Date taken out.	For what purpose.			Initials of clerk taking the paper or of attender.	Date returned.	Initials of attender.
	Department.	C. No.	Year.			

Marine (1897) Department.

G.O., No. 773 mar

DATED 2d September 1897

[Despatch Abstract.]

East Coast Railway: Ordr. Pros Coms to the manager of the — the Senior Govt Inspector's report of inspection of that Railway for the halfyear ended the 30th June 1897, recorded.

[M. 6. 500—23-8-97.]

Indexed. 10/9/97

BACK PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.
"	2857 W.	P.W.	3-10-96				
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"	1847 W.	"	20-6-96				
"	247	Mar.:	9-4-96				
"	3573/3572	W. P.W.	22-12-92				

FURTHER PAPERS.

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

Marine Department

RAILWAY.

Government (1897) of Madras.

PUBLIC WORKS.

Current number (11)

Recd. } 30-8 } 1897.
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G.O., No. 581 R., 21st August 1897.

B
No. 773 Marine 2nd September

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AUGUST.

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9/9/97

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East Coast Railway

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Note
Marine file 1892, of 97

GOVERNMENT OF MADRAS.

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Railway.

Read the following paper:—

Inspection report of the East Coast State Railway for the half-year ended 30th June 1897.

The inspection was made between June 11th and 19th in company with the Traffic Superintendent, the Engineer-in-Chief, and the District Locomotive Superintendent, and part of the time with the Manager and the Locomotive Superintendent.

2. *General.*—The state of the road is generally good, parts of it very good. The inspection party ran over most of it between stations at from 45 to 54 miles per hour without much shaking. The Puri branch is not in a fit state for fast running being too new.

3. *Formation.*—This is generally in good order. But the cuttings as a rule need better draining; the ballast ought simply to be built in between dry stone side walls flush with its top, and all outside should be left free for water and slips. The banks seem very low about miles 481–489. The big bank from mile 496 to 497¼ is still very soft, this being its first rainy season.

4. *Rails and Sleepers.*—These are still new and good. I enquired particularly from the Manager about corrosion in the steel sleepers, and was told that they are lasting excellently, except at a few places near the north end of the line, such as Naupada where, owing to press of construction necessitating their being laid over a salt swamp, they must be replaced by wooden ones. There are a couple of miles of wooden sleepers in sidings at Rhamba which might now come out and replace these steel ones. Very great care was taken when the road south of Vizinagram was being laid that steel sleepers were not put into salt soil where it was possible to detect it. A lot of steel sleepers near mile [illegible] mile 324 require to be changed immediately. If boiled in tar after being scraped they may last well in good ballast.

5. *Ballast.*—Money for ballast has been very scarce, and many miles between Rajahmandri and Tuni are much in need of a better supply. Most of the rest of the line, however, is very well supplied. The greater part of the Puri branch is still unballasted. The worst ballasted parts on the main line are, close to Bezwada, between Kadiam and Dewarpudi, the Coconada branch, between Naupada and Pundi, between Sompeta and Ichapur, between Berhampur and the Rushikulia, and in the neighbourhood of Humma. A good deal of ballast was being collected by famine labour at various places under an agreement with the railway for taking it over at an agreed price whenever wanted; a good deal of ballast is also lying along the side of the railway in places. As most of the bank is now four or five years old, there need be no hesitation in any longer deferring its proper ballasting, wherever money is not the obstacle. The sand ballast between mile 74 and 92 makes an excellent road, but it is dusty, and ought, as on the Madras Railway, to be covered with a thin coat of broken stone. It would be advisable to adopt a regular type section of ballast for each description of sleeper; at present each Sub-Inspector or each gang of coolies seems to trim it as his fancy moves him. The best section for all kinds of ballast for steel sleepers is one which leaves the middle third of the sleeper unsupported.

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A similar set of sections, on the identical same lines, would now be useful, and would, I anticipate, show the river practically unchanged since *before* the training was done, as the result of the careful choice of the position of the bridge. I was told that there is not a sign of any undermining of the training works stone. The water being pumped from the abutment wells for locomotive use is excellent.

7. *Bridges generally.*—The Western Kistna canal bridge was designed as a level crossing; but, though gated and manned it is not so used for some unknown reason. It ought to be thrown open to the public. In the Langulia and several other 100 and 150 feet girder bridges, the flooring design consists of corrugations large enough to carry the longitudinal rail timbers. It is practically impossible to properly bed the timbers into these irregular-shaped troughs, and there is a tendency for the timbers to roll and for the gauge to spread, which can only be safe-guarded by tie rods through the rail webs. The design of such floors in my opinion demands reconsideration; I can only suppose that they were designed for roadways to carry carts, and even for this the design is unsuitable. Three small culverts—one 3 feet at mile 382/16, two 3 feet at mile 383/9 and two 15 feet at mile 382/9—were shown me which have been badly cracked. The cracks were found and reported on the 16th June and are attributed to the earthquake of the 12th, which is likely enough. Arrangements are being made, I understand, for making them safe. The girders on the 7 × 60 bridge on the Puri branch, mile 20/15, should be coach-screwed to their bed plates.

8. *Flood waterways*—On Bezwada-Ellore section. These are all complete now. The 2,500 feet of causeway at mile 28/11, 16 feet on top with slopes 1 to 1 up-stream and 3 to 1 down-stream, and level with the ground except at its flanks, has been made a good job of. I was told that it cost just Rs. 10 per foot run. The extra waterway now given will probably save the line from being breached when occasional irrigation tanks burst; although several miles of causeways would probably not suffice to save it from destruction if the many square miles of tanks, in regular chains one above the other, that caused the severe breaches in 1896 should again give way. For ordinary maximum rainfall the original waterways were sufficient, but the bursting of a chain of tanks may easily be equivalent to a rainfall of 200 inches in 24 hours. The Manager informed me that he keeps a regular patrol on the tanks now, and warns the owners and the civil authorities when they seem likely to cause disaster.

9. *Station buildings.*—When the early construction Engineers had a free hand and plenty of money, a considerable number of more or less palatial buildings were erected without sufficient subsequent justification in some cases in the way of traffic. Later on all this was stopped, and when, during 1892–93, every available rupee was needed to get rails through to Vizianagram before the rains should commence, a number of the merest huts were run up at certain stations, in order to begin working somehow. Later on, when it was possible to settle down to a definite policy, a very neat type of cheap station was got out and adhered to, and the majority of the stations on the line are now of this type. They are in every way satisfactory, and when the traffic shows that it deserves more they can be extended. The platform walls of these newer stations mostly consist of a row of long dressed stones laid on the bank, with platforms little if at all over rail height. This is quite good enough and very neat. But some of the original hurriedly opened stations have still been left with earthen platforms above rail height, and with either a turf edge which has worn away below the carriage steps, or no edge at all. These are to be found at Mustabad, Viravalli, Kalaparu, Vangatur, Kovur, Golaprolu and perhaps at some other places. They are not safe and should be set right at once.

10. *Particular stations.*—At some stations I found that time and fare tables were not posted up. Pulla is a small flag station which the Traffic officers say would do a good deal of business if better communication across the canal were arranged for. At Nidadavol the goods siding ought to be right along the canal instead of being 40 yards away. At Rajahmandri the Traffic department are anxious to get the running room for a residence and office for the District Traffic Superintendent, giving another house that is available for the running room. At Kadium the south

distant signal ought to be put out at the apex of the curve where it will be visible, not only to approaching trains, but to the stationmaster. At present it is subsidized by a repeater several hundred yards outside, which however is never worked. Samalkotta is said by every one to be quite unworkable as a junction. A good design was got out for it in 1893, but it has never been carried out. Two cross-over roads would cobble up the present arrangement of sidings and render them less unworkable. The Traffic department say they want more quarters at Samalkotta. An extra 3rd-class passenger shed is badly wanted on the platform, and a small goods-shed on the canal would also be useful. Several pointsmen, or at least a great deal of running about, might be saved at this junction if some of the points were grouped. At Coconada the 3rd-class waiting-shed needs lengthening. At Coconada Port, working would be rendered very much easier if there were a scissors-crossing about opposite the middle of the long goods-shed. At Pittapur there is said to be a large passenger traffic, and the 3rd-class shed is not large enough. The Traffic want a shunting dead end here very badly; indeed dead ends are needed at many stations where they were omitted some years ago merely for want of material. Durgada is a flag station at a quarry siding, the latter being supplied with a catch siding; the stationmaster keeps the keys of both main and catch sidings. The station at Tuni, where refreshment-rooms are, is quite a model one, with flowers in pots and foliage plants; the refreshment-room here is very properly a temporary building. A good deal of business gets done at Tuni. At Vizianagram they are building a large rail tank staging. From Dusi station a road to Chicacole is badly wanted. As the railway was originally laid out here so as to avoid the business town of Chicacole, the mistake might now be to some degree corrected by the construction of feeder roads by famine labour. Dusi which earned only Rs. 50 per week last year is said to be earning Rs. 100 this year. Chicacole road station, old Aidavalsa, is doing a very good business. The goods traffic from Parlakimedi road station is said to go only to Vizianagram. There is said to be a large passenger traffic here, and a larger waiting-shed is needed. At Kotabomali the civil subordinates have, in spite of prohibition from the Railway authorities, built their sheds for famine coolies inside railway station land, and almost close up to the station buildings. At Naupada a dead end is badly wanted for the salt wagons for Cuttack. At Palasa the south signals worked stiffly and did not fly to danger. Better 3rd-class accommodation seems to be wanted at Ichapur. From Berhampur there used to be a heavy export of rice to Cochin and Colombo, but the B.I.S.N. Co. are said to have raised their rates 50 per cent. and killed the export. From Humma they say they send away to Orissa from one to three wagons of salt daily. At Khurda road, the junction for the Puri branch, a cheap lamp room is badly wanted. A lighting up furnace is also said to be wanted here. The facing points for a construction store-yard 200 yards outside Khurda junction ought to come out as soon as they are no longer wanted. At Bubaneshwar a waiting-shed for pilgrims is badly needed. At Barang, the northern terminus, arrangements are still a little immature, the Bengal-Nagpur lines being used for goods lines. Over 900 persons have booked here in one day for Puri and Bubaneshwar. The goods from here go chiefly to Vizianagram. During the Puri car festival, a week before the inspection, Rs. 5,600 was taken at Barang station, which argues well for the future. At Barang terminus is a triangle, and its points, which are at the signal, are ordinarily kept locked.

11. *Puri branch.*—The banks on this branch are very soft still. It is really scarcely fit for running, but during the week of the car festival they had 70 engines of the 95-ton type over the road. The maintenance gangs consist of six men a mile, but a good strong construction gang is wanted to get the road thoroughly ballasted and packed if it is to be kept running. The Manager has issued the necessary orders. Meanwhile I have informed him that the branch should not be run over at speeds higher than the following: 1st station—length, from Khurda road, not to exceed 20, 2nd station—length 10, and 3rd station, length 5, miles per hour. I was told that everything is settled about the terminal site at Puri and that the Collector's official acceptance of it has now been obtained, and that meanwhile the bridging on the extension towards the town is being gone on with. The present terminus is merely temporary with grass huts and rails on the ground.

12. *Vizagapatam*—I looked into the question of the alleged interference of the swamp line with the water-holding capacity of the backwater. It has been stated that enough waterway was not left in the line to allow the enclosed piece of swamp to take in all the tide that it ought to take in if the bar-scouring capacity of this piece of the backwater is not to be nullified. The result of my enquiries proved conclusively that the waterway is amply sufficient. I had levels taken throughout a six-hour period of fall of tide from highest to lowest, and found that at top and bottom of tide the water inside and that outside are at precisely the same level, though naturally at half tide the level outside when tide is rising, or inside when it is falling, is about 16 inches above the inside or outside water, respectively. The openings given are three forty feet spans and also six circular cast-iron culverts, 4 feet diameter.

13. *Vizagapatam inner harbour face.*—Excellent work has been done by the railway in running a loose stone face or bund along outside the shallow shore, and filling it up behind with sand, and so not only greatly enlarging the station yard, but allowing deep laden boats to lie up close alongside. This has been done out of funds supplied by the special harbour cess that has been levied for some years back. Now that the swamp line has been accepted as the proper entrance to the harbour station, it will be possible to make the harbour sidings workable, an impossibility so long as the Ross Hill line was the means of access.

14. *Vizagapatam Railway Station.*—When all arrangements at the harbour face are completed, and the terminal station buildings run up, it will be as well to abolish the present Vizagapatam town station, unless it be found possible to run round along the sea face by a loop, and return inside the present town station; this seems likely to be a very good arrangement.

14A. *Locomotive watering.*—Locomotives are watered at Sitanagram main engine station by a steam pump working from the neighbouring canal, while all the time an ample supply of good water can be got from the Kistna bridge north abutment. The pump in the wells of the latter has 2 barrels, 6″ diameter and 12″ stroke, but all it is doing at present is forcing a little stream of water, 20,000 gallons per day, over to the Bezwada tank; not one-fourth of what it is designed to do. Sitanagram wants 30,000 gallons more and this the same pump could easily supply from the pure abutment source. The reason why it is doing so little is that it is being made to force the water through a small 3″ pipe that was originally laid down four years ago for a small pump of not a quarter the capacity of the present one. This might well be seen to and two 6″ pipes laid down from the steam pump, to Sitanagram engine station at one side and to Bezwada watering station on the other. At Tadapalligudem the well water is a failure and they pump from the canal; an artesian pipe might be tried; see next paragraph. All engine water for Coconada is carried by train from Samalkotta; this is quite avoidable as I shall show. At Palasa locomotive station the water is good, but there is not enough of it, the well is only 30 feet deep. An artesian tube might be tried in the bottom of the well. The water-supply at Kalupara ghat is said to be excellent, and this might be made a watering station, it is not so now. The well at Tapang is said to be excellent.

15. *Artesian water.*—The experiment made in 1892–93 of putting down artesian tubes, when at 40 or 50 feet water did not appear in the station wells of Rajahmundri and Samalkotta, has proved a great success, providing a perpetual supply of the best water. Similarly the experiment was tried at Ellore, and there also, I hear, successfully. At none of these places had there ever before been anything that could be called pure water, and at neither Ellore nor Samalkotta had even clear-looking water been obtainable. The experiment was then tried of driving a pipe down in the bottom of the 30 feet well at Coconada whose only water-supply had heretofore been the canal. Here the 4″ pipe when driven 285 feet from the surface collapsed about 35 feet down, and the attempt was given up. But nevertheless this same collapsed pipe is even now pouring out water at the surface; dirty rusty water, and a mere trickle, as the result, of course, of the broken pipe; but veritable artesian water all the same, rising over the surface. It would seem to be worth while to go at this again and make a good job of it instead of training water down every day from Samalkotta in tanks. But all the same, whether good water be got or not at Coconada, that is not the place

for the engines working the branch. They ought, of course, to be at Samalkotta as intended in 1893, and as provided in the plan then prepared for that junction. For, once the Godavari bridge is open, Samalkotta will be the midway engine station between Bezwada and Waltair. The Coconada engine shed can be cheaply moved, and the two houses which would apparently be thrown away would easily rent or sell.

16. *The Godavari Ferry.*—This is working very well. They have two steamers, each 110 nominal, or 400 indicated, horse-power, and four pontoons to hold three waggons each. They have not as yet been taking any goods for the public in waggons across the river, and have confined themselves to taking across only coal and stores for the railway, and material going south to the Bezwada-Madras and north to the Bengal-Nagpur Railways. The 90-ton flats are said to carry 2,000 maunds in bulk, but only 1,0 0 in waggons, and in flood they will only carry two waggons each instead of three. The passenger arrangements on board the steamers are very good. The method of attaching the rails on the pontoons to those on the shore is primitive and may easily be improved. At the north bank the arrangements are good; there are two low sidings down near low water and two high sidings on the high flood bank, and a third low siding leads on to the pontoons at low-level. A goods-shed at the river is badly wanted; 2,000 bags of grain are often exposed there. The station office was said to be leaking.

17. *The Manganese ore trade.*—This seems likely to develop into a very big business. Garavidi is the chief station where it comes on the railway at present, but ore is expected to be offered at Sigadam and Chippurupalle. Garavidi is said by the Traffic Superintendent to have already this year sent away 50,000 tons. From January to end of June it was said to have averaged 150 tons a day, and some days 25 waggons of 14 tons each. The ore is 20 cubic feet to the ton. The Manganese Company talk of laying a ten-mile tramway to Gurbam, where a lot more ore is to be got. If this trade goes on developing, it will go far to justify the making of Vizagapatam harbour.

18. *Land demarcation.*—This has been done between Bezwada and Waltair and is going on elsewhere.

19. *The Salt trade.*—I do not believe that the officers of the East Coast Railway fully realize what a very important thing it is to try and get the salt traffic, and, in return, the loads of the carts that come down from the interior to take back salt. It ought to be their policy to encourage Vizianagram and Tuni to become the termini of the inland cart traffic instead of, as at present, Vizagapatam; and I think this could be done by a more advanced policy. Similarly as regards the more northern factories and the salt trade to Orissa, and eventually to Calcutta where the price of Liverpool salt is four times that of sea salt at Ganjam.

20. *The Locomotive Department.*—I think that some more shelter for engines is required at Sitanagram. I inspected the shops at Waltair which are the construction shops of early days. They are, in my opinion, good enough to go on with for some years to come, or until the future of the line is settled. I was told that new piping was very badly wanted between the new Root's blower and the smithy forges. It was brought to my notice that several of the big crank axles of the 95-ton engines had failed, a crack appearing in the web of the crank. The Locomotive Superintendent was shrinking a ring round the oval web. The crack seems to begin in the main shaft and to stretch out towards the crank journal. This is a matter worthy of Sir A. Rendell's notice. Another thing brought to my notice was the great frequency of the breakage of vehicle coupling shackles, not the screws themselves but the shackles. This is said to be due to the length of recoil of the buffer and draw-bar springs, and a new sort of spring with shorter recoil is being tried. The shops are rather cramped in the matter of exit from the back *viâ* the traverser; this can be corrected by a small alteration of the sidings back of the engine-shed as discussed on the ground. My attention was not called to the defective tube plates of the compound locomotives until after my return to Madras.

21. *The Bezwada-Kistna Canal Junction section.*—The Railway authorities were anxious to get leave to open for all traffic the 2·66 mile section from Bezwada over the Kistna to the point of junction with the Madras-Bezwada and Southern Mahratta Railways. This short section is on the mixed gauge. I see no objection when two or three minor matters that were pointed out on inspection have been attended to, and when a distant signal has been erected on the Bezwada-Madras Railway. A small waiting-shed and a rail level platform are wanted at Kistna Canal Junction.

22. *Canal competition.*—The Railway officials say that it will be impossible for the railway to secure any large proportion of the traffic, now carried by canal alongside of it, unless an end is put to the practice of issuing licenses to boats to ply for hire on the canals for short periods of a month or six weeks. If all licenses are made half-yearly or yearly the railway will have a chance, because then the swarms of boats which now ordinarily ply in the creeks, and which only appear on the canals during special short spells of busy traffic, will not find that it pays them to take out licenses, and so will have to confine their attention to the more legitimate duty of acting as feeders to the canals. For a full explanation of the conditions affecting the railway and canal competition, the Manager referred me to the note enclosed with his letter No. 2266 of the 16th March 1895.

23. *Kistna Bridge Paint.*—The silicate paint has lost its colour badly and is thin, but no corrosion appears to be going on underneath it at present. I am informed that the composition of the paint was as follows: 1st coat, 1 cwt. silicate paint (Charlton), 6 gallons boiled linseed oil, ½ gallon turpentine; 2nd coat, 1 cwt. same paint, 8 gallons same oil, ½ gallon turpentine; 3rd coat, same as 2nd. The result after about four years' use is certainly unsatisfactory, as the coating is thin and uneven and the colour has quite changed, and changed unequally.

MADRAS,
27th July 1897.

F. J. E. SPRING,
Senior Govt. Inspector of Rys., Madras.

ORDER—No. 581 R., dated 21st August 1897.

Communicated to the Manager, East Coast Railway, for information and necessary action.

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

[Here enter No. 582 R., dated 21st August 1897.]

(True Extract.)

Under Secretary to Government,
Railway Branch.

To the Manager, East Coast Railway.
" Marine Department.
" Engineer-in-Chief, Gódávari Bridge.
" Revenue Department.

Exd. T. K. Narayana Aiyangar.

27-2-19 ✓

Marine Department.

RAILWAY.

Government {1897} of Madras.

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Regd. } *Spare copies*

G.O., No. 581 R., 21st August 1897.

No. 773 Mar. D. 2 Septr /97

— Recorded

AUGUST.

(Sd) D.M.C. / M

To

The P.W.D.

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12. *Vizagapatam.*—I looked into the question of the alleged interference of the swamp line with the water-holding capacity of the backwater. It has been stated that enough waterway was not left in the line to allow the enclosed piece of swamp to take in all the tide that it ought to take in if the bar-scouring capacity of this piece of the backwater is not to be nullified. The result of my enquiries proved conclusively that the waterway is amply sufficient. I had levels taken throughout a six-hour period of fall of tide from highest to lowest, and found that at top and bottom of tide the water inside and that outside are at precisely the same level, though naturally at half tide the level outside when tide is rising, or inside when it is falling, is about 16 inches above the inside or outside water, respectively. The openings given are three forty feet spans and also six circular cast-iron culverts, 4 feet diameter.

13. *Vizagapatam inner harbour face.*—Excellent work has been done by the railway in running a loose stone face or bund along outside the shallow shore, and filling it up behind with sand, and so not only greatly enlarging the station yard, but allowing deep-laden boats to lie up close alongside. This has been done out of funds supplied by the special harbour cess that has been levied for some years back. Now that the swamp line has been accepted as the proper entrance to the harbour station, it will be possible to make the harbour sidings workable, an impossibility so long as the Ross Hill line was the means of access.

14. *Vizagapatam Railway Station.*—When all arrangements at the harbour face are completed, and the terminal station buildings run up, it will be as well to abolish the present Vizagapatam town station, unless it be found possible to run round along the sea face by a loop, and return inside the present town station; this seems likely to be a very good arrangement.

14A. *Locomotive watering.*—Locomotives are watered at Sitanagram main engine station by a steam pump working from the neighbouring canal, while all the time an ample supply of good water can be got from the Kistna bridge north abutment. The pump in the wells of the latter has 2 barrels, 6″ diameter and 12″ stroke, but all it is doing at present is forcing a little stream of water, 20,000 gallons per day, over to the Bezwada tank; not one-fourth of what it is designed to do. Sitanagram wants 30,000 gallons more and this the same pump could easily supply from the pure abutment source. The reason why it is doing so little is that it is being made to force the water through a small 3″ pipe that was originally laid down four years ago for a small pump of not a quarter the capacity of the present one. This might well be seen to and two 6″ pipes laid down from the steam pump, to Sitanagram engine station at one side and to Bezwada watering station on the other. At Tadapalligudem the well water is a failure and they pump from the canal; an artesian pipe might be tried; see next paragraph. All engine water for Coconada is carried by train from Samalkotta; this is quite avoidable as I shall show. At Palasa locomotive station the water is good, but there is not enough of it, the well is only 30 feet deep. An artesian tube might be tried in the bottom of the well. The water-supply at Kalupara ghat is said to be excellent, and this might be made a watering station, it is not so now. The well at Tapang is said to be excellent.

15. *Artesian water.*—The experiment made in 1892–93 of putting down artesian tubes, when at 40 or 50 feet water did not appear in the station wells of Rajahmundri and Samalkotta, has proved a great success, providing a perpetual supply of the best water. Similarly the experiment was tried at Ellore, and there also, I hear, successfully. At none of these places had there ever before been anything that could be called pure water, and at neither Ellore nor Samalkotta had even clear-looking water been obtainable. The experiment was then tried of driving a pipe down in the bottom of the 30 feet well at Coconada whose only water-supply had heretofore been the canal. Here the 4″ pipe when driven 285 feet from the surface collapsed about 35 feet down, and the attempt was given up. But nevertheless this same collapsed pipe is even now pouring out water at the surface; dirty rusty water, and a mere trickle, as the result, of course, of the broken pipe; but veritable artesian water all the same, rising over the surface. It would seem to be worth while to go at this again and make a good job of it instead of training water down every day from Samalkotta in tanks. But all the same, whether good water be got or not at Coconada, that is not the place

for the engines working the branch. They ought, of course, to be at Samalkotta as intended in 1893, and as provided in the plan then prepared for that junction. For, once the Godavari bridge is open, Samalkotta will be the midway engine station between Bezwada and Waltair. The Coconada engine shed can be cheaply moved, and the two houses which would apparently be thrown away would easily rent or sell.

16. *The Godavari Ferry.*—This is working very well. They have two steamers, each 110 nominal, or 400 indicated, horse-power, and four pontoons to hold three waggons each. They have not as yet been taking any goods for the public in waggons across the river, and have confined themselves to taking across only coal and stores for the railway, and material going south to the Bezwada-Madras and north to the Bengal-Nagpur Railways. The 90-ton flats are said to carry 2,000 maunds in bulk, but only 1,0 0 in waggons, and in flood they will only carry two waggons each instead of three. The passenger arrangements on board the steamers are very good. The method of attaching the rails on the pontoons to those on the shore is primitive and may easily be improved. At the north bank the arrangements are good; there are two low sidings down near low water and two high sidings on the high flood bank, and a third low siding leads on to the pontoons at low-level. A goods-shed at the river is badly wanted; 2,000 bags of grain are often exposed there. The station office was said to be leaking.

17. *The Manganese ore trade.*—This seems likely to develop into a very big business. Garavidi is the chief station where it comes on the railway at present, but ore is expected to be offered at Sigadam and Chippurupalle. Garavidi is said by the Traffic Superintendent to have already this year sent away 50,000 tons. From January to end of June it was said to have averaged 150 tons a day, and some days 25 waggons of 14 tons each. The ore is 20 cubic feet to the ton. The Manganese Company talk of laying a ten-mile tramway to Gurbam, where a lot more ore is to be got. If this trade goes on developing, it will go far to justify the making of Vizagapatam harbour.

18. *Land demarcation.*—This has been done between Bezwada and Waltair and is going on elsewhere.

19. *The Salt trade.*—I do not believe that the officers of the East Coast Railway fully realize what a very important thing it is to try and get the salt traffic, and, in return, the loads of the carts that come down from the interior to take back salt. It ought to be their policy to encourage Vizianagram and Tuni to become the termini of the inland cart traffic instead of, as at present, Vizagapatam; and I think this could be done by a more advanced policy. Similarly as regards the more northern factories and the salt trade to Orissa, and eventually to Calcutta where the price of Liverpool salt is four times that of sea salt at Ganjam.

20. *The Locomotive Department.*—I think that some more shelter for engines is required at Sitanagram. I inspected the shops at Waltair which are the construction shops of early days. They are, in my opinion, good enough to go on with for some years to come, or until the future of the line is settled. I was told that new piping was very badly wanted between the new Root's blower and the smithy forges. It was brought to my notice that several of the big crank axles of the 95-ton engines had failed, a crack appearing in the web of the crank. The Locomotive Superintendent was shrinking a ring round the oval web. The crack seems to begin in the main shaft and to stretch out towards the crank journal. This is a matter worthy of Sir A. Rendell's notice. Another thing brought to my notice was the great frequency of the breakage of vehicle coupling shackles, not the screws themselves but the shackles. This is said to be due to the length of recoil of the buffer and draw-bar springs, and a new sort of spring with shorter recoil is being tried. The shops are rather cramped in the matter of exit from the back *viâ* the traverser; this can be corrected by a small alteration of the sidings back of the engine-shed as discussed on the ground. My attention was not called to the defective tube plates of the compound locomotives until after my return to Madras.

21. *The Bezwada-Kistna Canal Junction section.*—The Railway authorities were anxious to get leave to open for all traffic the 2·66 mile section from Bezwada over the Kistna to the point of junction with the Madras-Bezwada and Southern Mahratta

Railways. This short section is on the mixed gauge. I see no objection when two or three minor matters that were pointed out on inspection have been attended to, and when a distant signal has been erected on the Bezwada-Madras Railway. A small waiting-shed and a rail level platform are wanted at Kistna Canal Junction.

22. *Canal competition.*—The Railway officials say that it will be impossible for the railway to secure any large proportion of the traffic, now carried by canal alongside of it, unless an end is put to the practice of issuing licenses to boats to ply for hire on the canals for short periods of a month or six weeks. If all licenses are made half-yearly or yearly the railway will have a chance, because then the swarms of boats which now ordinarily ply in the creeks, and which only appear on the canals during special short spells of busy traffic, will not find that it pays them to take out licenses, and so will have to confine their attention to the more legitimate duty of acting as feeders to the canals. For a full explanation of the conditions affecting the railway and canal competition, the Manager referred me to the note enclosed with his letter No. 2266 of the 16th March 1895.

23. *Kistna Bridge Paint.*—The silicate paint has lost its colour badly and is thin, but no corrosion appears to be going on underneath it at present. I am informed that the composition of the paint was as follows: 1st coat, 1 cwt. silicate paint (Charlton), 6 gallons boiled linseed oil, ½ gallon turpentine; 2nd coat, 1 cwt. same paint, 8 gallons same oil, ½ gallon turpentine; 3rd coat, same as 2nd. The result after about four years' use is certainly unsatisfactory, as the coating is thin and uneven and the colour has quite changed, and changed unequally.

MADRAS,
27th July 1897.

F. J. E. SPRING,
Senior Govt. Inspector of Rys., Madras.

ORDER—No. 581 R., dated 21st August 1897.

Communicated to the Manager, East Coast Railway, for information and necessary action.

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

[Here enter No. 582 R., dated 21st August 1897.]

(True Extract.)

(Signed) F. J. E. SPRING,
Offg. Joint Secy. to Govt.,
Railway Branch.

To the Manager, East Coast Railway.
" Marine Department.
" Engineer-in-Chief, Gódávari Bridge.
" Revenue Department.

Exd. T. K. Narayana Aiyangar.

Marine Department

RAILWAY.

Government {1897} of Madras.

PUBLIC WORKS.

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Regd.		*Spare copies*

G.O., No. 581 R., 21st August 1897.

No. 773 Mar Dy 2 Septr/97

Recorded

AUGUST.

(Sd) D.M.C. / M.

To

The P. P. O.

East Coast Railway

The Senior Government Inspector's report of inspection of the — for the half-year ended the 30th June 1897, communicated to the Manager of that Railway for necessary action, and a copy of the Proceedings ordered to be forwarded to the Government of India.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Railway.

Read the following paper:—

Inspection report of the East Coast State Railway for the half-year ended 30th June 1897.

The inspection was made between June 11th and 19th in company with the Traffic Superintendent, the Engineer-in-Chief, and the District Locomotive Superintendent, and part of the time with the Manager and the Locomotive Superintendent.

2. *General.*—The state of the road is generally good, parts of it very good. The inspection party ran over most of it between stations at from 45 to 54 miles per hour without much shaking. The Puri branch is not in a fit state for fast running being too new.

3. *Formation.*—This is generally in good order. But the cuttings as a rule need better draining; the ballast ought simply to be built in between dry stone side walls flush with its top, and all outside should be left free for water and slips. The banks seem very low about miles 481–489. The big bank from mile 496 to 497¼ is still very soft, this being its first rainy season.

4. *Rails and Sleepers.*—These are still new and good. I enquired particularly from the Manager about corrosion in the steel sleepers, and was told that they are lasting excellently, except at a few places near the north end of the line, such as Naupada where, owing to press of construction necessitating their being laid over a salt swamp, they must be replaced by wooden ones. There are a couple of miles of wooden sleepers in sidings at Rhamba which might now come out and replace these steel ones. Very great care was taken when the road south of Vizinagram was being laid that steel sleepers were not put into salt soil where it was possible to detect it. A lot of steel sleepers near mile 324 require to be changed immediately. If boiled in tar after being scraped they may last well in good ballast.

5. *Ballast.*—Money for ballast has been very scarce, and many miles between Rajahmandri and Tuni are much in need of a better supply. Most of the rest of the line, however, is very well supplied. The greater part of the Puri branch is still unballasted. The worst ballasted parts on the main line are, close to Bezwada, between Kadiam and Dewarpudi, the Coconada branch, between Naupada and Pundi, between Sompeta and Ichapur, between Berhampur and the Rushikulia, and in the neighbourhood of Humma. A good deal of ballast was being collected by famine labour at various places under an agreement with the railway for taking it over at an agreed price whenever wanted; a good deal of ballast is also lying along the side of the railway in places. As most of the bank is now four or five years old, there need be no hesitation in any longer deferring its proper ballasting, wherever money is not the obstacle. The sand ballast between mile 74 and 92 makes an excellent road, but it is dusty, and ought, as on the Madras Railway, to be covered with a thin coat of broken stone. It would be advisable to adopt a regular type section of ballast for each description of sleeper; at present each Sub-Inspector or each gang of coolies seems to trim it as his fancy moves him. The best section for all kinds of ballast for steel sleepers is one which leaves the middle third of the sleeper unsupported.

6. *The Kistna Bridge.*—I was told that Rs. 4,000 for the year was got as rent for the foot-paths on the upper booms. I carefully noticed that there is no appreciable change in the bed of the river since before the bridge was built. I have got a series of sections taken across between the bridge and the anicut, parallel to the former and at 500 feet intervals, one season before and two seasons after the river was trained.

A similar set of sections, on the identical same lines, would now be useful, and would, I anticipate, show the river practically unchanged since *before* the training was done, as the result of the careful choice of the position of the bridge. I was told that there is not a sign of any undermining of the training works stone. The water being pumped from the abutment wells for locomotive use is excellent.

7. *Bridges generally.*—The Western Kistna canal bridge was designed as a level crossing; but, though gated and manned it is not so used for some unknown reason. It ought to be thrown open to the public. In the Langulia and several other 100 and 150 feet girder bridges, the flooring design consists of corrugations large enough to carry the longitudinal rail timbers. It is practically impossible to properly bed the timbers into these irregular-shaped troughs, and there is a tendency for the timbers to roll and for the gauge to spread, which can only be safe-guarded by tie rods through the rail webs. The design of such floors in my opinion demands reconsideration; I can only suppose that they were designed for roadways to carry carts, and even for this the design is unsuitable. Three small culverts—one 3 feet at mile 382/16, two 3 feet at mile 383/9 and two 15 feet at mile 382/9—were shown me which have been badly cracked. The cracks were found and reported on the 16th June and are attributed to the earthquake of the 12th, which is likely enough. Arrangements are being made, I understand, for making them safe. The girders on the 7 × 60 bridge on the Puri branch, mile 20/15, should be coach-screwed to their bed plates.

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distant signal ought to be put out at the apex of the curve where it will be visible, not only to approaching trains, but to the stationmaster. At present it is subsidized by a repeater several hundred yards outside, which however is never worked. Samalkotta is said by every one to be quite unworkable as a junction. A good design was got out for it in 1893, but it has never been carried out. Two cross-over roads would cobble up the present arrangement of sidings and render them less unworkable. The Traffic department say they want more quarters at Samalkotta. An extra 3rd-class passenger shed is badly wanted on the platform, and a small goods-shed on the canal would also be useful. Several pointsmen, or at least a great deal of running about, might be saved at this junction if some of the points were grouped. At Coconada the 3rd-class waiting-shed needs lengthening. At Coconada Port, working would be rendered very much easier if there were a scissors-crossing about opposite the middle of the long goods-shed. At Pittapur there is said to be a large passenger traffic, and the 3rd-class shed is not large enough. The Traffic want a shunting dead end here very badly; indeed dead ends are needed at many stations where they were omitted some years ago merely for want of material. Durgada is a flag station at a quarry siding, the latter being supplied with a catch siding; the stationmaster keeps the keys of both main and catch sidings. The station at Tuni, where refreshment-rooms are, is quite a model one, with flowers in pots and foliage plants; the refreshment-room here is very properly a temporary building. A good deal of business gets done at Tuni. At Vizianagram they are building a large rail tank staging. From Dusi station a road to Chicacole is badly wanted. As the railway was originally laid out here so as to avoid the business town of Chicacole, the mistake might now be to some degree corrected by the construction of feeder roads by famine labour. Dusi which earned only Rs. 50 per week last year is said to be earning Rs. 100 this year. Chicacole road station, old Aidavalsa, is doing a very good business. The goods traffic from Parlakimedi road station is said to go only to Vizianagram. There is said to be a large passenger traffic here, and a larger waiting-shed is needed. At Kotabomali the civil subordinates have, in spite of prohibition from the Railway authorities, built their sheds for famine coolies inside railway station land, and almost close up to the station buildings. At Naupada a dead end is badly wanted for the salt wagons for Cuttack. At Palasa the south signals worked stiffly and did not fly to danger. Better 3rd-class accommodation seems to be wanted at Ichapur. From Berhampur there used to be a heavy export of rice to Cochin and Colombo, but the B.I.S.N. Co. are said to have raised their rates 50 per cent. and killed the export. From Humma they say they send away to Orissa from one to three wagons of salt daily. At Khurda road, the junction for the Puri branch, a cheap lamp room is badly wanted. A lighting up furnace is also said to be wanted here. The facing points for a construction store-yard 200 yards outside Khurda junction ought to come out as soon as they are no longer wanted. At Bubaneshwar a waiting-shed for pilgrims is badly needed. At Barang, the northern terminus, arrangements are still a little immature, the Bengal-Nagpur lines being used for goods lines. Over 900 persons have booked here in one day for Puri and Bubaneshwar. The goods from here go chiefly to Vizianagram. During the Puri car festival, a week before the inspection, Rs. 5,600 was taken at Barang station, which argues well for the future. At Barang terminus is a triangle, and its points, which are at the signal, are ordinarily kept locked.

11. *Puri branch.*—The banks on this branch are very soft still. It is really scarcely fit for running, but during the week of the car festival they had 70 engines of the 95-ton type over the road. The maintenance gangs consist of six men a mile, but a good strong construction gang is wanted to get the road thoroughly ballasted and packed if it is to be kept running. The Manager has issued the necessary orders. Meanwhile I have informed him that the branch should not be run over at speeds higher than the following: 1st station—length, from Khurda road, not to exceed 20, 2nd station—length 10, and 3rd station, length 5, miles per hour. I was told that everything is settled about the terminal site at Puri and that the Collector's official acceptance of it has now been obtained, and that meanwhile the bridging on the extension towards the town is being gone on with. The present terminus is merely temporary with grass huts and rails on the ground.

12. *Vizagapatam.*—I looked into the question of the alleged interference of the swamp line with the water-holding capacity of the backwater. It has been stated that enough waterway was not left in the line to allow the enclosed piece of swamp to take in all the tide that it ought to take in if the bar-scouring capacity of this piece of the backwater is not to be nullified. The result of my enquiries proved conclusively that the waterway is amply sufficient. I had levels taken throughout a six-hour period of fall of tide from highest to lowest, and found that at top and bottom of tide the water inside and that outside are at precisely the same level, though naturally at half tide the level outside when tide is rising, or inside when it is falling, is about 16 inches above the inside or outside water, respectively. The openings given are three forty feet spans and also six circular cast-iron culverts, 4 feet diameter.

13. *Vizagapatam inner harbour face.*—Excellent work has been done by the railway in running a loose stone face or bund along outside the shallow shore, and filling it up behind with sand, and so not only greatly enlarging the station yard, but allowing deep laden boats to lie up close alongside. This has been done out of funds supplied by the special harbour cess that has been levied for some years back. Now that the swamp line has been accepted as the proper entrance to the harbour station, it will be possible to make the harbour sidings workable, an impossibility so long as the Ross Hill line was the means of access.

14. *Vizagapatam Railway Station.*—When all arrangements at the harbour face are completed, and the terminal station buildings run up, it will be as well to abolish the present Vizagapatam town station, unless it be found possible to run round along the sea face by a loop, and return inside the present town station; this seems likely to be a very good arrangement.

14A. *Locomotive watering.*—Locomotives are watered at Sitanagram main engine station by a steam pump working from the neighbouring canal, while all the time an ample supply of good water can be got from the Kistna bridge north abutment. The pump in the wells of the latter has 2 barrels, 6″ diameter and 12″ stroke, but all it is doing at present is forcing a little stream of water, 20,000 gallons per day, over to the Bezwada tank; not one-fourth of what it is designed to do. Sitanagram wants 30,000 gallons more and this the same pump could easily supply from the pure abutment source. The reason why it is doing so little is that it is being made to force the water through a small 3″ pipe that was originally laid down four years ago for a small pump of not a quarter the capacity of the present one. This might well be seen to and two 6″ pipes laid down from the steam pump, to Sitanagram engine station at one side and to Bezwada watering station on the other. At Tadapalligudem the well water is a failure and they pump from the canal; an artesian pipe might be tried; see next paragraph. All engine water for Coconada is carried by train from Samalkotta; this is quite avoidable as I shall show. At Palasa locomotive station the water is good, but there is not enough of it, the well is only 30 feet deep. An artesian tube might be tried in the bottom of the well. The water-supply at Kalupara ghat is said to be excellent, and this might be made a watering station, it is not so now. The well at Tapang is said to be excellent.

15. *Artesian water.*—The experiment made in 1892–93 of putting down artesian tubes, when at 40 or 50 feet water did not appear in the station wells of Rajahmundri and Samalkotta, has proved a great success, providing a perpetual supply of the best water. Similarly the experiment was tried at Ellore, and there also, I hear, successfully. At none of these places had there ever before been anything that could be called pure water, and at neither Ellore nor Samalkotta had even clear-looking water been obtainable. The experiment was then tried of driving a pipe down in the bottom of the 30 feet well at Coconada whose only water-supply had heretofore been the canal. Here the 4″ pipe when driven 285 feet from the surface collapsed about 35 feet down, and the attempt was given up. But nevertheless this same collapsed pipe is even now pouring out water at the surface; dirty rusty water, and a mere trickle, as the result, of course, of the broken pipe; but veritable artesian water all the same, rising over the surface. It would seem to be worth while to go at this again and make a good job of it instead of training water down every day from Samalkotta in tanks. But all the same, whether good water be got or not at Coconada, that is not the place

for the engines working the branch. They ought, of course, to be at Samalkotta as intended in 1893, and as provided in the plan then prepared for that junction. For, once the Godavari bridge is open, Samalkotta will be the midway engine station between Bezwada and Waltair. The Coconada engine shed can be cheaply moved, and the two houses which would apparently be thrown away would easily rent or sell.

16. *The Godavari Ferry.*—This is working very well. They have two steamers, each 110 nominal, or 400 indicated, horse-power, and four pontoons to hold three waggons each. They have not as yet been taking any goods for the public in waggons across the river, and have confined themselves to taking across only coal and stores for the railway, and material going south to the Bezwada-Madras and north to the Bengal-Nagpur Railways. The 90-ton flats are said to carry 2,000 maunds in bulk, but only 1,000 in waggons, and in flood they will only carry two waggons each instead of three. The passenger arrangements on board the steamers are very good. The method of attaching the rails on the pontoons to those on the shore is primitive and may easily be improved. At the north bank the arrangements are good; there are two low sidings down near low water and two high sidings on the high flood bank, and a third low siding leads on to the pontoons at low-level. A goods-shed at the river is badly wanted; 2,000 bags of grain are often exposed there. The station office was said to be leaking.

17. *The Manganese ore trade.*—This seems likely to develop into a very big business. Garavidi is the chief station where it comes on the railway at present, but ore is expected to be offered at Sigadam and Chippurupalle. Garavidi is said by the Traffic Superintendent to have already this year sent away 50,000 tons. From January to end of June it was said to have averaged 150 tons a day, and some days 25 waggons of 14 tons each. The ore is 20 cubic feet to the ton. The Manganese Company talk of laying a ten-mile tramway to Gurbam, where a lot more ore is to be got. If this trade goes on developing, it will go far to justify the making of Vizagapatam harbour.

18. *Land demarcation.*—This has been done between Bezwada and Waltair and is going on elsewhere.

19. *The Salt trade.*—I do not believe that the officers of the East Coast Railway fully realize what a very important thing it is to try and get the salt traffic, and, in return, the loads of the carts that come down from the interior to take back salt. It ought to be their policy to encourage Vizianagram and Tuni to become the termini of the inland cart traffic instead of, as at present, Vizagapatam; and I think this could be done by a more advanced policy. Similarly as regards the more northern factories and the salt trade to Orissa, and eventually to Calcutta where the price of Liverpool salt is four times that of sea salt at Ganjam.

20. *The Locomotive Department.*—I think that some more shelter for engines is required at Sitanagram. I inspected the shops at Waltair which are the construction shops of early days. They are, in my opinion, good enough to go on with for some years to come, or until the future of the line is settled. I was told that new piping was very badly wanted between the new Root's blower and the smithy forges. It was brought to my notice that several of the big crank axles of the 95-ton engines had failed, a crack appearing in the web of the crank. The Locomotive Superintendent was shrinking a ring round the oval web. The crack seems to begin in the main shaft and to stretch out towards the crank journal. This is a matter worthy of Sir A. Rendell's notice. Another thing brought to my notice was the great frequency of the breakage of vehicle coupling shackles, not the screws themselves but the shackles. This is said to be due to the length of recoil of the buffer and draw-bar springs, and a new sort of spring with shorter recoil is being tried. The shops are rather cramped in the matter of exit from the back *vid* the traverser; this can be corrected by a small alteration of the sidings back of the engine-shed as discussed on the ground. My attention was not called to the defective tube plates of the compound locomotives until after my return to Madras.

21. *The Bezwada-Kistna Canal Junction section.*—The Railway authorities were anxious to get leave to open for all traffic the 2·66 mile section from Bezwada over the Kistna to the point of junction with the Madras-Bezwada and Southern Mahratta Railways. This short section is on the mixed gauge. I see no objection when two or three minor matters that were pointed out on inspection have been attended to, and when a distant signal has been erected on the Bezwada-Madras Railway. A small waiting-shed and a rail level platform are wanted at Kistna Canal Junction.

22. *Canal competition.*—The Railway officials say that it will be impossible for the railway to secure any large proportion of the traffic, now carried by canal alongside of it, unless an end is put to the practice of issuing licenses to boats to ply for hire on the canals for short periods of a month or six weeks. If all licenses are made half-yearly or yearly the railway will have a chance, because then the swarms of boats which now ordinarily ply in the creeks, and which only appear on the canals during special short spells of busy traffic, will not find that it pays them to take out licenses, and so will have to confine their attention to the more legitimate duty of acting as feeders to the canals. For a full explanation of the conditions affecting the railway and canal competition, the Manager referred me to the note enclosed with his letter No. 2266 of the 16th March 1895.

23. *Kistna Bridge Paint.*—The silicate paint has lost its colour badly and is thin, but no corrosion appears to be going on underneath it at present. I am informed that the composition of the paint was as follows: 1st coat, 1 cwt. silicate paint (Charlton), 6 gallons boiled linseed oil, ⅓ gallon turpentine; 2nd coat, 1 cwt. same paint, 8 gallons same oil, ½ gallon turpentine; 3rd coat, same as 2nd. The result after about four years' use is certainly unsatisfactory, as the coating is thin and uneven and the colour has quite changed, and changed unequally.

F. J. E. SPRING,
Senior Govt. Inspector of Rys., Madras.

Madras,
27th July 1897.

Order—No. 581 R., dated 21st August 1897.

Communicated to the Manager, East Coast Railway, for information and necessary action.

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

[Here enter No. 582 R., dated 21st August 1897.]

(True Extract.)

(Signed) F. J. E. SPRING,
Offg. Joint Secy. to Govt.,
Railway Branch.

To the Manager, East Coast Railway.
" Marine Department.
" Engineer-in-Chief, Gódávari Bridge.
" Revenue Department.

Exd. T. K. Narayana Aiyangar.

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