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Proceedings of the Madras Government, Public Works Department, *27th April* 1875.

No. 642. Read the following letter from Lieutenant-Colonel J. H. M. SHAW-STEWART, R.E., Consulting Engineer for Railways, to Colonel G. W. WALKER, R.E., Secretary to Government, Public Works Department, dated Madras, 5th April 1875, No. 195 :—

I HAVE the honor to submit, for the information of Government, a Note by the Officiating Deputy Consulting Engineer upon the works under construction on the Northern Extension of the South Indian Railway which was inspected by Captain Thompson during the first quarter of the year.

Dated 24th March.

2. The exceptional floods of last year were extensively felt upon this part of the Company's undertaking, especially as regards the works in progress between Madras and Cuddalore. Captain Thompson points out that the effect of those floods has been to entail delay and increase of cost in the preparation of materials, delay in the carriage of materials, and delay in commencing low-lying works.

3. In another respect the occurrence of these exceptional floods before the works had made much progress may be deemed fortunate, inasmuch as the Chief Engineer has been enabled to revise the proposals for waterway in the light of the experience gained during last year, the result being a considerable addition to the waterway already sanctioned. The revised proposals will shortly be laid before Government. In paragraphs 4, 77, 79, 80 of his Note, Captain Thompson alludes to some of the increases which have been found necessary. In the case of the Pooniar river, alluded to in paragraphs 101 to 104, the measures to be taken will depend upon the result of the survey and sections now being made.

4. The District Engineer of Chingleput has been addressed with regard to the irrigation channels alluded to in paragraph 64.

5. The difficulty alluded to in paragraph 54 is still the subject of correspondence and inquiry.

Note on the Northern Extension of the South Indian Line—Inspected in the months of January, February, and March 1875.

DISTRICT No. I.

Inspected 6th and 7th of January 1875.

Commences at 0 miles 0 chains.
Ends at 7 „ 0 „
Engineer in charge, Mr. A. D. Fox.

1. *Masonry.*—The largest bridge on this district is that over the Adyar at 6 miles 50 chains, consisting of six openings of 66 feet each spanned by " Warren " girders. The piers are 70′ 8″ from centre to centre.

2. The two abutments and piers Nos. 1 and 5 are up to 2 feet below formation level. The foundations are on rock a little below the surface level of the bed of the stream. The foundation of pier No. 2 was put in some time ago, but as several of the top courses of the brick-work were damaged during the floods in October 1874 they will have to be removed. A ring bund is now being constructed round this pier in order to recommence building. The foundations of piers Nos. 3 and 4 have not yet been put in.

3. The height of waterway on this bridge appears to be ample, girder bed level being well above the marks left on the abutments by the heavy floods of October 1874.

4. *Cooum Bridge.*—The next largest bridge in District No. I. is that over the Cooum. It was proposed at first to construct it with only four girder openings of 40 feet each, but the heavy floods of October last showed that it would be advisable to add another opening. The bridge now being constructed has therefore five openings of 40 feet each.

5. The foundations will be on wells, sunk through the sandy bed of the river to a hard substratum of rock and kunkur, at an average depth of about 30 feet below the river bed.

6. The wells carrying the piers and abutments are 8 feet in external and 4 feet 3 inches in internal diameter. The wing walls of the abutments rest on wells of 6 feet 4 inches external, and 3 feet 4 inches internal diameter.

7. The wells carrying the body of the south abutment are down 18 feet, and those under the wing walls 12 feet.

8. The wells for pier No. 1 (next the south abutment) are down 24 feet. For pier No. 2, 24 feet, and for pier No. 3, 28 feet. Pier No. 4 and the north abutment had not been commenced.

9. The floods of October 1874 caused a good deal of extra expense, trouble, and delay in the construction of this work, depositing a bank of sand nearly 4 feet in depth over the work then in progress, and burying a quantity of rails and other material which had to be dug out.

The north bank of the river, where the abutment is to be built, was also cut away to a width of about 25 feet.

Any amount of clean sand ballast is procurable from the bed of the river near the bridge.

10. Besides the Adyar and Cooum bridges there are twenty-nine small bridges and culverts in District No. I., varying in size from one foot culverts to single openings of 20 feet span.

Of these twenty-two are completed, one is in progress, and the remaining six have not yet been commenced.

11. *Stations.*—The masonry of the Madras goods shed and of the boundary wall of the goods yard is almost completed.

12. The boundaries of the Chetput station ground have been lock-spitted and some materials laid down for the buildings. A large well in this station ground may possibly turn out to be of some use.

13. *Earthwork.*—The earthwork of the district is not heavy, the estimated amount being about 92,000 cubic yards. Of this amount about 22,000 cubic yards have been done.

14. *Ballasting.*—No ballasting has been carried out yet.

15. *Turfing.*—About 25,000 square yards of turfing, or rather more than one-half the estimated amount has been done.

16. *Fencing.*—About a quarter of the 4th and the whole of the 5th miles have been fenced.

17. *Permanent-way.*—A few chains of permanent-way have been laid down in the 4th mile.

18. *Telegraph.*—Teakwood telegraph posts are being put up. They are 7" × 7" at the base, 5" × 5" at the top, and are to be planted 3 feet deep in the ground. The posts are 18 feet long.

DISTRICT No. II.

Inspected 11*th and* 12*th of January* 1875.
Commences at 7 miles 0 chains from Madras.
Ends at 23 miles 0 chains „ „
Engineer in charge, Mr. F. O. Bullmore.

19. *Masonry.*—The largest bridge in this district is one of five 25-feet girder openings at the 21st mile 79th chain. The north abutment is up to 2 feet below ground level. Piers Nos. 1, 2, 3 and 4 have been raised 4 feet above ground level, an additional 4 feet of masonry will raise them to girder bed level. The south abutment is now within one foot of ground level. The progress of this work has been a good deal delayed owing to the ground having been so long under water, and to the consequent difficulty in conveying materials to it.

20. At the 22nd mile 4th chain it is proposed to construct a bridge of two 10-feet girder openings. The original provision at this point was for a 6 feet girder opening, but this has since been found to be insufficient. Seventeen feet of lineal water-way are allowed in the public road for this stream, which is chiefly formed by the surplus water of some tanks to the east of the line.

21. Besides the two abovementioned works, there are sixty-five culverts and bridges varying in size from 2 feet to 10 feet openings. Fifty-two of these have been founded and are in various stages of progress, ten have been completed, and the remaining three have not yet been commenced.

22. The material used in these minor works is chiefly native bricks. They are as a rule well burnt, and with good chunam they have made sufficiently strong if not very pretty work. Owing to their edges being rounder and more irregular than those of more carefully moulded table-bricks, the joints of the faces of the work are rather coarse looking. In most instances, the work will, I think, look better coated with chunam, in which a full amount of "Soorkee" or brick dust has been mixed.

Stations. 23. *Guindy.*—The fencing of ditch and mound with double row of aloes has been completed round the Guindy station compound, and about half a lac of bricks collected for the station buildings.

24. *St. Thomas' Mount.*—The retaining walls of the platforms for passengers and goods are almost completed. The water in the station ground has been tested and found good for locomotive purposes. The fencing of ditch and mound with double row of aloes has been completed, and the aloes appear to be thriving well. A temporary engine shed of brick pillars with a couple roof thatched has been erected. An engine from Madras is expected to arrive in the course of one or two days.

25. *Palaveram.*—About 60,000 bricks are now on the ground for the station buildings. The fencing of mound and ditch with double rows of aloes has been completed. In some places, where the aloes had not thriven well, fresh plants have been put down. They appear to be growing all right now.

26. *Vandaloor.*—The water at this station has been tested and pronounced unfit for locomotive purposes. The compound fence of ditch and mound has been completed, and the aloes appear to be thriving very well.

27. *Earthwork.*—The earthwork of District II. is finished throughout, with the exception of gaps where bridges or culverts are being constructed, and sidings, &c., in station grounds.

28. *Ballasting.*—About 22,000 cubic yards of ballast, chiefly sand, have been collected at various points along the district, and will be distributed as soon as ballast trains commence to run.

About 15,000 cubic yards of ballast have been spread between the 7th and 12th miles.

29. *Turfing.*—Rather more than four miles of line have been turfed and fenced with aloes on each side, as follows :—

8th mile	40 chains.
9th „	45 „
10th „	30 „
11th „	80 „
12th „	29 „
19th „	80 „
20th „	25 „

= 4 miles 9 chains turfed and fenced.

The 15th and 16th miles have been partly turfed, but no fencing yet carried out, *viz.* :—

15th mile	69 chains.
16th „	16 „

= 1 mile 6 chains turfed, but not yet fenc

30. *Permanent-way.*—Permanent-way has been laid from the level crossing on the Mount Road near Guindy at 7 miles 15 chains to Palaveram at 12 miles, with the exception of a break of a few chains in the 10th mile, which will be connected in the course of a few days.

This portion of line, *viz.*, from the 7th to the 12th mile, has been ballasted up to rail level with the exception of the break abovementioned.

31. Where culverts and small bridges have not yet been completed, temporary piers of wooden (pine wood,) sleepers have been put in to admit of material wagons passing along. An engine and ballast train will probably be able to run between the Mount and Palaveram by the end of the current month (January 1875).

32. Sufficient permanent-way is now in depôt at Palaveram to complete the main line to Vandaloor, and in depôt at Vandaloor to complete it on to the end of the district at Goodavancherry.

33. *Ballast fields.*—Additional ground for ballast fields has been taken up at Guindy, adjoining the station ground. A good deal of fairly clean sand ballast has been collected here and there in the district from the beds of small streams crossing the line.

It is probable that engines will be able to run between Guindy and Vandaloor by the middle of April 1875.

34. *Waterways.*—Mr. Bullmore, the Resident or District Engineer, informs me that he carefully noted the effect of the heavy floods of October 1874 on the line, and with the exception of the proposed substitution of two 10-feet girder openings for the 6 foot girder opening referred to in paragraph 20, he considers that the waterway provided for is sufficient. No damage was done to the line during these floods.

35. *Telegraph.*—The telegraph posts (teakwood) are being erected along the line.

DISTRICT No. III.

Inspected 12*th and* 13*th January* 1875.

Commences at 23 miles 0 chains
Ends at 38 „ 0 „
Engineer in charge, Mr. H. W. Hudson.

36. *Masonry.*—The largest work in this district is a bridge of six 20-feet girder openings in the bed of the Chingleput tank, at 33 miles 75 chains, to allow the surplus water to flow to the calingulah. The piers and abutments are to be of stone up to ground level and brick-work above.

The south abutment is about three-fourths finished, and piers Nos. 1 and 2 next it are 2′ 6″ above the ground level. Pier No. 3 is up to ground level, and piers Nos. 4 and 5 have not yet been commenced. An excavation was made for the foundation of pier No. 4, but the tank filling work was put a stop to.

37. The next largest work is a bridge of four 20-feet girder openings at 23 miles 51 chains. Two piers were brought up to ground level, and the north abutment foundation partly excavated for when the work was stopped by floods. The ground is now drying up, and work has been recommenced. The material used is quarried stone.

38. In addition to these two works there are 54 smaller bridges and culverts, varying in size from 2 feet culverts to bridges of two 10-feet girder openings; of these three are completed, twelve about three-fourths finished, twelve in various other stages of progress, and the remaining twenty-seven have not yet been commenced.

The country having been so much under water during the past year has greatly delayed the progress of bridge work in this district.

Brick-making was also at a stand-still for several months.

39. *Stations.*—No masonry has yet been commenced.

The Goodavancherry station ground fence, of ditch, mound, and aloes is completed. The aloes appear to be thriving very well.

The Chingleput station ground boundaries have been lockspitted, and a number of native huts which were in the way pulled down. The ground is still under crop, so nothing further is being done just at present.

40. *Earthwork.*—The earthwork of District III. is completed to formation level with the exception of a few chains in the 31st, 35th, and 36th miles, where the ground is still under wet cultivation, a portion of the 34th mile at the Chingleput tank, and at gaps where bridges are being constructed.

The sidings in the station grounds have not been commenced.

The estimated amount of earthwork to be done is about 308,000 cubic yards; of this about 222,000 cubic yards have been executed.

41. *Turfing.*—About half the turfing is completed, *viz.*, 88,000 square yards, out of an estimated amount of 166,000 square yards. Some extra turfing will have to be carried out, in consequence of several gradients having been raised in places where the line was found to run too low.

42. *Fencing.*—Rather more than one-third of the aloe fencing has been planted, *viz.*, 18,000 lineal yards, out of an estimated amount of 53,000.

43. *Ballasting.*—No ballasting has yet been carried out, but very fair, red gravel ballast is procurable at frequent intervals all along the district, and can easily be collected and distributed, as soon as permanent-way has been laid and ballast trains commence to run.

44. *Permanent-way.*—None received yet.

45. *Telegraph.*—Telegraph posts are being set up.

46. *Bricks.*—Mr. Hudson has turned out some of the best bricks I have seen in India from his brick-fields near Chingleput; they are hard, heavy, well burnt, and have clean, sharp edges and corners. When he has met his own requirements, he will continue to manufacture bricks for the districts adjoining his own.

DISTRICT No. IV.

Inspected on the 14*th,* 15*th, and* 16*th January* 1875.

Commences at 38 miles 0 chains.
Ends at 50 „ 0 „
Engineer in charge, Mr. T. Nicholls.

47. *Masonry.*—The largest work in this district is the bridge over the Palar river. The centre of the bridge will be at the 44th mile 65th chain. It will consist of eighteen 120-feet openings, spanned by "Warren" girders on brickwork piers and abutments which will be founded on wells of 12 feet external and 6 feet internal diameter. The bed of the river is sand, but it is expected that a sufficiently hard substratum for the wells to rest on will be met with at from 40 to 50 feet below the lowest part of the river bed.

48. The excavation for the foundation of the south abutment is now in progress, and well sinking will be commenced in the course of a few days.

49. The Palar came down in flood on the 9th of September 1874, and remained so more or less until the 15th of December 1874. On the 25th of October 1874, a flood, foot higher than the highest flood previously recorded in the Palar came down, submerging the brickfields at Battalen on the south bank of the river to a depth of 2 feet, and destroying 118,000 unburnt bricks. The cyclone of May 1874 also destroyed 120,000 unburnt bricks at the same place.

50. There are now 750 lineal feet of drying sheds, and two kilns, each capable of turning out 110,000 bricks at work. Another drying shed 250 feet long, and two more kilns of the same capacity as those already built are now being constructed.

When they are finished, it is hoped that three lacs of bricks per mensem will be turned out. At present the outturn is about one and a half lacs per mensem, and there is now a stock of well-burnt brick on hand of about three and a half lacs, so that when work has been commenced, there will not be much danger of its being retarded from want of material. Well sinking will be commenced in the course of a few days.

51. A siding has been laid down from the south bank to convey material to the river bed from the brick-fields, and a store shed and cooly lines are almost completed. The well curbs are being constructed at, and sent down by bandies from Madras.

52. The next largest work is the Carangooly bridge, consisting of eleven 40-feet girder openings at the 49th mile 11th chain. The girders (ordinary web and flange) will rest on masonry piers and abutments built of stone from the walls of the old fort at Carangooly. The foundation will rest on rock throughout which crops up to the surface of the ground.

53. The north abutment is completed to girder bed stone level, and a bed has been nearly completed on the rock for the foundation of pier No. 1.

None of the other piers have yet been commenced. The south abutment excavation is almost completed.

54. Mr. Nicholls (the Engineer in charge) states that the progress of this work has been considerably retarded in consequence of the Revenue officials of Madranticum and Carangooly having impressed a number of his coolies, wudders, and bandies to work on the repairs and drainage of certain roads in these two villages.

55. The work next in importance is a bridge of four 20-feet girder openings at 42 miles 8 chains. The excavations for this work were started more than a year ago, but as the ground has been under water since May 1874, nothing further has yet been done.

The foundations will be on wells 8 feet in external diameter, and the piers and abutments will be of brickwork.

A brick-field is now being started close to the work, which will also be useful as an auxiliary to the brick-field at Battalen for the Palar bridge. One lac of bricks per mensem will be turned out.

56. There are 63 minor bridges and culverts, varying in size from 1 foot culverts to 20 feet single openings.

Ten of these are completed, with the exception of the parapets, 16 are in various stages of progress, and the remaining 37 are not yet commenced. The sites of the majority of these 37 works have been under water since May 1874.

Building materials are now being conveyed to them as the country dries up sufficiently to admit of bandies passing along.

57. *Stations.*—There are no stations.

58. *Earthwork.*—Out of an estimated amount of 220,700 cubic yards of earthwork, 132,000 have been completed.

59. *Turfing and Fencing.*—About 6¼ miles of line have been turfed and fenced.

60. *Ballast.*—No ballast has been collected yet; good gravel is to be had close to the line at the 40th mile. There is also an inexhaustible supply of sand in the bed of the Palar. The Carangooly end of the district will be worse off for ballast than the Chingleput end.

61. *Permanent-way.*—One mile of permanent-way material has been stacked at the south side of the Palar bridge at Battalen, and a siding has been laid down from the south bank of the river to convey material to the work in the river bed.

62. *Rainfall.*—The average annual rainfall in the Chingleput District is, I believe, under 40 inches, but during the last three years the fall has been considerably greater. According to the Range Office register at Chingleput—

66·60 inches of rain fell in 1872.
42·68 " of " " in 1873.
72·79 " of " " in 1874.

Since May 1874 there has been but little weather for brick-making, and it was found that the bricks dried in sheds were never sufficiently dried to burn well. The rainfall between May and December 1874 was distributed as follows:—

	Inches.
In May 1874	9·27
In June "	7·44
In July "	5·40
In Aug. "	3·22
In Sep. "	19·24
In Oct. "	17·46
In Nov. "	6·25
In Dec. "	4·51
	72·79

63. This unusually wet season has, with regard to the railway works, simply meant great delay and increase of cost in the preparation of materials, delay in the carriage of materials, and delay in commencing such works as were situated in low ground. Every effort is now being made by the Railway Engineers to make up for the time thus unavoidably lost. Brick burning and the carriage of material is being everywhere vigorously pushed on, and the foundations of such works as lie low are being put in during the dry season, so that they may still be proceeded with during the coming monsoon.

64. Mr. Nicholls tells me that between the unfinished bridge at the public road crossing of the Palar and the Railway bridge now under construction, there are four irrigation channels led away from the Palar, only one of which has a head sluice, and it is out of repair. This will, I presume, be looked to in due course of time by the Irrigation Department, as the line of Railway lies under the influence of all four of these irrigation channels.

DISTRICT No. V.

Inspected 16th and 17th January 1875.

Commences at 50 miles 0 chains.
Ends at 68 " 0 "

Engineer in charge, Mr. C. Scott.

65. *Masonry.*—The largest work in this district is a bridge of four 20-feet girder openings at the 63rd mile 58th chain. It is being built of "burnt" stone, and founded on hard rock about 2½ feet below the river bed. A bed has been levelled off in the rock for the foundation of the second pier, and 3 feet 6 inches of masonry has been built on the third pier. Between 30 and 40 cubic yards of stone are on the ground.

66. The next largest work is a bridge of two 25-feet girder openings with a 10 feet arch at each end. It will be constructed of burnt stone, founded at a depth of about 6 feet below the river bed on hard "barber's" stone.

About 70 cubic yards of stone are on the ground.

67. There are 85 other small bridges and culverts in this district; of these eleven are completed, eight in progress, and stone has been collected at the sites of fourteen others. The remainder are all below 6 feet span, and will be built of native brick.

68. The total estimated amount of masonry to be executed is 5,413 cubic yards, of which about 800 cubic yards have been done.

69. *Stations.*—The only stations proposed for this district are a third-class one at Madranticum, which has not been commenced yet, and a third-class station at Acherawauk, the fencing of which is completed. An Engineer's bungalow has also been erected on the station ground, which will eventually be inhabited by the station master.

70. *Earth-work.*—About one-half of the earth-work has been completed, *viz.*, out of an estimated amount of 265,000 cubic yards, 139,000 cubic yards have been done.

In the neighbourhood of Madranticum earth-work has been delayed in consequence of the country being a good deal under water.

At Cudamulapothoor also earth-work has been delayed for the same reason.

71. *Turfing.*—Out of a total length of 18 miles, rather more than 10½ miles have been turfed.

72. *Fencing.*—About 6 miles of fencing have been planted. The aloes in some places are rather too small to take root rapidly and well.

73. *Ballast.*—Ballast is being collected in the 57th, 61st, 62nd, 63rd, and 67th miles, and between the 67th and 68th miles about 2,000 cubic yards have been spread.

74. *Permanent-way.*—None received yet.

75. *Telegraph.*—Material not yet arrived.

DISTRICT No. VI.

Inspected 17th and 18th January 1875.

Commences at 68 miles 0 chains.
Ends at 86 „ 0 „
Engineer in charge, Mr. J. A. Jones.

76. *Masonry.*—The most important work in this district is the bridge over the Gingee river at 85 miles 69 chains. Nine 30-feet girder openings with stone piers and abutments founded on rock about 10 to 14 feet below the river bed.

Between 500 and 600 cubic yards of stone have been collected and are being delivered at the site of the work. The carriage of material has been much delayed owing to the country having been so wet since July last. The stone comes in from various quarries, distant 10 to 14 miles from the bridge.

Work has not yet been commenced, but will be in a few days when sufficient stone has been brought to the site.

77. The next largest work is the Chendoor bridge at 84 miles 29 chains, originally designed to have four 30-feet girder openings; but since the floods of October 1874, it has been necessary to reconsider the design and allow more water-way. It will be founded on wells with a superstructure of brick.

78. Bricks are being made about a mile north of the bridge site, and permanent-way is being laid down on the line to facilitate their carriage to the work.

The wells will probably have to be sunk from 30 to 40 feet before reaching the hard.

79. A bridge at 76 miles 13 chains, originally designed as a one 30-feet girder opening, is now to be constructed with two 30-feet arches, granite abutments and pier founded on rock. The north abutment is up to springing level, and excavations for the south abutment and pier foundations have been completed.

The arches are to be turned in brick with brick backing.

80. At the 77th mile 2½ chains, a bridge of two 10-feet girder openings was to have been constructed, but the floods of October 1874 proved the necessity of altering the design, and substituting a bridge of four 20-feet girder openings.

It is to be founded on hard moram with stone piers and abutments; excavations for the abutments were taken out before October 1874, but were then filled in by floods. Work has not yet been commenced again.

81. There are 58 small culverts and bridges to be constructed beside the four bridges above mentioned; they vary in size from 2-feet culverts to bridges of double 20-feet openings. Seven of these works are completed to girder bed level, 16 are in various stages of progress, and the remainder have not yet been commenced. Materials are being conveyed to them as the ground dries.

82. *Stations.*—The boundary fence of the Woolacoor station ground at 68 miles 54 chains has been completed and planted with aloes.

At the Tindevanum station ground in the 76th mile, the boundary fence is partially completed. All the land required for the station ground has not yet been handed over, some of it being house property.

The site for the station ground at Chendoor is still under consideration.

83. *Earth-work.*—The earth-work is completed to formation level throughout, with the exception of gaps at bridges, altered gradients, station sidings, and about 50 chains in the 86th mile south of Chendoor river, where the Chendoor Railway Station may possibly be located.

84. *Turfing.*—The district is turfed throughout, with the exception of places where it has been found necessary to raise the gradients.

85. *Fencing.*—Between five and six miles of fencing have been planted.

86. *Ballasting.*—Between one and two hundred cubic yards of red gravel ballast have been collected in the 82nd and 83rd miles. Fair ballast may be had in the 72nd mile at about 2 feet below the surface, and any amount of good sand ballast is procurable from the beds of the Chendoor and Gingee rivers.

87. *Permanent-way.*—One mile and ten chains of permanent-way materials are being delivered in the 84th and 85th miles, and will be laid at once for running in material to the Chendoor river bridge.

88. *Telegraph.*—No posts or wires received yet.

DISTRICT No. VII.

Inspected 18th, 19th, and 20th January 1875.

Commences at 86 miles 0 chains.
Ends at 102 „ 0 „
Engineer in charge, Mr. Bond.

89. *Masonry.*—The Vicravandy bridge at the 92nd mile 13th chain is the largest work in this district. It is to consist of five 30-feet openings (girder) founded on wells. The excavations were taken out before October 1874, but were then filled in again by floods. The piers and abutments will be of stone, the greater part of which has already been conveyed to the site of the work.

Well bricks are being moulded about two miles south-east of the bridge, and work will be recommenced as soon as the river has fallen sufficiently.

90. A bridge of three 30-feet girder openings is being constructed over the Pombay nullah at 97 miles 3 chains. The north abutment, pier No. 1, and cross walls between, are up to 18 inches of river bed level.

An excavation was made for the foundation of the south abutment last year, but was filled in again by the floods of October last. Pier No. 2 and cross walls between piers Nos. 1 and 2 are completed to within five feet of river bed level. The work is to be of brick throughout. It is still covered with water, but it will probably be practicable to commence work again in about a month's time.

91. The next largest works are a bridge of two 20-feet girder openings at 93 miles 64 chains not yet commenced, and a bridge of one 25-feet girder opening at 100 miles 72 chains. The work was commenced last year, but was stopped by floods, and, being situated in the Anangoor tank, has not yet been recommenced. About 20,000 bricks are now at the site.

92. There are 60 other small bridges and culverts to be built varying in size from two feet culverts to small bridges of one 20-feet girder opening.

Four of these are in various stages of progress. The remainder will be commenced shortly as the ground dries, and material can be conveyed to sites of the works.

93. Brick making has been greatly delayed in this as in the other districts by the past unusually wet season. Bricks are, however, now being turned out in seven places on the district, and every effort is being made to lay in a sufficient stock before the next rainy season sets in.

94. *Stations.*—The fencing in of the Vicravandy and Villapuram station grounds has been completed.

95. *Ballasting.*—No ballasting done yet.

Good sand ballast is procurable from the Gingee, Vicravandy, and Pombay river beds.

The south end of the district will probably be ballasted from the Pooniar river bed when permanent-way has been laid down.

96. *Earth-work.*—About 150,000 cubic yards out of an estimated amount of 188,000 cubic yards of earth-work have been executed. The earth-work of the district is, in fact, completed, with the exception of a portion of the 86th mile, gaps where bridges are being constructed, and sidings in station grounds. The earth-work can easily be completed throughout when the bridges are finished and the ground has dried up sufficiently.

97. *Turfing.*—About 11¼ miles of line have been turfed on both sides.

98. *Fencing.*—Between 11 and 12 miles of line have been planted with aloe fencing on both sides.

99. *Permanent-way.*—No permanent-way material received yet.

100. *Telegraph.*—None yet.

DISTRICT No. VIII.

Inspected on the 20th and 21st January 1875.
Commences at 102 miles 0 chains.
Ends at 116 „ 0 „
Engineer in charge, Mr. R. W. Thompson.

101. *Masonry.*—The Pooniar bridge at 105 miles 3 chains is the largest bridge to be constructed on this district. It was originally proposed to have 17 100-feet girder openings; but since the floods of October last, it has become a question whether this is a sufficient amount of water-way. Sections of the river bed are now being taken, from which will be known the amount of water which actually passed down during those unusually high floods, and the question of water-way will be shortly determined.

102. The abutments and piers will be founded on wells, 12 feet in external diameter, which will probably have to be sunk to a depth of 40 feet below the river bed. Bricks for the wells and superstructure are being moulded in bed brick-fields, one on the north and the other on the south of the river. Well sinking has not yet been commenced.

103. The next largest work is a bridge over the "Mullatar,"* a tributary of the Pooniar, which the line will cross to the north of that river at the 103rd mile 41st chain. Bricks are being moulded for this work close to its site.

104. In addition to these two large bridges, there are 55 smaller bridges and culverts to be constructed, varying in size from 2-feet culverts to bridges of three 25-feet girder openings.

Twelve of these are completed, two are in progress, and the remainder will be started as soon as the country has dried up sufficiently. The floods of October 1874 have shown that the height of the railway embankments and the water-ways of the minor bridges and culverts must be considerably modified to meet "spills" from the Pooniar, unless the banks of that river are to be bunded. This, however, is a question which cannot with any advantage be discussed, until the sections above referred to have been received and other information which the Chief Engineer of the line is now having collected.

105. *Station.*—Bricks are being made in a portion of the ground taken up for the Punrooty station, and an Engineer's bungalow has been built.

The site for the Akadavilly station, on the south bank of the Pooniar, has been abandoned, not without very good reason as the floods of October 1874 have shown.

106. *Ballasting.*—None yet commenced.

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* Three 40-feet girder openings.

Ballast will be procured from the bed of the Pooniar and the beds of the two "Mullatars," tributaries of the Pooniar on the north and south of that river.

107. *Earth-work.*—The earth-work of this district has been completed to formation level, with the exception of gaps at bridges, sidings in station grounds, and portions of the line in the 105th and 106th miles where the floods of May and October 1874 broke through. The raising of some gradients and lowering of others is now with the water-ways, a question under consideration.

108. *Turfing.*—Almost completed throughout.

109. *Fencing.*—About 30,000 lineal yards out of an estimated 49,000 of fencing planted.

110. *Permanent-way.*—None yet delivered. A few miles of it would be of great advantage to convey materials down to the Pooniar bridge.

111. *Telegraph.*—No telegraph material yet delivered.

DISTRICT No. IX.

Inspected 22nd to 30th January 1875.
Commences at 116 miles 0 chains.
Ends at 128 „ 0 „
Engineer in charge, Mr. H. C. Baggallay.

112. *Masonry.*—The bridge over the Guddelum at Cuddalore is the largest work on this district. It will consist of 10 girder spans of 100 feet each. The girders ("Warren") will rest on piers and abutments of brick-work, founded on brick wells 12 feet on external and 6 feet in internal diameter. The wells will probably be sunk to a depth of 40 feet below the river bed.

A chunam kiln has been built close to the work, and 400,000 bricks burnt. Well sinking will be commenced as soon as the well curbs arrive from Trichinopoly, where they are being made in the Railway Engineer's Workshops.

113. The next largest work is the bridge over the back-water between Cuddalore and Munjacoopum. It will consist of a 70-feet "Warren" girder opening, with brick piers and abutments founded on wells 12 feet on external and 6 feet in internal diameter; one of the wells has been built up 20 feet and sunk 10. They will probably have to be sunk to a depth of 40 feet each.

114. In addition to the two bridges above mentioned there are 42 smaller bridges and culverts varying in size from one foot culvert to single girder openings of 20 feet span.

Thirty-nine of these works are up to girder level and three are in progress.

115. *Stations.*—The Nellicoopum station at 120 miles 25 chains has not yet been commenced. The boundaries of the station ground have been marked out and partially planted with aloes.

The boundary fence of the Tirupapaloor station at 126 miles 27 chains has been planted on the east side with a bund and aloes, and on the west it is protected by wire fencing. No masonry yet commenced.

At the Cuddalore station in the 128th mile 52nd chain, no fencing or masonry commenced yet.

116. The estimated amount of masonry to be executed in bridge-work is 4,900 cubic yards, of this more than one-half has been executed, *viz.*, 2,540 cubic yards.

117. *Earth-work.*—The estimated amount is 275,500, of this 207,600 cubic yards have been executed.

The "wharf line" from Tirupapaloor to the Old Town, Cuddalore, has been completed to formation level, and permanent-way laid down.

The main line has been brought up to formation level from the 117th to the 127½ miles, and is now ready for ballasting.

118. *Turfing.*—The wharf line and 10½ miles of the main line have been turfed throughout.

119. *Fencing.*—A fence mound planted with aloes has been completed along 10 miles of line on each side, and 12 miles of line have been planted with aloes on the slopes of the banks on each side.

120. *Ballasting.*—About 3 miles of sand ballasting, 9 inches thick, have been done.

121. *Permanent-way.*—Eleven miles of permanent-way have been laid, *viz.*, from the Old Town, Cuddalore, to Tirupapaloor, on the "wharf line," and from Tirupapaloor to Nellicoopum on the main line.

122. *Telegraph Posts.*—Arrangements have been made with the Forest Department for the supply of 30 miles of temporary telegraph posts, but none are yet planted along the line.

123. *Permanent-way material.*—Forty-two miles of permanent-way material have been landed at Cuddalore; about a mile and ten chains has been sent to District No. VI. at Tindevanum. miles to 128

124. *Girders.*—Girders for the line between Chingleput and Cuddalore, *viz.*, 43 miles to 128 only miles, have been landed at Cuddalore; the girders are for minor bridges up to 40 feet spans only.

DISTRICT No. X.

Inspected 22nd to 30th of January 1875.

Commences at 128 miles 0 chains.
Ends at 140 „ 0 „
Engineer in charge, Mr. H. C. Baggallay.

125. *Masonry.*—The bridge over the Paravanaur, between Cuddalore and Porto Novo will be the largest work on this district.

The number of spans and other details connected with it are not yet settled.

126. There will probably be 27 minor bridges and culverts to be constructed, several of which will be girder openings of from 50 feet to 100 feet span.

127. The land for six miles only of this district has been received from the Revenue authorities. The remaining six miles are now being taken over. The water-ways are not yet definitely fixed, and it is not certain what stations, if any, will be required.

128. *Earth-work.*—The total estimated amount of earth-work is 271·150 cubic yards, 97·900 cubic yards, or rather more than one-third of which has already been executed.

Five-and-a-half miles of line are now up to formation level.

129. *Ballasting.*—One mile of line is ballasted.

130. *Turfing.*—Five-and-a-half miles are turfed.

131. *Fencing.*—Four-and-a-half miles of aloe fencing have been planted.

132. *Permanent-way.*—Two miles of permanent-way are laid, one mile of which has been ballasted.

133. *Telegraph.*—No telegraph erected yet.

134. *Engineer's Bungalow.*—The Engineer's Bungalow at Allampaukum has been commenced.

DISTRICT No. XI.

Inspected 3rd, 4th, and 5th February 1875.

Commences at 140 miles 0 chains.
Ends at 151 „ 0 „
Engineer in charge, Mr. Ellis.

135. The land for this district has not been handed over yet by the Revenue authorities, but the staking out of the line is in progress.

136. The largest work will be the bridge to be built over the Vellaur near Porto Novo. The line will cross as nearly as possible perpendicularly to the general direction of the stream above the bridge site or point of crossing; the river at this point has well defined banks, the water has a tolerably even depth, and generally the point selected is the best that could have been chosen.

137. Brick-fields are being opened in several places close to the site of the bridge.

DISTRICT No. XII.

Inspected 2nd February 1875.

Commences at 151 miles 0 chains.
Ends at 156 „ 0 „
Engineer in charge, Mr. J. Rice.

138. The bridge over the Coleroon is the largest work to be undertaken in this district. The details for its construction have not yet been finally determined.

139. Mr. Clarke, a Native Assistant Engineer, is at present in charge of the collection and preparation of materials. He has opened a large brick-field on the south bank of the Coleroon, in which excellent brick clay is found.

140. The land for this district has not yet been handed over, but the staking out of the line has been proceeded with.

General Remarks.

141. There is no doubt that the unusually wet season of last year greatly delayed the progress of masonry works between Madras and Cuddalore. The sites of many of the works were for months under water, and brick making and burning were also for a long time at a stand-still.

142. Some vigorous efforts were made to proceed with brick making in spite of the weather, by constructing long lines of drying sheds, but it was found that the bricks did not dry sufficiently in them to burn well.

143. Since dry weather set in, however the Engineers are all proceeding vigorously with the collection and manufacture of building materials, and foundations are being put in as rapidly as possible in such works as are situated in low ground, so that they may be proceeded with without fear of interruption.

144. The character of the masonry and brick-work generally between Madras and Cuddalore is excellent.

145. In some cases where native-made bricks have been used, the work does not appear particularly neat, owing to the joints on the faces of the work being rather coarse; but, as care has been taken to select really well-burnt bricks, and as the chunam is good, there can be no doubt that the work is quite strong and substantial enough. I think it would be well to plaster all works constructed of native brick with chunam mixed with "soorkee."

146. I did not proceed further south than the end of District No. XII. between Chellumbrum and Sheally, as I there met Mr. Logan, the Chief Engineer, with whom I had the pleasure and advantage of going over the line back again to Madras, where we arrived on the 3rd instant.

147. From Punrooty we proceeded up the valley of the Pooniar, past Tiruvananelloor to the Tirukovaloor anicut, examining the river bed and banks with a view to determining what must be done to enable the line of Railway to dispose of such extraordinary floods as those of October 1874.

148. Mr. Rice and Mr. Greswell, two of the South Indian Railway Engineers, have since been employed under Mr. Logan's instructions in taking a series of levels and sections of the river bed, and of various places where the river overflowed.

When the information they are now collecting has been received, the water-ways to be provided in the line will be definitely determined.

(Signed) ROSS THOMPSON, Captain, R.E.,
Offg. Depy. Consg. Engr. for Railways.

BANGALORE,
24th March 1875.

No. 643.

RAILWAY, No. 82.

ORDER THEREON, 27th April 1875, No. 1,168.

THE late date at which this report of inspection of 156 miles of the Northern Extension of the South Indian Line, from Madras to the Coleroon river, made between the 6th January and 2nd February, has been submitted by the Deputy Consulting Engineer for Railways, greatly detracts from the usefulness of the information it conveys and makes detailed notice of it unnecessary.

2. Taken in connection with all previous returns, it conveys a general impression of unsatisfactory progress since receipt of sanction by telegram of 29th January 1873 of the proposals for the work to be done on the 128 miles between Madras and

Proceedings of the Madras Government, Public Works Department,
27th April 1875.

Cuddalore. It seems desirable, therefore, to review the causes of delay. The amalgamation of the Carnatic with the Southern of India Company was, no doubt, a chief source of delay up to the date of concentration of the management and supervision of both lines in the same hands in September 1873. But it then fell to the lot of the Chief Engineer, whose head-quarters were at Trichinopoly, not only to start the works on this sanctioned section, but to revise the designs both of it and the extension to the Coleroon 28 miles, from whence into Tanjore, a distance of 62 miles, he had the entire responsibility of planning the works. For the Tanjore-Cuddalore extension authority to collect materials was given in Government of India telegram of 19th February 1874. But simultaneously with this amount of fresh work was proceeding the construction of 196 miles of line between Trichinopoly and Tuticorin. The working of a length of 168 miles of open line from Negapatam to Erode had also to be supervised. It is not, therefore, to be wondered at that progress in the fair season of 1873-74 was slow, and the year that has since elapsed has been one of unusual floods, the difficulties caused by which are detailed in this and former reports. Altogether His Excellency the Governor in Council cannot but consider that more was attempted than could possibly have been undertaken by one Chief Engineer, without at least a Deputy of experience to aid him in the work of supervision.

3. It would appear that the question of water-way of the large bridges, as well as of the minor bridges and culverts, affected by the floods of rivers near Cuddalore, and of the height to which the Railway embankments should be raised, is still in a very unsettled state. And His Excellency the Governor in Council has no doubt that the Chief Engineer and Consulting Engineer for Railways will give the subject the fullest consideration, and be able to satisfy the Government of India with the decision arrived at; the grounds for which will have to be communicated to them in detail.

4. The result of the reference made to the District Engineer, Chingleput, in respect to sluices for Irrigation channels, and of the inquiries being made on the subject of the withdrawal of labor by Revenue officials will be reported in due course by the Consulting Engineer.

(True Extract.)
(Signed) G. W. WALKER, Colonel, R.E.,
Secretary to Government.

To the Consulting Engineer for Railways.

Exd. A. Grube.
Spare Copies

Note on the Northern Extension of the South Indian Line. Inspected in the months of January. February and March. 1875.

Ross Thompson
Captain R.E.
Offg. Dy. Con. Engr. for Railways
Madras

District No I

Commences at 0 miles 0 Chains
Ends at 7 miles 0 Chains

Engineer in Charge Mr A.D. Fox.

Inspected 6th & 7th of January 1875.

Masonry

1. The largest bridge in this District is that over the Adyar at 6 miles 50 Chains, Consisting of Six openings of 66 feet each spanned by "Warren" Girders The piers are 70' 8" from Centre to Centre.

2. The two abutments and piers Nos 1 and 5 are up to ten feet below formation level. The foundations are in Rock, a little below the surface level of the bed of the Stream The foundation of pier No 2 was put in some time ago, but as several of the top courses of the brick work were damaged during the floods in October 1874, they will have to be removed. A ring bund is now being constructed round this pier in order to recommence building. The foundations of piers Nos [illegible] and 4 have not yet been put in.

3. The height of waterway in this bridge appears to be [illegible], girder bed level being well above the marks left [illegible] the abutment by the heavy floods [illegible] October 1874.

1. The [illegible] is [illegible] 6 m[illegible] Six [illegible] Span [illegible]

Lower Bridge

The [illegible] carried [illegible] [illegible] at No I is [illegible] [illegible] own. It was [illegible] at first to construct [illegible] only four girder openings of forty feet each, but the heavy floods of October last showed that it would be advisable to add another opening. The bridge now being constructed has therefore five openings of forty feet each.

5. The foundations will be on wells, sunk through the sandy bed of the river to a hard substratum of rock and kunkur, at an average depth of about 30 feet below the river bed.

6. The wells carrying the piers and abutments are eight feet in external and four feet three inches internal diameter. The wing walls of the abutments rest on wells of six feet four inches external and three feet four inches internal diameter.

7. The wells carrying the body of the [illegible] abutment are [illegible] 18 [illegible], and those under [illegible] lateral [illegible] 12 feet.

8. The [illegible] for pier No 1 [illegible] each the So[illegible] abutment) are [illegible] 24 feet. For Pier No 2 — 24 feet and for Pier No 3 — 28 feet. Pier No 4 and the North Abutment had not been commenced.

9. The floods of October 1874 caused a good deal of extra expense, trouble, and delay in the construction of the work, depositing a bank of sand nearly four feet in depth over the work then in progress and burying a quantity of rails and other material which had to be dug out. The north bank of the river, where the abutment is to be built was also cut away to a width

of about 25 feet.

Any amount of clean sand ballast is procurable from the bed of the river near the bridge.

10.

Besides the Adyar and Cooum bridges there are 28 small bridges and culverts in District No I. varying in size from one foot culverts, to single openings of twenty feet span.

Of these, 22 are completed, one is in progress and the remaining 5 have not yet been commenced.

11. Stations

The masonry of the Madras Goods Shed, and the boundary wall of the Goods Yard is almost completed.

12.

The boundaries of the Chetput Station ground have been lockspitted and some materials laid down for the buildings. A large well in the Station ground may possibly turn out to be of some use.

13. Earthwork

The Earthwork of the District is not heavy, the estimated amount being about 92,000 Cubic Yards

yards. Of this amount about 72,000 Cubic Yards have been done

14. Ballasting

No ballasting has been carried out yet.

15. Turfing

About 25,000 Square Yards of turfing, or rather more than one half the estimated amount has been done

16. Fencing

About a quarter of the fourth, and the whole of the fifth miles have been fenced.

17. Permanent Way

A few chains of permanent way have been laid down in the fourth mile

18. Telegraph

Teakwood telegraph posts are being put up. They are 7"×7" at the base. 5"×5" at the top and are to be planted 3 feet deep in the ground. The posts are 18 feet long.

Inspected 11th & 12th of January 1875

District No II.

Commences at 7 miles 0 chains from Madras

Ends at 23 m. 0 chs " "

Engineer in Charge Mr. F. O. Bullmore.

Masonry. 19 The largest bridge on this District is one of five 25 feet girder openings at the 21st mile 79th chain. The North abutment is up to two feet below ground level. Piers Nos 1. 2. 3 and 4 have been raised four feet above ground level; an additional four feet of masonry will raise them to girder bed level. The South abutment is now within one foot of ground level. The progress of this work has been a good deal delayed owing to the ground having been so long under water, and to the consequent difficulty in conveying materials to it.

20. At the 22nd mile 4th chain it
proposed to construct a brid
of two ten feet girder opening
The original provision at th
point was for a six feet gird
opening, but this has since

found to be insufficient.
Seventeen feet of lineal waterway are allowed in the Public Road for the Stream, which is chiefly formed by the surplus water of some tanks to the East of the line.

21. Besides the two above mentioned works, there are sixty five Culverts and bridges, varying in size from two feet to ten feet openings. Fifty two of these have been founded, and are in various stages of progress. Ten have been completed, and the remaining three have not yet been commenced.

22. The material used in these minor works is chiefly native bricks. They are as a rule well burnt, and with good chunam they have made sufficiently strong if not very pretty work. Owing to their edges being rounder and more irregular than those of more carefully moulded table bricks, the joints on the faces of the work are rather coarse looking. In most instances, the work will I think look better coated with Chunam in which a full amount of "Soorkee" or brick dust has been mixed

Stations
Guindy 23. The fencing, of ditch and mound, with double row of aloes, has been completed round the Guindy Station Compound, and about half a lakh of bricks collected for the Station buildings.

St Thomas' Mount 24. The retaining walls of the platforms for passengers and goods are almost completed. The water in the Station ground has been tested and found good for locomotive purposes. The fencing, ditch and mound, with double row of aloes has been completed. and the aloes appear to be thriving well. A temporary Engine Shed, of brick pillars with a couple roof, thatched, has been erected. An Engine from Madras is expected to arrive in the course of one or two days.

Palaveram 25.

About 60,000 bricks are now on the ground for the Station buildings. The fencing of mound and ditch, with double rows of aloes, has been completed. In some places where the aloes had not thriven well, fresh plants have been put down. They appear to be growing all right now.

26. Vandaloor

The water at this Station has been tested, and pronounced unfit for locomotive purposes. The compound fence, of ditch and mound, has been completed and the aloes appear to be thriving very well.

27. Earthwork

The Earthwork of District II is finished throughout, with the exception of gaps where bridges or culverts are being constructed, and sidings &c in Station grounds

28. Ballasting

About 22,000 cubic yards of ballast, chiefly sand, have been collected at various points along the District, and will be distributed as soon as ballast-trains commence to run.

About 15,000 cubic yards of ballast have been ~~collected~~ spread between the 7th and 12th miles.

Turfing 29.

Rather more than four miles of line have been turfed, and fenced with aloes on each side, as follows:

8th mile	40 Chains
9 "	45 "
10 "	30 "
11 "	80 "
12 "	29 "
19 "	80 "
20 "	26 "

= 4 miles 9 Chains turfed and fenced

The 15th and 16th miles have been partly turfed, but fencing not carried out.

Viz 15th mile	69 Chains
16 "	17 "

= 1 mile 6 Chains turfed but not yet fenced.

30. Permanent-Way.

Permanent-way has been laid from the level crossing on the Mount-Road near Guindy at 7 miles 15 Chains to Palaveram at 12 miles, with the exception of a break of a few chains in the tenth mile, which will be connected in the course of a few days. This portion of line viz from the 7th to the 12th mile has been ballasted up to rail level with the exception of the break above mentioned.

31. Where culverts and small bridges have not yet been completed temporary piers of wooden R.W sleepers have been put in, to admit of material wagons passing along. An Engine and ballast train will probably be able to run between the Mount and Palaveram by the end of the current month (January 1875).

32. Sufficient permanent-way is now in depôt at Palaveram to complete the main line to Vandaloor, and in depôt at Vandaloor to complete it on to the end of the District at Gordavancherry.

33. **Ballast Fields** Additional ground for ballast fields has been taken up at Guindy, adjoining the Station ground. A good deal of fairly clean sand ballast has been collected here and there on the District from the beds of small streams crossing the line.

It is probable that Engines will be able to run between Guindy and Vandaloor by the middle of April 1875.

Waterways 34. Mr Bullmore, the Resident or District Engineer, informs me that he carefully noted the effect of the heavy floods of October 1874 on the line and with the exception of the proposed substitution of two ten feet girder openings for the six feet girder opening referred to in para 20. he considers, that the waterway provided for is sufficient. No damage was done to the line during these floods.

Telegraph 35 The telegraph posts (teakwood) are being erected along the line

District No III

Commences at 23 miles 0 Chains
Ends at 38 miles 0 Chains

Engineer in Charge Mr H. W. Hudson
Inspected 12th & 13th of January 1875

Masonry. 36. The largest work in this District is a bridge of six twenty feet girder openings, in the bed of the Chingleput tank, at 33 miles 75 Chains, to allow the surplus water to flow to the Calingula. The piers and abutments are built of stone, up to ground level and brickwork above. The South abutment is about three fourths finished, and piers Nos 1 and 2 next it are 2'6" above the ground level. Pier No 3 is up to ground level, and piers Nos 4 and 5 have not yet been commenced. An excavation was made for the foundation of pier No 4 but the tank filling, work was put a stop to.

The next largest work is a bridge of four twenty feet girder openings, at 23 miles 57 chains. Two piers were brought up to ground level and the North abutment foundation partly excavated for when the work was stopped by floods. The ground is now drying up and work has been recommenced. The material used is quarried stone. 37.

In addition to these two works there are 54 smaller bridges and culverts, varying in size from two feet culverts to bridges of two ten feet girder openings. Of these, 3 are completed. 12 about 3/4ths finished, 12 in various other stages of progress and the remaining twenty seven have not yet been commenced. 38.
The country having been so much under water during the past year has greatly delayed the progress of bridge work in this District.

Brick making was also at a stand still for several months.

Stations 39. No masonry has yet been commenced.
The Goodavanchery Station ground fences of ditch mounds and aloes, is completed. The aloes appear to be thriving very well.

The Chingleput Station ground boundaries have been lock-spitted and a number of native huts which were in the way pulled down. The ground is still under crop, so nothing further is being done just at present.

Earthwork 40 The earthwork of District III is completed to formation level, with the exception of a few chains in the 31st 35th and 36th miles, where the ground is still under wet cultivation, a portion of the 34th mile at the Chingleput tank, and

and at gaps where bridges are being constructed. The Sidings in the Station grounds have not yet been commenced. The estimated amount of Earth-work to be done is about 308,000 Cubic Yards, of this about 222.000 Cubic Yards have been executed.

41. Turfing

About half the turfing is completed viz 88.000 Square Yards out of an estimated amount of 166.000 Square Yards. Some extra turfing will have to be carried out, in consequence of several gradients having been raised, in places where the level was found to run too low.

42. Fencing

Rather more than one third of the close fencing has been planted. viz 18.000 lineal yards, out of an estimated amount of

43. Ballasting

No ballasting has yet been carried out, but very fair, red gravel ballast is procurable at frequent intervals all along the District and can easily be collected and distributed, as soon as permanent way has been laid and ballast trains commence to run.

44. Permanent-way

None received yet

45. Telegraph

Telegraph posts are being set up

Bricks 46.

Mr Hudson has turned out some of the best bricks I have seen in India, from his brick fields near Chingleput; they are hard, heavy, well burnt, and have clean sharp edges and corners. When he has met his own requirements, he will continue to manufacture bricks for the Districts adjoining his own.

District No IV

Commences at 38 miles 0 Chains
Ends at 50 miles 0 Chains
Engineer in charge Mr. J. Nicholls
Inspected on the 14th 15th & 16th January 1875

Masonry 47. The largest work in this District is the bridge over the Palar River. The Centre of the bridge will be at the 44th mile 65th chain. It will consist of eighteen, one hundred and twenty feet openings, spanned by "Warren" girders on brickwork piers and abutments which will be founded on wells of 12 ft external and 6 feet internal diameter. The bed of the River is Sand, but it is expected that a sufficiently hard substratum for the wells to rest on, will be met with at from 40 to 50 feet below the lowest part of the River bed.

48. The excavation for the foundation of the South abutment is now in progress and well sinking

will be commenced in the Course of a few days

The Palar came down in flood on the 9th of September 1874, and remained so, more or less, until the 15th of December /74. 49.

On the 25th of October /74 a flood one foot higher than the highest flood previously recorded in the Palar, came down, submerging the brickfields at Battalin on the South bank of the river to a depth of two feet, and destroying 118.000 unburnt bricks. The Cyclone of May 1874 also destroyed 120.000 unburnt bricks at the same place.

There are now 750 lineal feet of drying sheds, and two kilns each capable of turning out 110,000 bricks, at work. 50.

Another drying shed, 250 feet long, and two more kilns of the same capacity as those already built, are now being constructed.

When they are finished, it is hoped that 3 lakhs of bricks per mensem will be turned out. At present the out turn is about one and a half lakhs per mensem and there is now a stock of well burnt bricks on hand of about three and a half lakhs so that when work has been commenced, there will not be much danger of its being retarded from want of material

Well sinking will be commenced in the course of a few days.

51. A siding has been laid down from the South bank, to convey material to the river bed, from the brickfields, and a store shed and cooly lines are almost completed.

The well curbs are being constructed at, and sent down by bandies from Madras

52. The next largest work is the Carangooly bridge, consisting of Eleven, forty feet girder openings, at the 49th mile 11th chain. The girders (ordinary web and flange) will

110

rest on masonry piers and abutments, built of stone from the walls of the old fort at Carangooly. The foundation will rest on rock throughout which crops up to the surface of the ground.

53. The North abutment is completed to girder bed stone level and a bed has been nearly completed in the rock for the foundation of Pier No 1.

None of the other piers have yet been commenced

The South abutment excavation is almost completed.

54. Mr Nicholls (the Engineer in Charge) states that the progress of this work has been considerably retarded, in consequence of the Revenue officials of Madrantucum and Carangoly having impressed a number of his coolies, wodders and bandies to work on the repairs and drainage of certain roads in these two villages.

55. The work next in importance is a bridge of four twenty feet girder openings at 42 miles 8 chains. The excavations for this work were started more than a year ago but as the ground has been under water since May 1874 nothing further has yet been done.

The foundations will be on wells 8 feet in external diameter and the piers and abutments will be of brickwork.

A brick field is now being started close to the work, which will also be useful as an auxiliary to the brick field at Battalum for the Palar bridge. One lakh of bricks per mensem will be turned out.

56. There are 63 minor bridges and culverts, varying in size from one foot culverts to 20 feet single openings.

Ten of these are completed, with the exception of the parapets; sixteen are in various stages of progress. and the remaining 37 are not yet commenced. The sites of the majority of these 37 works have been under water since May 1874.

Building materials are now being conveyed to them as the country dries up sufficiently to admit of bandies passing along.

57. **Stations**

There are no Stations.

58. **Earthwork**

Out of an Estimated amount of 220,700 Cubic yards of Earthwork 132,000 have been completed

59. **Turfing and Fencing**

About 6½ miles of line have been turfed and fenced.

60. **Ballast**

No ballast has been collected yet. Good gravel is to be had close to the line at the 40th mile. There is also an inexhaustible supply of sand in the bed of the Palar

The Carangooly End of the District will be more off for ballast

61. **Permanent-Way**

One mile of permanent way material, has been stacked at the South Side of the Palar bridge at Battalam; and a siding has been laid down from the South bank of the river to convey material to the work in the river bed.

62. **Rainfall**

The average annual rainfall in the Chingleput District is I believe under forty inches, but during the last three years the fall has been considerably greater. According to the Range Office register at Chingleput.

66.60 inches of rain fell in 1872
" " " " 73
42.68 " " " " 1874.
72.79

Since May 1874 there has been but little weather for brick making and it was found that the bricks dried in sheds were never sufficiently dried to burn well. The rainfall between May and December 1874 was distributed as follows

In May 1874	9.27 Inches
June	7.44 "
July	3.40
August	3.22
September	19.24
October	17.46
November	6.26
December	4.51
	72.79 Inches

63. This unusually wet season has, with regard to the Railway works, simply meant great delay and increase of cost in the preparation of materials. Delay in the carriage of materials; and delay in commencing such works as were situated in low ground. Every effort is now being made by the Railway Engineers to make up for the time, thus unavoidably lost. Brick burning and the carriage of material is being everywhere vigorously pushed on, and the

of such works as lie low are being put in during the dry season, so that they may still be proceeded with during the coming Monsoon.

64. Mr Nicholls tells me, that between the unfinished bridge at the Public Road Crossing of the Palar, and the Railway bridge now under construction, there are four irrigation channels led away from the Palar, only one of which has a head sluice, and it is out of repair. This will I presume be looked to in due course of time by the Irrigation Department, as the line of Railway lies under the influence of all four of these irrigation channels.

District No V

Commences at 50 miles. 0 Chains
Ends " 68 " 0 "
Engineer in Charge Mr. C. Scott.
Inspected 16th & 17th January 1875

Masonry 65. The largest work in this District is a bridge of four 20 feet girder openings at the 63rd mile 58th Chain. This being built of burnt stone and founded on hard rock about 2½ feet below the river bed. A bed has been levelled off in the rock for the foundation of the second pier and three feet six inches of masonry has been built in the third pier. Between 30 and 40 cubic yards of stone are on the ground.

66. The next largest work is a bridge of two 26 feet girder openings with a ten feet arch at each end. It will be constructed of burnt stone, founded at a depth of about six feet below the river bed

on hard "barker's" stone.
About 70 cubic yards of stone are on the ground.

67. There are 85 other small bridges and culverts in this District, of these eleven are completed, eight in progress, and stone has been collected at the sites of fourteen others. The remainder are all below six feet span and will be built of native brick.

68. The total estimated amount of masonry to be executed is 5413 cubic yards, of which about 800 cubic yards have been done.

69. **Stations**

The only stations proposed for this District are a third class one at Madrantacam, which has not been commenced yet, and a third class station at Achirawauk the fencing of which is completed. An Engineer's bungalow has also been erected on the station ground which will eventually be inhabited by the station master.

Earthwork 70. About one half of the earthwork has been completed. Viz: 539 out of an estimated amount of 265.000 cubic yards 139.000 cubic yards have been done.

In the neighbourhood of Madrauticum earth work has been delayed, in consequence of the country being a good deal under water.

At Cudamulapothoor also, earthwork has been delayed for the same reason.

Turfing 71. Out of a total length of 18 miles, rather more than ten and a half miles have been turfed.

Fencing 72. About 6 miles of fencing have been planted. The aloes in some places are rather too small to take root rapidly and well

Ballast 73. Ballast is being collected in the 57th, 61st, 62nd, 63rd and 67th miles and between the 67th and 68th miles about 2000 cubic yar have been spread.

74. Permanent way

None secured yet.

75. Telegraph

Material not yet arrived.

District VI

Commences at 68 miles 0 chains
Ends at 86 miles 0 chains
Engineer in Charge. Mr J. A. Jones
Inspected 17th and 18th January 1875

Masonry 76. The most important work in this District is the bridge over the Gingee River at 85 miles 69 chains. Nine thirty feet girder openings, with stone piers and abutments, founded on rock, about ten to fourteen feet below the river bed.

Between 500 and 600 cubic yards of stone has been collected and are being delivered at the site of the work. The carriage of material has been much delayed owing to the country having been so wet since July last. The stone comes in from various quarries, distant from ten to fourteen miles from the bridge.

Work has not yet been commenced but will be in a few days when sufficient stone has been brought to the site.

77. The next largest work is the Cheudoir bridge at 84 miles 29 chains. Originally designed to have four thirty feet girder openings, but since the floods of October 1874, it has been necessary to reconsider the design and allow more water way. It will be founded on wells, with a superstructure of brick.

78. Bricks are being made about a mile North of the bridge site, and permanent way is being laid down on the line to facilitate their carriage to the work.

The wells will probably have to be sunk from 30 to 40 feet before reaching the hard.

79. A bridge at 76 miles 13 chains, originally designed as a one thirty feet girder opening, is now to be constructed with two thirty feet arches. Granite abutments and pier founded on rock. The North abutment is up to springing line and

Excavations for the South abutment and pier foundations have been completed. The arches are to be turned in brick with brick backing.

80. At the 77th mile 2½ chains, a bridge of two ten feet girder openings was to have been constructed, but the floods of October 1874 proved the necessity of altering the design, and substituting a bridge of four twenty feet girder openings. It is to be founded on hard moorum with stone piers and abutments. Excavations for the abutments were taken out before October/74 but were then filled in by floods. Work has not yet been commenced again.

81. There are 58 small culverts and bridges to be constructed beside the four bridges above mentioned. They vary in size from two feet culverts to bridges of double twenty feet openings. Seven of these works are completed to granite bed

Civil. Sixteen are in various stages of progress, and the remainder have not yet been commenced. Materials are being conveyed to them as the ground dries.

82. Stations

The boundary fence of the Woolacoor Station ground at 68 miles 54 chains has been completed, and planted with aloes.

At the Tridevanum Station ground in the 76th mile, the boundary fence is partially completed. All the land required for the Station ground has not yet been handed over, some of it being Inam property.

The site for the Station ground at Chendoor is still under consideration.

83. Earthwork

The Earthwork is completed to formation level throughout with the exception of gaps at bridges, altered gradients, Station sidings, and about 50 chains in the 84th mile South of Chendoor River, where

86
599

the Chendoor Railway Station may possibly be located.

84. Turfing

The District is turfed throughout with the exception of places where it has been found necessary to raise the gradients.

85. Fencing

Between five and six miles of fencing have been planted.

86. Ballasting

Between one and two hundred cubic yards of red gravel ballast have been collected in the 82nd and 83rd miles.

Fair ballast may be had in the 72nd mile at about two feet below the surface and any amount of good sand ballast is procurable from the beds of the Chendoor and Gingee rivers.

87. Permanent way

One mile and ten chains of Permanent Way materials are being delivered in the 84th and 85th miles, and will be laid at once for running in material to the Chendore river bridge.

88. Telegraph

No posts or wires received yet.

District VII

Commences at 86 Miles 0 Chains
Ends at 102 Miles 0 Chains
Engineer in Charge Mr Bond.
Inspected 18th 19th & 20th January/75

Masonry 89. The Veeravandy bridge at the 92nd Mile 13th Chain is the largest work in this District. It is to consist of five 30 feet openings (girder) founded on wells. The excavations were taken out before October 1874 but were then filled in again by floods. The piers and abutments will be of stone, the greater part of which has already been conveyed to the site of the work.

Well bricks are being moulded about two miles South East of the bridge, and work will be recommenced as soon as the river has fallen sufficiently.

90. A bridge of three, thirty feet girder openings is being constructed over the Pombay Nullah

District No V

Commences at 50 miles. 0 Chains
Ends 68 " 0 "
Engineer in Charge Mr C. Scott.
Inspected 16th & 17th January 1875

Masonry 65. The largest work in this District is a bridge of four. 20 feet girder openings at the 63rd mile 58th Chain. This being built of burnt stone and founded on hard Rock about 2½ feet below the river bed. A bed has been levelled off in the Rock for the foundation of the second pier and three feet six inches of masonry has been built on the third pier. Between 30 and 40 Cubic Yards of Stone are on the ground.

66. The next largest work is a bridge of two 26 feet girder openings with a ten feet arch at Each End. It will be constructed of burnt stone, founded at a depth of about six feet below the Riverbed

on hard "barker's" stone.
About 70 Cubic Yards of stone are on the ground.

67. There are 85 other small bridges and culverts in this District, of these eleven are completed, eight in progress, and stone has been collected at the sites of fourteen others. The remainder are all below six feet span and will be built of native brick.

68. The total estimated amount of masonry to be executed is 5413 Cubic Yards, of which about 800 cubic yards have been done.

69. Stations

The only stations proposed for this District are a Third Class one at Madrantecam, which has not been commenced yet, and a Third Class station at Achirawauk the fencing of which is completed. An Engineers bungalow has also been erected on the station ground, which will eventually be inhabited by the Station Master.

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In the neighbourhood of Madrantecam earth work has been delayed, in consequence of the country being a good deal under water.

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allast 73. Ballast is being collected in the 57th, 61st, 62nd, 63rd and 67th miles and between the 67th and 68th miles about 2000 cubic yards

Have been spread.

None received yet.

74. Permanent way

Material not yet arrived.

75. Telegraph

District VI

Commences at 68 miles 0 chains
Ends at 86 miles 0 chains
Engineer in Charge. Mr J. A. Jones
Inspection 17th and 18th January 1875

Masonry 76. The most important work in this District is the bridge over the Ginger River at 85 miles 69 chains. Nine thirty feet girder openings, with stone piers and abutments, founded on rock, about ten to fourteen feet below the river bed.

Between 500 and 600 cubic yards of stone have been collected and are being delivered at the site of the work. The carriage of material has been much delayed owing to the country having been so wet since July last. The stone comes in from various quarries distant ten to fourteen miles from the bridge.

Work has not yet been commenced but will be in a few days when sufficient stone has been brought to the site.

77. The next largest work is the Cheadoir bridge at 84 miles 29 chains. Originally designed to have four thirty feet girder openings, but since the floods of October 1874, it has been necessary to reconsider the design and allow more water way. 08 - It will be founded on wells, with a superstructure of brick.

78. Bricks are being made about a mile North of the bridge site, and permanent way is being laid down on the line to facilitate their carriage to the work.
The wells will probably have to be sunk from 30 to 40 feet before reaching the hard.

79. A bridge at 76 miles 13 chains, originally designed as a three thirty feet girder opening, is now to be constructed with two thirty feet arches. Granite abutments and pier founded on rock. The North abutment is up to springing level and excavations for the South abutment and pier foundation have been completed.
The arches are to be turned in brick with brick backing.

80. At the 77th mile 2½ chains, a bridge of two ten feet girder openings was to have been constructed, but the floods of October 1874 proved the necessity of altering the design, and substituting a bridge of four twenty feet girder openings.
It is to be founded on hard moorum with stone piers and abutments. Excavations for the abutments were taken out before October/74 but were then filled in by floods. Work has not yet been commenced again.

81. There are 58 small culverts and bridges to be constructed beside the four bridges above mentioned. They vary in size from two feet culverts to bridges of double twenty feet openings. Seven of these works are completed to girder bed

at 97 miles 3 Chains. The North abutment, Pier No 1, and Cross walls between, are up to 18 inches of river bed level.

An Excavation was made for the foundation of the South abutment last year, but was filled in again by the floods of October last. Pier No 2 and Cross walls between Piers Nos 1 and 2 are completed to within five feet of river bed level. The work is all of brick throughout. This is still covered with water but it will probably be practicable to commence work again in about a month's time

91. The next largest works are a bridge of two 20 feet girder openings at 93 miles, 64 Chains not yet commenced, and a bridge of one 25 feet girder opening at 100 miles 72 Chains. The work was commenced last year but was stopped by floods and being situated in the Anangoor tank has not yet been recommenced. About 20,000 bricks are now at the site.

92. There are sixty other small bridges and culverts to be built varying in size from two feet culverts to small bridges of one, 20 feet girder opening.

Four of these are in various stages of progress. The remainder will be commenced shortly as the ground dries and material can be conveyed to sites of the works

93. Brick making has been greatly delayed in this as in the other Districts by the past unusually wet season. Bricks are however now being turned out in several places on the District and every effort is being made to lay in a sufficient stock before the next rainy season sets in.

Stations 94. The fencing in of the Vicravandy and Villaporam Station grounds has been completed

95. Ballasting

No ballasting done yet. Good sand ballast is procurable from the Gaiger, Neravandy and Pombay River beds. The South end of the District will probably be ballasted from the Poonaur River bed, when permanent way has been laid down.

96. Earthwork

About 150,000 Cubic Yards out of an Estimated amount of 188,000 Cubic Yards of Earthwork have been Executed. The Earthwork of the District is in fact completed with the exception of a portion of the 86th mile, gaps where bridges are being constructed, and sidings in station grounds. The Earthwork can easily be completed throughout when the bridges are finished and the ground has dried up sufficiently.

97. Turfing

About 11¼ miles of line have been turfed on both sides

98. Fencing.

Between 11 and 12 miles of line have been planted with aloe fencing on both sides.

14
29
659

99. Permanent way

No permanent way material received yet.

100. Telegraph

None yet.

District VIII

Commences at 102 miles 0 Chains
Ends at 116 miles 0 Chains

Engineer in Charge Mr. R. W. Thompson

Inspected on the 20th & 21st January 1875.

Masonry 101. The Poonar bridge at 105 miles 3 Chains, is the largest bridge to be constructed on this District. It was originally proposed to have seventeen, 100 feet girder openings; but since the floods of October last it has become a question whether there is a sufficient amount of water way. Sections of the river bed are now being taken, from which will be known the amount of water which actually passed down during these unusually high floods. and the question of water way will be shortly determined.

102. The abutments and piers will

be founded on, wells, 12 feet in external diameter, which will probably have to be sunk to a depth of 40 feet below the river bed. Bricks for the wells and superstructure are being moulded in two brick fields, one on the North and the other on the South of the river. Well sinking has not yet been commenced.

103 The next largest work is a bridge over the "Mullalar"* a tributary of the Ponnear, which the line will cross to the North of that river at the 103rd Mile 41st Chain. Bricks are being moulded for the work close to its site.

*3.40 ft girder openings.

104 In addition to these two large bridges, there are 558 smaller bridges and culverts to be constructed varying in size from two feet culverts, to bridges of three, 25 ft girder openings. Twelve of them are completed two are in progress, and the remainder will be started as soon as the country has dried up sufficiently.

The floods of October 1874 have shown, that the height of the railway embankments and the waterways of the minor bridges and culverts must be considerably modified to meet "Spills" from the Ponnear, unless the banks of that river are to be bunded. This however is a question which cannot with any advantage be discussed, until the sections above referred to have been received, and the information which the Chief Engineer of the line is now having collected.

105 Stations — Bricks are being made in a portion of the ground taken up for the Punrooz Station and an Engineers bungalow has been built.

The site for the Aradavilly Station, on the South bank of the Ponnear, has been abandoned: not without very good reason, as the floods of October 1874 have shown.

106.
Ballasting

None yet commenced. Ballast will be procured from the bed of the Pomear and the beds of the two "Mullaters", tributaries of the Pomear on the north and south of that river.

107.
Earthwork

The earthwork of this District has been completed to formation level, with the exception of gaps at bridges, sidings in station grounds, and portions of the line in the 105th and 106th miles where the floods of May and October 1874 broke through. The raising of some gradients and lowering of others is [illegible] with the waterways, a question under consideration.

108
Masonry

Almost completed throughout.

109
Fencing

About 30.000 lineal yards out of an estimated 49.000 of fencing planted

16

110.
Permanent way

None yet delivered. A few miles of it would be of great advantage to convey materials down to the Pomear bridge.

111.
Telegraph

No telegraph material yet delivered.

District No IX

Commences at 116 miles 0 Chains
Ends at 128 miles 0 Chains

Engineer in Charge Mr. H.C. Baggallay.
Inspected 22nd to 30th January /95.

Masonry 112. The bridge over the Gaddelam at Cuddalore is the largest work on the District. It will consist of ten girder spans of one hundred feet each. The girders ("Warren") will rest on piers and abutments of brick work, founded on brick wells 12 feet in external and 6 feet in internal diameter. The wells will probably be sunk to a depth of 40 feet below the river bed.

A Chunam Kiln has been built close to the work, and 400,000 bricks burnt. Well sinking will be commenced as soon as the well curbs arrive from Trichinopoly, where they are being made in the Railway Engineers Work Shops

113. The next largest work is the bridge over the backwater between Cuddalore and Immyacoopam. It will consist of a 70 feet "Warren" Girder opening with brick piers and abutments, founded on wells 12 feet in external and 6 feet in internal diameter. One of the wells has been built up 20 feet and sunk 10. They will probably have to be sunk to a depth of 40 feet each.

114. In addition to the two bridges above mentioned there are 42 smaller bridges and culverts varying in size from one foot culverts to single girder openings of twenty feet span. Thirty nine of these works are up to girder level, and three are in progress.

115. Stations

The Nellicoopam Station at 120 miles 25 chains has not yet been commenced. The boundaries of the Station ground have been marked out and partially planted with aloes.

34

759

The boundary fence of the Tirupapooloor Station at 126 miles 27 chains, has been planted on the East side with a bund and aloes and on the West protected by wire fencing. No masonry yet commenced

At the Cuddalore Station at the 128th mile 52nd chain, no fencing or masonry commenced yet.

116. The estimated amount of masonry to be executed in bridge work is 4900 cubic yards of this more than one half has been executed viz 2540 Cyds.

117. Earth work

The estimated amount is 275,600, of this, 207,600 cubic yards have been executed.

The "Wharf line" from Tirupapaloor to the Old town Cuddalore has been completed to formation and permanent way laid down.

The main line has been brought

up to formation level from the 117½ to the 127½ miles and is now ready for ballasting.

118. Turfing

The Wharf line, and ten and a half miles of the main line have been turfed throughout.

119. Fencing

A fence mound planted with aloes has been completed along ten miles of line, on each side. And 12 miles of line have been planted with aloes, on the slopes of the banks on each side.

120. Ballasting

About three miles of sand ballasting 9 inches thick have been done.

121. Permanent way

Eleven miles of permanent-way have been laid. Viz. from the Old town Cuddalore to Tirupa-paloor, on the Wharf line; and from Tirupapaloor to Nellicoopum on the Main line.

122. Telegraph Posts

Arrangements have been made with the forest department for the supply of 30 miles of temporary telegraph posts, but none are yet planted along the line.

123. Permanent-way Material

Forty two miles of permanent-way material have been landed at Cuddalore. About a mile and ten chains has been sent to District No VI at Tindevanum.

124. Girders

Girders for the line between Chingleput and Cuddalore viz. 43 miles to 128 miles, have been landed at Cuddalore. The girders are for minor bridges, up to 40 feet spans only.

District No X

Commences at 128 miles 0 Chains
Ends at 140 miles 0 Chains
Engineer in Charge. Mr H.C. Baggallay
Inspected 22nd to 30th of January 1875.

Masonry 125. The bridge over the Paravanar between Cuddalore and Portonovo will be the largest work on this District. The number of spans and other details connected with it are not yet settled.

126. There will probably be 27 minor bridges and Culverts to be constructed, several of which will be six arch openings of from 50 feet to 100 feet span.

127. The land for six miles only of this District has ~~not~~ been received from the Revenue Authorities. The remaining six miles are now being taken over. The waterways are not yet definitely fixed and it is not certain what stations, if any, will be required.

128. **Earthwork**

The total Estimated amount of Earthwork is 271.150 Cubic yards 97.900 Cubic yards, or rather more than one third of which has already been executed.

Five and a half miles of line are now up to formation level

129. **Ballasting**

One mile of line is ballasted.

130. **Turfing**

Five and a half miles are turfed

131. **Fencing**

Four and a half miles of aloe fencing have been planted

132. **Permanent way**

Two miles of permanent way are laid. One mile of which has been ballasted.

133. **Telegraph**

No telegraph erected yet.

134. **Engineers Bungalow**

The Engineers bungalow at Allampaukum has been commenced

District No XI

Commences at 140 Miles 0 Chains
Ends at 151. Miles 0 Chains
Engineer in Charge Mr Ellis
Inspected. 3rd. 4th & 5th. February/75

135. The land for this District, has not been handed over yet by the Revenue Authorities, but the staking out of the line is in progress.

136. The largest work will be the bridge, to be built over the Vellar near Portonovo. The line will cross as nearly as possible, perpendicularly to the general direction of the stream above the bridge site or point of crossing. The river at this point has well defined banks, the water has a tolerably even depth, and generally, the point selected is the best that could have been chosen.

137. Brickfields are being opened in several places close to the site of the bridge.

District No XII 839

Commences at 151 Miles 0 Chains
Ends at 156 Miles 0 Chains
Engineer in Charge Mr J. Rice
Inspected 2nd February 1875

138. The bridge over the Coleroon is the largest work to be undertaken in this District. The details for its construction have not yet been finally determined.

139. Mr Clarke, a Native Assistant Engineer, is at present in charge of the collection and preparation of materials. He has opened a large brick field on the South bank of the Coleroon, in which excellent brick clay is found.

140. The land for this District has not yet been handed over but the staking out of the line has been proceeded with

General Remarks

141. There is no doubt that the unusually wet season of last year, greatly delayed the progress of masonry works between Madras and Cuddalore. The sites of many of the works were for months under water and brick making and burning were also for a long time at a stand still.

142. Some vigorous efforts were made to proceed with brick making in spite of the weather, by constructing long lines of drying sheds, but it was found that the bricks did not dry sufficiently in them to burn well

143. Since dry weather set in however the Engineers are all proceeding vigorously with the collection and manufacture of building materials, and foundations are being put in as rapidly

as possible, in such works as are situated in low ground, so that they may be proceeded with without fear of interruption

144. The Character of the masonry and brick work generally, between Madras and Cuddalore is Excellent.

145. In some cases where native made bricks have been used the work does not appear particularly neat, owing to the joints on the faces of the work being rather coarse, but, as care has been taken to select really well burnt bricks, and as the Chunam is good, there can be no doubt that the work is quite strong and substantial enough. I think it would be well to plaster all works constructed of native brick, with Chunam mixed with "Soorkee"

146. I did not proceed farther South than the End of District No XII. between Chillumbrum and Shealy, as I there met Mr Logan, the Chief Engineer, with whom I had the pleasure and advantage of going over the line, back again to Madras, where we arrived on the 3rd Instant.

147. From Panrooty we proceeded up the Valley of the Ponnar, past Tiruvanaellore to the Tirukovaloor Anicut, examining the river bed and banks, with a view to determining what must be done to enable the line of Railway to dispose of such Extraordinary floods as those of October 1874

148. Mr Rice, and Mr Gresnell, two of the South Indian Railway Engineers have since

been employed under Mr Logan's instructions, in taking a series of levels, and sections, of the river bed, and of various places where the river overflowed.

When the information they are now collecting has been received, the waterways to be provided in the line will be definitely determined

Ross Thompson
Captain R.E.
Offg. Dy. Consulting Engineer for Railways

Bangalore
March 24th 1875

1. April

P.W. 2283/5

90-27 April/75 in B No 642

Railway Department.

CONSULTING ENGINEER'S OFFICE.

No. 195.

From
LIEUT.-COLONEL J. H. M. SHAW STEWART, R.E.,
Consulting Engineer for Railways,

To
COLONEL G. W. WALKER, R.E.,
Secretary to Government,
Public Works Department,
Fort Saint George.

SIR,

I have the honour to submit for the information of Government a note by the Officiating Deputy Consulting Engineer upon the works under construction on the Northern extension of the South Indian Railway which was inspected by Captain Thompson during the first quarter of the year.

Dated 24th March 75.

2. The exceptional floods of last year were extensively felt upon this part of the Company's undertaking, especially

especially as regards the works in progress between Madras and Cuddalore. Captain Thompson points out that the effect of those floods has been to entail delay and increase of cost in the preparation of materials,- delay in the carriage of materials,- and delay in commencing low lying works.

3. In another respect the occurrence of these exceptional floods before the works had made much progress may be deemed fortunate, inasmuch as the Chief Engineer has been enabled to revise the proposals for waterway in the light of the experience gained during last year: the result being a considerable addition to the waterway already

sanctioned.

sanctioned. The revised proposals will shortly be laid before Government. In paragraphs 4, 77, 79, 80, of his note, Captain Thompson alludes to some of the increases which have been found necessary. In the case of the Poonian river, alluded to in paragraphs 101 to 104, the measures to be taken will depend upon the result of the survey and sections now being made.

4. The District Engineer of Chingleput has been addressed with regard to the irrigation — channels alluded to in paragraph 64.

5. The difficulty alluded to in paragraph 54 is still the subject of correspondence and inquiry.

I

I have the honour to be
Sir
Your most obedt servt.
M. Montmorency Lt Col. R.E.
Cons: Engineer for
Railways.

Madras
5 April
1875
St George

P.W. 1875 Dept
No 2283.

RAILWAY DEPARTMENT.

G.O. 4: Decr/72 No 79-81.
" 4 " " " 82
" 7: " " " 142 to 144.
" 26 March/73 - 635-636.
" 29: Augt " " 513-514
" 18: Septr " " 292-294.
" 8: " " " 114-117.
" 20: " " " 341A-341C.
" 30: Octr " " 571-572
" 20: Decr " " 425 to 427.
" 19 Febry/74 - 373-374.
" 5 March " - 127-128.
" 16: " " " 525-527
" 17: " " - 460-462
" 1st May " " 34-35
" 1st July " " 8-10.
" 13: " " " 230-231.
" 20: Octr " " 596-597
" 2d Novr " " 13-15.
" 19: Janry/75 " " 320-322.
17-4-75

From
The Consulting Engineer,
for Railways,

To
The Secretary to Government,
P. W. Department,
Fort Saint George.

Dated 5th April 1875
Recd. 6th

No. 195 Enl.

Forwarding the ~~Dy~~ Cons: Engrs report of inspection on construction works on the Northern Extension of the S. I. R. during the first quarter of 1875.

G.O. No. 1168. 27-4-75.

Cir/

RM/ 8.H.L. RM/RC/ 41

Proceedings of the Madras Government

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Read the following:-

From,

The Consg Engineer for Railways } (A. E. No. 75 d/ 5th April 1875)

G O No. 1168 d/ 27th April 1875

The late date at which this Report of inspection of 15.6 miles of the northern extension of the South Indian Line, from Madras to the Coleroon River made between the 6th January and 2nd February has been submitted by the Deputy Consulting Engineer for Railways, greatly detracts from the usefulness of the information it conveys and makes detailed notice of it unnecessary.

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2. Taken in connection with all previous returns, it conveys a general impression of unsatisfactory progress since receipt of sanction by Telegram of 29° January 1873 of the proposals for the work to be done on the 128 miles between Madras and Cuddalore. It seems desirable therefore to review the causes of delay - The amalgamation of the Carnatic with the Southern of India Company was no doubt a chief source of delay up to the date of concentration of the management and supervision of both lines in the same hands

in September 1873 - But it then fell to the lot of the Chief Engineer, whose Head Quarters were at Trichinopoly, not only to start the works on the sanctioned section, but to revise the designs both of it and the extension to the Coleroon 28 miles; from whence into ~~Trichinopoly~~ Tanjore, a distance of 62 miles, he had the entire responsibility of planning the works - For the Tanjore-Cuddalore extension authority to collect materials was given in Government of India Telegram of 19° February 1874 - But simultaneously with this amount of fresh work was proceeding the construction of 196 miles of line between Trichinopoly and Tuticorin. It is not therefore to be wondered at that progress in the fair season of 1873-74 was slow; and the year that has since elapsed has been one of unusual floods, the difficulties caused by which are detailed in this and former reports. Altogether His Excellency the Governor in Council cannot but consider that more was attempted than could possibly have been undertaken by one

The working of a length of 168 miles of open line from Negapatam to Erode, had also to be supervised.

An [illegible] Excel[illegible] that the [illegible] had [illegible] placed [illegible] on Resident Engineer [illegible] will [illegible] to [illegible]

[illegible] – 128
Cuddalore to Tanjore – 93
[illegible] – 210
Trichy & Tuticorin – 196
[illegible] – 12
[illegible] – 12
Total – 5[illegible]

Chief Engineer, without at least a Deputy of experience to aid him in the work of supervision.

3. It would appear that the question of waterway of the large bridges, as well as of the minor bridges and culverts, affected by the floods of Rivers near Cuddalore, and of the height to which the Railway Embankments should be raised, is still in a very unsettled state and His Excellency the Governor in Council has no doubt that the Chief Engineer and Consulting Engineer for Railways will give the subject

the fullest consideration, and be able to satisfy the Government of India with the decision arrived at; the grounds for which will have to be communicated to them in detail.

The result of the reference made to the District Engineer Chingleput in respect to sluices for Irrigation Channels; and of the inquiries being made on the subject of the withdrawal of labour by Revenue officials will be reported in due course by the Consulting Engineer.

Govt. C. Engr. for Rep.

No. 642/43

Recd. 12-5-75

Rd. Attd. C. 17-4-75

Govt. of 1875 Madras.

PUBLIC WORKS.

To The Consltg Engr for Rlys

Dated

Recd.

Encl.

G. O. 27 April No. 1164

Nos. 642-643

Northern Extension South Indian Railway - Pass orders on the Deputy Contl Engineer's report of inspection on construct work on the during the 1st Quarter of 1875