk and town of Gudiváda. The length of this line would be 50 miles, or only 10 miles more than a crow-line. It would run, for the whole distance, through a richly irrigated tract, almost every acre of which is under rice cultivation; it would tap the chief town of the taluk and numerous important villages, which are not, and, as I have ascertained from the Superintending Engineer, will never be, served by a navigable canal.

	Population.		Population.
Nidamanur	... 1,150	Vinnakota	... 1,800
Tenner	... 1,180	Cowtaram	... 2,400
Gudiváda	... 4,040	Vadlamannad.	1,100
Angalur	... 1,700	Pedana	... 4,400

15. The termini of the two railways have been placed at Bezváda and the extension of the lines to the sea has apparently never been brought under discussion. This is probably due in great part to a curious error as to the advantages of carriage by canal. Transport of goods by canal is much cheaper than the transport of goods by railway. It has, therefore, been taken for granted that it is also cheaper to break bulk of goods in order to secure the cheaper means of carriage *for a short distance*. This, of course, is entirely erroneous. For instance, suppose coal is to be transported from Hyderabad or Sing aréni for shipment at Masulipatam, no consigner would dream of stopping short at Bezváda in order to convey his goods the remaining 40 miles by canal, when he might run them right through to the port by rail. The coal would lose, as I have already pointed out, 5 per cent. in quantity besides the cost of porterage. So with goods landed at Masulipatam and liable to damage by wet, leakage, breakage, or other injury in transhipment, no one consigning to Hyderabad would tranship such goods from the sea cargo-boat to the canal boat and send them 40 miles by water in order that they might be refreighted on the railway at Bezváda. The distance is so small that the less cost of water carriage is not equal to the cost and risk of breaking bulk. With certain kinds of goods such double transhipment might be resorted to, but always with loss of security as the set-off against a trifling gain. So much as to the general question of transport of goods between Masulipatam and Bezváda when the canals are open for navigation.

16. The passenger traffic, whether local or through, would all fall to the railway. The ordinary single fare by boat from Bezváda to Masulipatam or *vice versá* is 7 annas. The journey takes 20 to 24 hours with the current and 30 to 40 hours upstream. The passengers are jammed together, experience the greatest discomfort, and are loud in their complaints. I enclose a printed paper, from the secretary of a local society, detailing the miseries of the passengers during transit. By rail the charge for 50 miles would be no more than the boat-fare and the journey would be completed in four or five hours at the utmost. I regret that I cannot obtain exact information as to the present number of passengers by canal. All I can find out is that there must have been more than 38,000 in the nine months ending February last.

17. There is, however, another important consideration. The canals are open for traffic barely nine months in the year. For three full months (March, April, May) all traffic not by cart must be carried by rail. It happens too that these are the three months when the grain traffic would be most active if communications allowed. The crops are harvested in January and garnered in that month and in February. At present there is rush to utilise the canals before they close at the end of February. After that time all transport must go on by carts or else be deferred till the canals re-open. Both these processes are disadvantageous to the former, who loses in the one case by excess of competition, and in the other by having to raise money to pay the Government land assessment and for other purposes till his grain can be sold.

18. It must further be noted that, with the extension of the Nizam's State Railway to Masulipatam, much of the trade from England to Hyderabad must eventually

be diverted *viá* Masulipatam. This may seem a startling assertion, seeing that Hyderabad is now served by railway direct from Bombay. But the distance from Bombay to Hyderabad by rail is 490 miles, while the distance from Masulipatam to Hyderabad by rail will be 220 miles. The saving of cost of carriage over 270 miles of railway cannot be over-balanced by the superiority of the port of Bombay, and must, in the long run, determine shippers to go to Masulipatam.

19. In the same way, the extension of the Bellary-Kistna State Railway to Masulipatam will give it a greatly increased through traffic to and from Kurnool all the year round.

20. It is only a portion of the delta that is served by navigable canals, and the roads are in a very backward condition. For a large portion of the delta, therefore, the time for wheeled traffic is limited to the three months when the fields are dry and available for the passage of vehicles. For nine months in the year the traffic of many villages goes on by coolies or pack bullocks. For such tracts, notably in the Gudiváda taluk, the railway would afford an outlet to the sea and to the upland tracts. Short roads would gradually be constructed from outlying villages to act as railway feeders.

21. The extended railway would at once obtain the salt traffic from the two salt factories north of Masulipatam, from which the Nizam's dominions and Kurnool will be largely supplied. In the hot weather, when the canals are closed, transport by pack bullocks is resorted to. In the wet weather there is always risk of loss, whether the transport be by bullock or canal boat. The railway would secure the traffic by removing the risk of loss.

22. Similarly, the extension of the railway will render the Singaréni coal supply available for all ports on the coast by export from Masulipatam. As a triple line would be laid with the gauges of both the railways, coal would be run down for export from the mines to Masulipatam without break of bulk.

23. There remains the very important reason that was given above for the construction of the bridge over the Kistna. The Bellary-Kistna State Railway is a protective work against famine, and should, therefore, be brought into communication not only with a large grain-producing tract of country, but also with the sea, whence supplies can at all times be poured in for despatch inland.

24. I have said nothing, so far, of the great advantage which would fall to the district from an administrative point of view by the proposed extension. As the Government are aware, Masulipatam is so awkwardly situated that proposals have been made for the transfer of the head-quarters of the district to Bezváda. During the short time I have been here, the transfer of two public offices has been locally urged. All this would be ended by the railway extension to Masulipatam. The town would become easy, instead of difficult of access, suitors and witnesses could attend the courts without trouble and with great saving of time, and official communication of every kind would be greatly facilitated.

25. Finally, it may be remarked that the 50 miles of railway through the delta would probably pay a far higher percentage than any other equal section of either railway. The Masulipatam Municipality and numerous interested persons are anxious that the District Board should undertake the work. This, however, is out of the question. It is too large and too expensive a work for a District Board to attempt. The task could be undertaken by the Nizam's Government to bring the Nizam's State Railway into rail communication with a sea-port, or it can be accepted by Government as a natural and integral portion of the Bellary-Kistna State Railway.

26. On reviewing the project, the difficulty is to find valid reasons against it. It is probably the first time in the history of railway construction that it has been arranged to stop two separate lines of railway at a junction within 50 miles of a sea-port town with 40,000 inhabitants and with a sea-borne trade of nearly half-a-million sterling, while a fertile rice-producing country, lacking nothing so much as means of communication, lies on the road between.

27. I beg that the Government, on considering the reasons I have advanced, will permit a preliminary survey of the proposed line to be made during the next dry season.

28. A map of the country concerned and petitions in favor of the scheme from local bodies and towns are herewith enclosed.

Transferred to the Public Works Department (Railway Branch).

(Signed) H. E. STOKES,
Ag. Chief Secretary.

8th November 1887.

COPY of Mr. Molesworth's note on Mr. Turner's proposal for an East Coast of India Railway.

I have studied, with much interest, Mr. Turner's able memorandum on a proposal for an East Coast of India Railway, and I consider the project is well worthy of more extended consideration.

2. The enormous population and increasing traffic of the districts through which the projected line would pass indicate the desirability of introducing railway communication into it for the further development of this important tract of country.

3. I have already pointed out the necessity for connecting the Nizam's State Railway system and the Singaréni coal-fields with the Godávari canals, from which it will be cut off under the present arrangements for several months in the year.

4. It is unnecessary, however, as a preliminary measure, before a detailed survey can be commenced, to undertake a reconnaissance of the country between Ganjam and Cocanada in order to ascertain whether any serious difficulties present themselves to the construction of such a railway.

5. In connection with this project I am of opinion that a line of railway from Cuttack *viâ* Balasore and Midnapore to Hooghly, so as to obtain access to Calcutta by the bridge over the river at that point, might with advantage form an integral portion of the projected system of the East Coast of India Railway.

6. Should the Government of India consider the project worthy of further consideration, I could undertake the necessary reconnaissance of the doubtful points of the railway in conjunction with Colonel C. J. Smith, the Consulting Engineer for Railways to the Government of Madras.

(Initialled) G. L. M.

7th December 1887.

From Colonel C. J. SMITH, R.E., Joint Secretary to the Government of Madras, Public Works Department, to the Secretary to the Government of India, Public Works Department, dated Madras, 24th December 1887, No. 966 R.

I am directed to forward, for the consideration of the Government of India, a memorandum on a proposal for an East Coast of India Railway, together with an index plan and a short note by Mr. Molesworth, the Consulting Engineer to the Government of India for State Railways, whose views upon the memorandum were recently sought during his tour in this Presidency.

2. I am to urge very strongly the expediency of permitting at an early date the reconnaissance which Mr. Molesworth suggests as a necessary preliminary step to a further investigation of the project, a portion of which at least is essential for the full development of traffic on the line now under construction to Bezváda.

Note by the Secretary to Government, Public Works Department.

Mr. Arundel's arguments in favor of a bridge across the Kistna at Bezváda are for the most part sound, and I have no doubt that a bridge will be found necessary, a steam ferry being merely the *ad interim* link between the broad and narrow gauge railways; but I do not agree with the remarks in paragraph 8 of the letter, showing that only 40 trucks per diem could be sent across the river without a bridge. I believe much more might be passed over.

2. Regarding the proposition to connect Masulipatam with Bezváda by a line of railway passing through Gudiváda, I consider that, when the system of railways advocated by Mr. Turner is undertaken, such a line would be a very useful addition, but I look on the proposal, as it stands at present, as an attempt to bolster up the moribund port of Bandar which would lead to perfectly useless expenditure. I think

that expenditure on the Bandar port would only be justifiable if there were no other ports from which the produce of the delta could be shipped; but Cocanada, which will continue to be the port of the east coast unless a harbour is constructed at Vizagapatam, is directly connected with the eastern delta of the Kistna by two navigable canals, the Ellore and the Polraz canal, and will shortly have a third connecting line *viâ* Bantumille, of which the two last-named run through the Gudiváda taluk, while the Masulipatam canal connects the port of Bandar with the two first. It is true that these canals are navigable only for nine months in the year, but it must be remembered that during the other three months the delta can be traversed in almost any direction by carts, and the ryots' bullocks are absolutely idle, so that produce can be carted either to Bezváda or Masulipatam at very trifling cost. I therefore consider that railway communication between Bezváda and Masulipatam is not a pressing necessity, and that many other lines deserve prior consideration.

(Signed) J. O. HASTED, Colonel, R.E.,
Chief Engineer, P.W.D.

28th December 1887.

From Major M. C. BRACKENBURY, R.E., Under Secretary to the Government of India, Public Works Department (Railway—Construction), to the Secretary to the Government of Madras, Public Works Department, dated Calcutta, 13th February 1888, No. 212 R.C.

I am directed to acknowledge the receipt of your letter, No. 966 R., of the 24th December 1887, submitting a memorandum on a proposal for the construction of a railway which, starting from Bezváda, would run along the eastern coast of India and join the projected Benares-Puri line near Khurda.

With the memorandum is also submitted a note on the project, written by the Consulting Engineer to the Government of India for State Railways, in which he proposes an extension of this east coast line to Calcutta direct *viâ* Cuttack, Balasore and Midnapore; Mr. Molesworth also recommends a reconnaissance of the country between Ganjam and Cocanada, and the Madras Government asks that this may be made.

2. In reply, I am to say that, provided the cost is moderate, the Government of India has no objection to the reconnaissance between Ganjam and Cocanada being effected. It is observed from paragraph 7 of the memorandum accompanying your letter that a section of this tract of country, which lies between Vizagapatam and Vizianagrum, has already been surveyed, demarcated and estimated for.

ORDER—dated 25th February 1888, No. 159 R., Public Works.

Communicated to the Consulting Engineer for Railways for consideration and report.

(True Extract.)

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

To the Consulting Engineer for Railways.
" Secretary to Government, Public Works Department.
" Chief Engineer for Irrigation.
" Newspapers.

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Order thereon No 1530 h
dy 25th May 1888

Recorded.

25-4-88

No 1530 W. dy 25-5-88

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Land: Dept.
Revenue Dept.
L & M Dept