

## GENERAL CONTENTS.

---

| <i>Page.</i> |                                                                                                                   |
|--------------|-------------------------------------------------------------------------------------------------------------------|
| I.           | Requisition from the Madras Railway Committee, for the publication of the papers and order of Government thereon. |
| to XXXIII.   | MAJOR PEARS' REPORT ON THE PROPOSED RAILWAY BETWEEN MADRAS AND WALAJAHNUGGUR.                                     |

## APPENDIX.

|               |                                                                                                                                                                  |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| I.            | <b>A.</b> Letter from J. Ouchterlony, Esq., forwarding the printed proceedings of the Madras Railway Committee, and the reports and estimates possessed by them. |
| II.           | <b>B.</b> Further letter from J. Ouchterlony, Esq., on the subject.                                                                                              |
| II to VII.    | <b>C.</b> Letter from J. A. Huddleston, Esq., affording information respecting the land trade of the Madras Presidency.                                          |
| VIII to XIII. | <b>D.</b> Statement shewing the value and estimated weight of IMPORTS into Madras from certain districts during 1842-43.                                         |
| XIV to XVII.  | <b>E.</b> Ditto      EXPORTS      Ditto.                                                                                                                         |
| XVIII.        | <b>F.</b> Statement shewing the Imports to and from Madras by sea and land for 11 years.                                                                         |

## PLATES.

SKETCH No. 1.—Shewing the principal lines constituting a system of railways in India.

SKETCH No. 2.—Shewing the course and extent of the proposed experimental railway from Madras to Vaniembaddy.

Indian Atlas, Sheet No. 78, [reduced] on which the three lines that have been examined are marked in blue, red, and yellow.

Survey of the proposed line between Madras and Wallajahnuggur.

Plan of a portion of Madras, shewing two different directions in which the railway might be extended from the present proposed Terminus.

## ERRATA.

Page 14, of Major Pears' report, 10th line from the bottom, for "effected" read "affected."

In statements D. and E. in the "APPENDIX," the *ciphers* are intended to signify that the amount (whether referring to quantity or value) is not known, no returns having been received.

Page XX of the APPENDIX, under letter G. middle of first line, read "*Salem* is in a flat, open," &c.

„ 50, of the "SUPPLEMENTARY REPORT," 16th line from the bottom, for "*any part* upon the eastern coast" read "*any port* upon the eastern coast."

„ 52, „ 11th line from the bottom, for "*trade in rightly* wrought commodities" read "*trade in highly* wrought commodities."

„ 65, „ 8th line from the top, for "*Slamannar* railway" read "*Slaman-nar* railway."

„ „ 20th line from the top, for "*the cost for* earthwork" read "*the cost of* earthwork."

SIR HENRY MONTGOMERY, BART.

*Chief Secretary to Government.*

SIR,

I have the honor, by desire of the Madras Railway Committee, to acknowledge the receipt of Extract Minutes of Consultation, of 29th August and 11th October, with accompanying Reports, and to request you will be pleased to convey to the Right Honorable the Governor in Council their best thanks for the same.

Looking at the intrinsic value of these papers and the general interest that must attach to them, the Committee are induced to solicit that his Excellency in Council will be pleased to cause their being printed in a pamphlet, or other convenient form, so that they may be available for circulation and afford facility for reference.

I have the honor to be,

Sir,

Your most obedient Servant,

JAS. OUCHTERLONY,

*Honorary Secretary,*

*Railway Committee.*

MADRAS, }  
November 29, 1851. }

---

THE Right Honorable the Governor in Council will have much pleasure in complying with the request of the MADRAS RAILWAY COMMITTEE and directs that Major PEARS' Reports and the papers connected therewith, be printed at the expense of Government. The Chief Secretary will take measures to carry these orders into effect.

FORT ST. GEORGE; }  
2d December 1851. }

(Signed) H. C. MONTGOMERY,  
*Chief Secretary.*

**R E P O R T,**  
BY  
**MAJOR T. T. PEARS, C. B., ENGINEERS,**  
**Railway Commissioner,**  
ON THE PROPOSED  
**R A I L W A Y,**  
BETWEEN  
**MADRAS AND WALLAJAHNUGGUR.**

FROM MAJOR T. T. PEARS, C. B.  
*Engineers.*

TO SIR H. C. MONTGOMERY, BART.  
*Chief Secretary to Government,*  
*Fort St. George.*

SIR,

In accordance with the instructions conveyed to me by an extract from *Minutes of Consultation No. 853* in the Public Department, dated the 24th September 1850, I addressed a letter to the honorary Secretary to the Madras Railway Committee, requesting that I might be put in possession of the plans, estimates, and other papers connected with that project.

2. From that gentleman's reply I learned, that the whole of the original papers connected with the Madras and Wallajahnuggur Railway had been sent to England—no copies having been kept; and that the only information the Committee could furnish me with at present, was that contained in a pamphlet published at Madras last year.

App. A. I was also informed that the line of railway contemplated by the Madras Committee was one connecting Madras and Wallajahnuggur.

3. Under these circumstances, having neither plans nor estimates before

me, I considered it proper to make application to the Board of Revenue for the services of two Surveyors; to proceed with the determination of the best line between those two points; and prepare for submission to Government complete surveys and estimates of the same.

4. These documents are not yet completed; but as the most important points to be considered on this occasion are, the propriety of selecting this particular line, and the probable amount of traffic thereon; I take the earliest opportunity of submitting to Government the information that I have obtained, and the conclusions to which I have arrived on these two points.

5. In attempting to fix upon a short line of railway that may serve at once as an experiment and as the most suitable commencement of an extended system, we have this difficulty to contend with, viz.—that while the experimental line must necessarily be dependent for its traffic, upon the highways of the country; as they already exist beyond its terminus, the direction of a trunk line as the basis of a general system of railways would be determined with reference to the requirements of the country at large and to the consequent arrangement of that system.

6. The great bulk of the traffic between Madras and the interior, passes over one or other of three trunk roads—the northern, southern, and western or central. Of these three the latter is, as might be expected, by far the most important; not only because the other two, being Coast lines, have to compete with the coasting trade, which is carried on here under many advantages; but because the topographical character of the country, as well as its former political divisions, have led to a system of roads which throws the whole of the traffic of the most populous and important inland districts into the Carnatic by the passes of North Arcot towards the ancient capital of that name: thus concentrating the trade with Coimbatore, Salem, Mysore, Bellary, Cuddapah, and North Arcot itself, upon the high road between Madras and Wallajahnuggur.

7. Such being the case, there could be no doubt as to the general direction which the first line of railway from Madras should take; and, considering it as an experimental line, it was natural enough that the town of Wallajahnuggur, a suburb of Arcot, but situated on the northern bank of the Palar, should be selected as the first terminus.

8. Considering this line with reference “to the ulterior destination of such a mode of conveyance as forming part of the general system,” it will be well to take a brief glance forward to the probable arrangement of the most important lines of railway within the limits of this Presidency.

Honorable Court's despatch, Financial Department, No. 16, 15th May, 1850.

9. In the accompanying sketch\* I have attempted to show the general direction of the lines which would probably be considered the first in importance within the limits of this Presidency. The particular course which they should follow would necessarily form the subject of subsequent careful investigation. Of these lines it is to be

\* The effect of an electric telegraph to Cochin or Mangalore in expediting communication with Aden will not fail to be noticed.

observed that such portions as serve to connect any populous and important town near the middle of the Peninsula with either Coast, may be considered as constituting lines complete in one sense—commercially. A railway from the same spot to the opposite coast completes in a similar manner another line; while the two together, accomplishing certain political ends, form one line complete in all respects. In the arrangement here shown it will be seen that the most important lines connected with Madras itself would probably fall into one trunk line at a point about 60 or 70 miles from that town, and that the most direct and obvious course for this is nearly central, or due west from Madras. The exact course of such a line would, however, depend upon the ascertained best localities for a passage up the Eastern ghats. The character of the intervening country, highly favorable to the construction of a railway, and the position of the present passes would point to the neighbourhood of Sholinghur as the direction for this first line, and the spot from whence others would diverge to Vellore and the Amboor valley on the one hand, and to the Mooglee pass on the other. Such a line would, however, pass clear of Wallajahnuggur and would only be adopted under a determination of disregarding that, and seeking another terminus for our experimental line.

10. Having thus pointed out the most suitable line as the commencement of a general system of railways, I come to consider the prospects of that proposed to Wallajahnuggur as an experimental line—and though not perhaps the best, as forming a very convenient basis for the construction of a complete system.

11. The town of Wallajahnuggur is by the present high road 68 miles from the Fort of Madras—it is two miles short of the Cavalry Cantonment of Rancepet; and stands on the left, or northern bank of the river Palar—nearly opposite to the town of Arcot. The combined population of these three places is estimated at 54,000—but it is in Wallajahnuggur alone that this population is calculated to afford any employment to a railway beyond that arising from its own immediate wants.

12. The population of Wallajahnuggur amounts to 20,000, consisting almost wholly of people actively engaged either in manufactures or commerce. Though in many respects offering a convenient temporary terminus for a rail-

to population

way the importance of this town as a "great entrepôt of traffic" has been over-rated; though not perhaps to so great an extent as that of the "considerable military station" of Arcot.

13. The amount of traffic of which Wallajahmuggur may be considered as the source is that which is derived in the shape of agricultural produce from its own, and the neighbouring talooks—from its own manufactures—and also from the cotton of the Ceded Districts and the betel nut of North Canara, both of which are, according to a practice of long standing, carried on chiefly by means of Agents at Wallajahmuggur. With these exceptions the traffic passing into Madras along the western road comes for the most part through Wallajahmuggur; and this constitutes a very important feature in the character of this town as an entrepôt; or as the proposed terminus of a railway.

14. It will be observed also that the trade, such as it is, comes to Wallajahmuggur from the westward for dissemination through the Carnatic—while the traffic on the other hand passing over the road from Madras to that town is utterly insignificant. As far therefore as Wallajahmuggur is an entrepôt of trade, it would affect a rail-road running into it from the westward rather than that portion of the line which lies on this side.

15. In considering the prospects of a railway between Madras and Wallajahmuggur, we find that the subject naturally divides itself into the following heads:—

- 1st. The nature and amount of the traffic.
- 2dly. The cost at which that traffic is carried on at present; and the maximum charge that can with safety be calculated upon for the railway.
- 3dly. The cost of construction of a railway adapted to the requirements of this traffic; the interest on which we consider as constituting a fixed annual charge.
- 4thly. The cost of maintaining and working the railway with such an amount of traffic.
- 5thly. The financial results.

16. 1st.—The present amount of traffic is not only the most important but it is unfortunately the most difficult point to ascertain with any degree of accuracy. Prior to the year 1844, the returns of the Land Custom House at Madras showed the nature and amount of imports by land, as far as they were recorded in that office; and from these returns we may safely take a minimum amount for that day. The Collector of Madras obligingly furnished me with information on this head.

App. C.

and it will be seen from his letter, that while the annual value of the imports by land was gradually increasing, it amounted in the year 1842-43 to Rs. 96,52,266.

17. Detailed statements furnished me by the same gentleman show that of the above, the districts of Coimbatore, Salem, North Arcot, Bellary and Cuddapah, with the province of Mysore yielded traffic to the extent of Rs. 58,05,053; the estimated weight of which is 20,284½ tons, to be assumed as having passed over the road in question: since whatever portion of the imports from Cuddapah might have entered Madras by a different route would probably not exceed that which would have passed over this from districts which I have not noticed. In 1841-42 the amount ascertained in the same manner was Rs. 52,70,332 or tons 18,437.

18. Regarding the exports by land our information is more unsatisfactory and less to be relied upon—the declared value of these exports, entered at the Custom House in 1842-43 was Rs. 13,41,240, exclusive of the value of Salt. Transactions in this article between Madras and the districts in the interior having only commenced, to any considerable extent, in 1847.

19. The value of exports for the preceding year, 1841-42, was Rs. 12,45,350; and from this return, the latest which I have had an opportunity of seeing in all its details, I find that the value of Goods of every kind exported to the above districts, and supposed, therefore, to pass over the western road, was Rs. 6,52,532; and has been estimated at tons 931.

20. It will be seen by the letter from the Collector of Madras, that the amount of Salt annually exported for inland consumption has been regularly increasing; and is estimated, for the past year, at from 2,500 to 3,000 garces or about tons 12,400.

21. By a return which I have received from the Principal Commissary of Ordnance, I find that the amount of Military Stores which have been despatched from the Arsenal of Fort St. George, and have passed over the road between Madras and Arcot, has been on an average of five years:—

|              |      |     |
|--------------|------|-----|
| Imports..... | Tons | —   |
| Exports..... | Tons | 135 |

22. I have been favored with a similar return by the Commissary General which shows the annual average amount of Stores despatched in that department, by the road in question, to be

|              |      |     |
|--------------|------|-----|
| Imports..... | Tons | 43  |
| Exports..... | Tons | 343 |

23. We have thus for our minimum traffic in goods :—

|                                                                                                                                 |      |         |
|---------------------------------------------------------------------------------------------------------------------------------|------|---------|
| The amount of Imports from the districts immediately concerned as reported at the Land Custom House in the year 1842-43....     | Tons | 20,284½ |
| The amount of Salt exported during last year.....                                                                               | Tons | 12,400  |
| Average annual amount of Military Stores passing and repassing upon this road.....                                              | Tons | 135     |
| And the same for Stores despatched by the Commissariat Department....                                                           | Tons | 386     |
| Total of traffic as taken from official returns, And lastly the amount of exports according to the official returns of 1841-42. | Tons | 931     |
| Making a total of.....                                                                                                          | Tons | 34,136  |

annually passing one way, or the other, over the whole distance between Madras and Wallajahnuggur.

24. The reports of the Land Custom House, from which the above information was derived, were, however, confined to those articles (36 in number) enumerated in a Government proclamation of the 17th July 1837. A reference to the number and names of articles, exported by sea at the same time, will show that the western road must have given passage to many commodities not included in the above list, and therefore not noticed by the Collector.

25. Of the above amount then we may feel fairly assured; and little less certain that it has experienced very considerable increase since that time. The Collector of Madras in forwarding a statement of imports by land from the year 1838-39 to 1842-43 inclusive, observes,—  
 “It may fairly be supposed that the actual value of the goods imported was considerably higher; and the amount has undoubtedly increased since the abolition of the transit duties.”  
 Moreover, the construction of a good highroad, such as now exists between Madras and Wallajahnuggur, must have tended materially to promote an increase, which would be at the same time a natural consequence of continued peace and good Government.

26. There is certainly a very general impression on the minds of those who have had opportunities of observing, that the traffic upon this western road has increased very considerably during the last few years. Of the probability of the exports from Madras having increased in amount we may form some idea from the annexed statement, by which it will appear (assuming the imports by land in 1848-49 to have been one hundred lacs of Rupees—rather more than they were in 1842-43)—the difference between the total imports (by land and sea) in the year 1842-43 and the exports by sea for the same year was Rs. 10,922,914; while the same difference calculated for 1848-49 was Rs. 15,292,541. It has been seen that the declared value of exports by land for 1842-43 was Rs. 1,341,240, which would leave out of

App. F.

the above balance the sum of Rs. 9,581,674 as the value of the consumption of Madras itself for that year. Allowing an addition of 20 per cent on this last item we should have for the value of the local consumption in 1848-49 Rs. 11,500,000: and consequently for that of the total exports by land Rupees 3,800,000.

27. Further in considering the probable augmentation in the amount of traffic during the past eight years, we have the help of certain returns which have been from time to time drawn up under the authority of various public officers for the express purpose of ascertaining this amount. These returns consist of tabulated statements showing the number of persons and conveyances of every description that have been observed to pass each way at certain points on the road. They are not entitled to much credit, I fear, as returns of the real amount of traffic; but knowing under what circumstances and by what class of men they are taken and on which side they are most likely to err, we may make use of them as checks upon estimates framed from other data.

28. The traffic statements for the western road with which I have been favored by Captain Best, Superintendent of Roads, an officer who has of late years paid very close attention to this subject exhibit the returns taken at various points during different years and at different seasons of the year; and the conclusion to which I have been led by a careful examination of these papers (making no allowance for errors which would be in most cases those of omission) is that the average traffic over every mile of road between Madras and Wallajahnuggur may be safely taken at 300 loaded bandies per diem, after striking out all those which through the road in the neighbourhood of Madras laden with straw, fuel, &c., which, though calculated to yield a considerable profit to a rail-road, it will be as well to leave out of our calculations for the present. Similar statements with which I have been favored by the Collector of Chingleput confirm me in my opinion that the above is a fair and safe estimate.

29. The annual amount of this traffic would be :—  
 $300 \times 365 = 109,500$  loads or about 54,000 tons; being an excess of 19,864 tons over that deduced from the imperfect official returns of 1842-43 and the Salt and Government Stores of later years. I have no hesitation in adopting 50,000 tons as a fair approximate estimate of the present annual traffic—the difference being in my opinion not more than may be reasonably attributed to the causes already

Assumed traffic 50,000 tons.

Total mileage 3,200,000. • mentioned. Assuming the distance by rail to be 64 miles this would give us a total mileage of  $64 \times 50,000 = 3,200,000$ .

30. The passenger traffic is now carried on in such a manner as to render it impossible for us to ascertain its amount; but we may conclude that it is considerable, since by this road is carried on all communication between the central and western districts and the town of Madras: the latter being the seat of Government, the chief port on the eastern coast and having a population of 700,000 souls. It is, however, vain to attempt to estimate this traffic. It will be better to consider it as one of the sources to which we may look to make up in a measure, whatever deficiencies there may be in the receipts on account of goods.

31. 2dly—The present charge for a handy, a pair of bullocks and driver from Wallajahmuggur to Madras is Rs. 4. In the Salem district, it will be seen by Mr. Phillips's letter that the ordinary charge is rather lower than this—nor is it on this road by any means the lowest—but it is about the average. The distance from Wallajahmuggur to Madras is 68 miles; and as these carts certainly carry, when required to do so, half a ton, and frequently more, the cost of carriage will not exceed As. 1 10 per mile per ton. This is the rate of working towards Madras; but as our object is to discover the average rate at which these people can afford to carry goods, we must take into consideration the charge the other way; and I find that they will return conveying a similar load for about Rs. 2 12. The average rate thus becomes half a ton carried 136 miles for Rs. 6 12 or about As. 1 6 per ton per mile. Such is the case under present ordinary circumstances without any serious competition—but we should not be justified in assuming that the above rates are susceptible of no further reduction.

32. It must not be forgotten that the cost of the road itself ought to be thrown in here, since the charges on the rail-road are expected to provide for all expenses. Captain Best estimates the expense attending the maintenance of the western road inclusive of interest on the original outlay at 33 per cent on the present charge for transport; which would raise the actual average cost of conveyance on the present system to As. 2 per ton: but though this be the real state of the case, the opposition which the rail-road would encounter from the native bandies remains

the same; for it is difficult to see how the Government could avoid keeping up the present road, or how they could, to ensure fair play, exact from those using it a charge for its maintenance without the introduction of a system of tolls bearing upon different portions of the road, as well as upon the whole line. We must therefore assume that the rail-road would have to compete with the native carts now carrying on the traffic at an average charge of As. 1 6 per ton per mile. For this, and other reasons to be hereafter noticed, I consider that the maximum charge by the rail-road should not exceed As. 1 per ton per mile.

Proposed charge by rail-  
way As. 1 per ton per mile.

33. 3dly—With regard to the cost of construction I hope to be able to submit very shortly an estimate for a line which I have selected as appearing to me the most direct and the cheapest between Madras and Wallajahmuggur. In the mean time it will be sufficient for the object of this report if I adopt the estimate of the Madras Committee for a single line which has been framed upon liberal data and which I think likely to prove amply sufficient.

34. According to this, the following items which constitute the railway proper, determine the permanent charge upon its revenues:—

|                          |              |
|--------------------------|--------------|
| Earthwork .....          | Rs. 2,13,819 |
| Bridges, Drains, &c..... | „ 1,40,000   |
| Ballast.....             | „ 1,29,096   |
| Rails, Sleepers, &c..... | „ 13,20,700  |
| Laying Rails, &c.....    | „ 29,000     |

Total Rs. 18,32,615

Permanent annual charge On which interest at 5 per cent = Rs. 91,630 as a permanent annual charge.

35. 4thly—The cost of maintaining and working the railway with the above amount of traffic.—Under this head I shall include the interest on the cost of buildings and carrying stock, these being dependent on the nature and extent of the traffic.

|                                             |                                                                |
|---------------------------------------------|----------------------------------------------------------------|
| 4thly—Cost of maintain-<br>ing and working. | Cost of 6 Engines with tenders.. = Rs. 1,10,000                |
|                                             | Waggons (150)..... = „ 1,05,000                                |
|                                             | Buildings—Offices, Sheds, Work-<br>shops, &c..... = „ 1,15,000 |

Total Rs. 3,30,000

|                                                                                                     |               |
|-----------------------------------------------------------------------------------------------------|---------------|
| Interest on the above at 5 per cent = Rs.                                                           | 10,500        |
| Maintenance of way 64 miles at Rs. 700.....                                                         | = „ 14,800    |
| • Note App. H. Locomotive expenses at * As. 8 per train per mile (4 trains daily for 313 days)..... | = „ 40,000    |
| • Management and Police.....                                                                        | = „ 40,000    |
| Repairs to Waggon at 10 per cent = „                                                                | 10,500        |
| Ditto to Buildings at 5 per cent.. = „                                                              | 5,750         |
| Total annual expenses                                                                               | Rs. 1,57,610. |
| Total annual expenses..                                                                             | Rs. 1,57,610  |

36. 5thly—Financial results.—The expense of maintaining and working a single line of railway with a traffic of 50,000 tons over its whole length is estimated at.. Rs. 1,57,610 While that traffic at the rate of As. 1 per ton per mile would yield..  $\frac{32,00,000}{16}$  = 2,00,000 Leaving a balance to meet the interest on capital of..... 42,300 Against the actual amount of interest.. 91,630 Deficit on goods traffic. And showing a deficiency of .. 49,240

37. To meet this apparent deficit we have the profits arising from the passenger and parcels traffic—the mails—conveyance of Troops and all the many indirect advantages which the Government itself, no less than the people of the country, may be expected to derive from the introduction of railways.

38. With regard to the Mails, I find that the present cost of conveying tappal and banghy between Madras and Arcot is about Rs. 9,600 per annum, and that as an experimental measure, the conveyance of the Mails upon this road by means of horses has been sanctioned by Government at an increased cost raising the expense between Madras and Arcot to Rs. 12,000 per annum. This can scarcely be looked upon as a standard by which to measure the service rendered to Government in providing the means of conveying the Mails regularly and to any amount at the rate of 20 miles an hour—their present pace being on an average 4 miles—their regularity greatly affected by the state of the weather and other causes; and their bulk limited by the number of men available as carriers.

39. The Quarter Master General of the Army has been good enough to furnish me with a return showing the total number of troops that have passed over this road during the last ten years. The annual average is 2,336 men of all ranks, to which we may add 11,680 followers at the rate of five per fighting man. We may assume that Troops would on all occasions be moved by the railway, not only with a view of saving their batta, and the wear and tear of camp equipage; but also as a means of economizing their services and of avoiding the risk (unhappily in this country too near a certainty) of exposing them to sickness and suffering. In order to simplify the calculations, I will take the above 2,336 men as third class passengers, at 6 pice per mile each, and the 11,680 followers as fourth class, at 2 pice per mile. The sum they will contribute to the railway will stand thus:—

$$\begin{array}{rcl} \frac{2336 \times 6 \times 64}{12 \times 16} & = & \text{Rs. } 4072 \\ \frac{11680 \times 2 \times 64}{12 \times 16} & = & 7786 \\ \text{Total..} & & 12,458 \end{array}$$

Note App. P.

40. If the above calculations are correct the several sources of revenue already enumerated would leave the sum of Rupees 24,782 to be realized among the various classes of passengers from parcels—from the several descriptions of short traffic or from an increase in the goods generally arising out of the operations of the railway. At the same time it may be observed that the above estimated deficiency would amount to rather less than Rs. 410 per mile per annum. The cost of the present high road has been estimated by Captain Best to amount to Rs. 813 per mile per annum.

41. The circumstances under which this railway would be constructed and worked are so exceedingly favorable that there can be little difficulty in demonstrating the probability of its proving a remunerative undertaking: but even while so doing one cannot but lament that the question of “Railways for India,” should have been brought forward burdened with all the conditions which the fortuitous circumstances of their origin, and the peculiar state of society in England have given rise to there. We are in danger of doing great injustice to the people of this country by looking upon these great works as mere commercial speculations, and by meeting every railway project with

Railways in India should not, in reason, be required to pay at once.

the condition that it shall at once pay its own expenses together with the interest of the money laid out in its construction. There may be some few instances, as the present, in which they will do so: but my impression is that they would not and that it would be unreasonable to expect they should if generally substituted even for the present trunk roads. I think it will be found that of the railways yet constructed very few indeed would have paid by the traffic existing before they came into operation. A railway must do its work before it can earn its own support, or defray all the expenses connected with its construction. So well, however, are we warranted by experience in believing that a railway placed judiciously, constructed and worked with care and economy will extend its influence far beyond that of the common road which preceded it, that we fall into error when we frame our calculations from the amount of traffic already existing and disregard that increase which forms part of the necessary results of railway operations; an error at least as pernicious (since it tends to the discouragement of important public works) as that more frequently met with of insufficient estimates and exaggerated results.

42. It will be useful to consider the nature of the more important portion of the traffic on this line and the probability of its amount being affected by the railway. With this view, I consulted the Collectors of the several districts concerned, and sought advice from gentlemen engaged in mercantile pursuits by addressing the Chairman of the Chamber of Commerce at Madras, in a letter which will be found in the Appendix. The replies with which I have been favored by the Collectors will be read with much interest; but I regret to say that my letter to the Chairman of the Chamber of Commerce has met with no reply whatever.

43. The principle articles which constitute this traffic are—  
 1st—Salt. 1st. Salt—As an export from Madras. The total amount of Salt supplied during the Fussy 1259 to the districts likely to be effected by the proposed railway was 10,283 garces, viz. from the eastern coast 8,000 from the western 2,193. Of this, nearly 3,000 garces were disposed of at Madras, and it is more than probable that the whole of this was conveyed on the western road—a small portion perhaps stopping short of Wallajahmuggur. The price of this Salt at the pans is Rs. 120 per garce. Taking the aggregate population of the above districts at 8 millions—it needs no argument to prove that the quantity of sea Salt now supplied is insufficient to meet a demand from that number of people. On the other

Nature of the present traffic and probability of increase.

App. I.

1st—Salt.

App. O.

Quantity sent inland at present insufficient.

hand, it would be very unsafe to assume that, in the present state of the country, sea Salt could, by any possibility, be placed within such easy reach of all classes of the inhabitants at a distance of 3 or 400 miles from the Coast as to supersede the earth Salt which abounds in some parts of the country; and which, though commonly considered a very noxious article, is certainly in general use among the poor in those parts.

App. K. para. 10.

44. That any reduction in the price of this, however effected, would at once increase the amount consumed, there cannot be the least doubt; but the extent to which the Depot price might be reduced, in dependence on this anticipated increase, without involving loss to the public revenue, can only be determined by actual experience. It appears from a Minute written in 1836 by Mr. D. Elliot, third member of the Board

of Revenue, that the price was, at least on one occasion, reduced with this view; but the experiment, perhaps only a partial application of a general principle, was not followed by encouraging results. It is no easy matter to determine, in such cases, the exact point to which the price may be diminished without loss of revenue, or to which it must be reduced in order to attain (if such be the object) a maximum revenue: but it must be borne in mind that we are more likely to err in keeping the price too high than in reducing it too much. Considering the people as divided, so far as worldly means are concerned, into several classes numerically varying, the object in reducing the price of sea Salt would be not so much to cause an increase of consumption among those who already use it, as to place it within the reach of other classes of people sufficiently numerous to make up for the reduction of price by a large increase in the demand.

45. The price of Salt in the interior is made up of three distinct elements; the original cost—the carriage—and the profits. It is obvious that any reduction in one of these can only affect the ultimate selling price in a diminished ratio. 33 per cent. for example, on the prime cost (120) would effect a reduction of little more than 13 per cent. on the retail price at Bellary (291\*). An instructive and rather curious fact is noticed in the above Minute by Mr. Elliot, viz.—that an increase of 20 per cent. in the average retail price was immediately followed by a decrease in the amount sold for inland consumption in exactly the same ratio.

46. Another feature in this question deserves notice, viz.—that while,

Reduction in price sure to be followed by increased consumption.

Nov. 9th, 1836.

Retail price of Salt—how composed.

\* Fort St. George Gazette, 24th January 1851.

under present circumstances, the effect of a reduction in the *Depôt* price would be to increase the amount sold, this very increase would tend to raise the cost of carriage; a circumstance which, combined with the natural effect of a sudden increase in the demand, might help to explain the fact noticed in the *Minute* above quoted, viz.—that the retail price in *Fusly* 1244, when the *Depôt* price was 105, was in some places lower than that of 1237, when that price was 70.

47. It is one of the most remarkable characteristics of a railway, distinguishing it from a common road, that the cost at which any unit of work can be performed decreases as the number of those units is augmented; so long as the amount of work keeps within the limits of its capacity. The effect of a reduction in the *Depôt* price of Salt, therefore, would be to increase the amount of traffic on the railway, and at the same time, to diminish the cost of transport; and, as a necessary consequence, to lower the retail price and increase the consumption: thus conferring a great benefit on the people, contributing to the profits of the railway, and very probably, augmenting the revenue by a large increase in the quantity of Salt sold. Assuming, however, that the price of Salt remains the same, it is to be feared that a railway of 60 or 70 miles in length with the proposed charge of *As.* 1 per ton per mile would produce little effect on the retail price in the more remote districts.

48. The annexed table shows the average price of Salt in some of the principal towns in the district of North Arcot from *Fusly* 1255 to 1259 inclusive, with the distance from Madras of each town; from which it will be seen, allowing 10 per cent for profits and deducting the prime cost (*Rs.* 120,) that the cost of carriage even

App. L.

Average price in North Arcot from A. D. 1845 to 1849 inclusive.

to places beyond the reach of the highroad, seldom exceeds *As.* 1-4 per ton per mile. To Arcot itself, the point to which it is proposed to carry the railway, the charge calculated by this process is only 11 pice per ton. These calculations, however, have been made upon the assumption that the whole of the Salt retailed in North Arcot has been purchased at the *Depôt* price; but as there can be no doubt that under the present system, smuggling is carried on to a considerable extent, it will be safer to take as our guide the present hire of a bandy to Arcot, which has been already stated to be *Rs.* 2-12. The saving on the carriage of Salt by railway at *As.* 1 per ton would then be 22 per cent. the reduction in the retail price at Arcot about 3-5 per cent.

40. It is probable, however, that the proposal made to establish Salt *Depôts* in the interior might, under such circumstances, receive favorable consideration. A reasonable reduction in the *Depôt* price, and at the same time in the cost of transport, would, under such arrangements,

tend greatly to increase the consumption and contribute largely to the health and comfort of the people; but in this, as in all similar cases, we must make sure of the general principles upon which we are acting, carry them out with confidence and wait the results with patience.

60. Another article of growing importance in this Presidency is Sugar.

2dly—Sugar.

App. K.

The cultivation of Sugar encouraged by the presence of intelligent and enterprising European merchants has been gaining ground of late years both in Mysore and the western Talooks of North Arcot. Mr. Bourdillon informs me that during *Fusly* 1259, 359,712 maunds were exported to Madras from his district. This circumstance is not so remarkable in the amount as it is encouraging from the great increase that has taken place during the last few years. This traffic, carried on now under many difficulties, would fall upon the proposed railway at Wallajahuggur. The present cost of carriage from Palmanair is about *As.* 2 per ton per mile, a portion of the road being very bad. The saving on a ton by adopting the rail-road from Wallajahuggur to Madras would be *Rs.* 3 12, in addition to the advantages derived from a safe, regular and speedy mode of transport and the convenience offered to the resident merchants by the establishment of an improved means of communication with the Coast.

51. The Cotton brought by land to Madras for export is derived chiefly from the districts of Cuddapah and Bellary. The total amount annually exported from hence has fallen

3dly—Cotton.

off very much during the last ten years; but this is chiefly owing to the circumstance of the Cotton from the southern districts (Madura and Tinnevely) formerly brought to Madras for export, being now shipped at the local ports. At the same time, though we have no returns since 1842-43 of the amount actually brought from Bellary and Cuddapah, it appears certain that it has been on the decline; a circumstance that may be in some measure attributable to the improvements which have been made in the means of communication between the Ceded districts and the western Coast. A railway carried into those districts would doubtless tend greatly to the encouragement of this product, not more by cheapening its transport than by facilitating communication and promoting among our European community a more intimate acquaintance with the country and its capabilities: but the line now projected, running 64 miles towards Bellary, could not be expected to produce any marked effect upon a field so remote. Cotton is, however, brought in smaller quantities to Madras by land from North Arcot, Salem and Coimbatore; and, as the railway advances into or towards any of these districts, its beneficial effects upon this product will be felt, since there are few articles likely to be so much affected by a railway when brought once within its influence. Its

bulk—its liability to injury from accident or exposure, render its transport by land a point of peculiar difficulty and importance. The charge for carriage to the Coast, independent of the loss arising from the above cause, bears at present a high ratio to its market value. The introduction of railways appears likely to operate greatly to the benefit of this branch of agriculture. Whether they will supply all that is required to place it on a satisfactory footing is a question which does not fall within the limits of this report.

52. We have then Indigo (chiefly from Cuddapah), Grain, Oils, and Oil Seeds (from Salem,) Timber, Salt-petre, Piece-goods, &c. &c. &c. The effects of a rail-road, considered solely as an improved and economical mode of transport, would be inversely proportioned to the distance of the place of production beyond the terminus of the railway, and to the intrinsic value of the commodities themselves. The effect *thus* produced upon Indigo, for example, would be very small; while the contemplated reduction in the cost of transport might be expected to exercise a marked influence on the consumption of the less valuable products. A writer in the public papers, well informed apparently on these subjects, has lately furnished me with an illustration in the case of linseed—the land carriage of which is estimated by him at about 20 per cent. of the total cost at which it can be landed in England. The effect of railway carriage on such an article would be very important. In regard to Grain, Timber, Hay, Straw, Firewood, &c., could these latter articles, by a judicious arrangement of the tariff, be brought on to the rail, a fall of nearly 50 per cent. in the cost of transport could not fail to increase greatly the demand, while it would necessarily extend the influence of our local market in the direction of the rail-road to districts now beyond its reach.

53. To the well known examples, presented to us in the large increase of traffic which has, in every case, followed the construction of rail-roads in Europe, I shall only now refer, as justifying the expectation that traffic of various kinds now unknown, might be expected to follow the construction of this railway; in the same manner that personal intercourse on occasions when such had been previously unthought of, has proved to be another invariable result. I shall mention, merely as an illustration of this, that Hay of a very superior quality is occasionally brought from North Arcot to Madras at a cost of from Rs. 35 to 40 per ton; while on the other hand, the refuse from this, the most populous town in India, has not only not been applied to its proper purpose, that of fertilizing the soil, but continues to the present moment a constant source of discomfort and suffering to its inhabitants. Lastly, I would observe that independent of any increase on the present aggregate amount of traffic, the con-

Additional traffic to be expected, drawn away from other lines.

struction of a rail-road, or of any improved means of communication, must necessarily draw from competing lines a portion of their traffic. There are even now certain lines of road which, though far inferior in construction do, during a great part of the year, compete with the high western road: the traffic upon these I have not taken into account, but there can be no doubt that they would yield to the superior advantages offered by a rail-road.

54. We are thus, I think, clearly justified in anticipating an increase on the present amount of traffic amply sufficient to cover, with the moderate charge of As. 1 per ton per mile, every expense connected with the construction, maintenance, and working of the proposed railway; if we could ensure that traffic passing over it.

Sufficient traffic to make this line pay if we could ensure the whole passing over it.

55. We are thus led to a consideration of the sufficiency of the proposed railway as an experimental line and the propriety of selecting Wallajahnuggur as its terminus. 64 miles would be considered a respectable length for a railway in England; but as the commencement of a line destined to extend from 500 to 1000 miles, it can only be considered, and must be expected to operate as a mere fragment. The disadvantages of a short and incomplete line of railway are those, which attach to all experiments made with imperfect instruments: their results must necessarily be partial and unsatisfactory. A railway is incomplete so long as it fails to reach the source or sources of its anticipated traffic. The annexed table shows some of the principal products constituting this traffic; the distance from Wallajahnuggur of the sources from whence they are derived; and the saving which would be effected by the adoption of the railway from that place. The question is, then, whether the advantage here gained will be sufficient inducement for the traders of Coimbatore, Salem, Mysore, Bellary and Cuddapah to establish agencies at Wallajahnuggur and incur the risk and cost of trans-shipment at that place—the greater and, in most cases, the worst portion of the journey having been accomplished, the rivers crossed and only three days march on a good road remaining. Considering these circumstances, remembering also the efforts that would be made by those interested, to secure the loan for the native bandies the whole way, I am strongly impressed with the conviction that the line proposed to Wallajahnuggur would be found too short either to furnish a satisfactory experiment or to produce any marked improvement in the state of the country. Another peculiar and unfavorable

Remarks on the sufficiency of the proposed line.

Disadvantages of an incomplete line.

App. M.

Appears insufficient.

Falls short of two rivers of importance.

feature in the proposed terminus is that it falls short of two rivers—the Pooney and the Palar—both unbridged; and both therefore remaining, between the railway and the great bulk of the traffic, very serious obstacles.

56. A complete line of railway, such as I have defined it, having Madras for one terminus, and some port on the western Coast, or important town in the heart of the Peninsula, for the other, would offer perhaps too costly a work to be undertaken at first; but we may, at all events provide, in selecting a

Points to be considered in deciding on an experimental line.

portion to be carried out as an experiment, not only that the line is judiciously laid down with reference to the existing state of commerce; but, that the ratio which its length bears to the distance between Madras and the sources of that commerce, is such as to justify us in expecting the people of the country will readily avail themselves of it. I consider, therefore, that the proposed line should be carried farther; and the only questions which remain are, how far, and in which direction.

Proposed line should be carried farther.

57. The most important line, as far as the interests of the country or of Government are concerned, is that from Madras to or towards Bellary, touching upon North Arcot, Mysore and Cuddapah, and having in view ultimate connection with the Bombay railways. Such a line, however, though indisputably the first in importance to this Presidency, does not hold out as an experimental line, even taken as a whole, still less if constructed only in part, such

Not favorable for experiment.

good promise of immediate results as another of perhaps less ultimate importance. I think the proposed railway should be extended to Vaniambady, as the line upon which there is at present the greatest amount of traffic; and one which, from the very favorable circumstances under which it might be constructed and worked, is more likely than any other in this Presidency to exhibit favorable results.

A line to Vaniambady preferable.

58. Sketch No. 2, shows the course and extent of this line, the chief towns through, or near, which it passes; and the points at which the traffic from remote districts would fall into it. The question of the Cuddapah and Bellary traffic taking advantage of it, would remain nearly the same; except that a station at Trivellum, the point of junction for the latter, would be 6 or 7 miles west of Wallajahnuggur and on the right or western bank of the Pooney river.

Its effects on the traffic from Bellary.

And the Sugar of North Arcot.

With regard to the Sugar of North Arcot—a pass which should and probably will, under any circumstances, be opened near Sautgum in lieu of that fallen into disrepair (the old Nackinairy,) would bring much, if not the whole, of the Sugar from the talooks above the ghauts on to the rail-road near Policondah, 100 miles from Madras.

59. The town of Vaniambady is described by the Collector of Salem as

Vaniambady.

being “on the high road from Madras to Bangalore

App. G.

“and Salem, a rich and thriving town closely inha-

Its population.

“bited—it is on the bank of the Ponnear and Jon-

Position.

“napar rivers, is the principal entrepôt of trade of

“this district”—its population is given in the same

letter as 6,078 “with Amboorpettah”; but Mr. Phil-

lips has since favored me with a supplementary

statement of the population of the suburbs which

raises it to 8,000. I am inclined, however, to think

this a low estimate of its present condition, drawn

probably from returns of not very recent date. It

will be seen that this town is situated at a point

where the traffic on the great trunk road from Mad-

ras branches into two channels towards Salem,

Coimbatore and Malabar by the one road—the My-

sore territories and Canara by the other.

60. A line of railway carried up to this point would possess the follow-

Advantages of this line.

ing advantages:—It would have a greater amount

of traffic, in proportion to its extent, than any other

line that could be selected in this Presidency. It

would be easier of construction, involving fewer

works of magnitude than any line of equal length:

the bridges across the Pooney and the Palar being

the only works of importance; and those attended

with no difficulty, and with no expense, that would

not be amply counterbalanced by the cheap rate at which the rest of the line

could be constructed; and by the greatly increased importance, which the

railway would derive from the passage of those two rivers. Although the

earthwork would be remarkably light, so favorable are the natural features of

Light slopes.

the country that, the steepest slope throughout the

whole line would probably not exceed 16 feet in the

mile; a peculiarity which materially affects the ques-

tions of the weight of rails and the size and power

of engines, and is calculated to exercise a most favor-

Cheap in the working.

Fall one way.

able influence on the cost of working the line. It may be further noticed, as a remarkable feature in this project, that the fall, moderate as it is, characterizes its whole length in that direction—(viz. from west to east) in which the tide of traffic runs at present, and in which it is likely to continue.

61. The traffic passing over each mile of this line will be found, even now, to be not far below that on the shorter line; while, as I shall presently show, the longer line would exercise a far greater influence on its amount; and we might, therefore, reasonably expect (the cost of construction being relatively the same) that the profits arising from it would be greater, while its usefulness would be so much more extended. From

App. G.

a passage in the letter from the Collector of Salem, it appears that a considerable traffic between the districts of Trichinopoly, Madura, Dindigul and the Presidency is, even now, carried over this road. There cannot be the least doubt of the tendency of a railway terminating at Vaniambady to increase this traffic. It would thus immediately affect three entire districts beyond its terminus, besides those which now communicate with Madras wholly by this road; and would probably draw a large portion of their traffic with the Presidency into itself. I shall offer, perhaps, a better illustration of the effects of a prolonged line by referring to the movement of Troops and Military Stores. If the line be made to Wallajahnuggur we may calculate that the same number of Troops which have, up to the present time, annually passed over the western road will be conveyed in future by the railway—no more. Extended to Vaniambady, the southern division of the Army comes within its influence and, there can be little doubt that, every man, and every barrel of powder would be sent from Madras to Trichinopoly by this route.

62. My reasons for concluding that the traffic per mile is, even now, nearly as great, upon the whole, as upon the shorter line are, that by far the greater part of the traffic which now passes over the road from Wallajahnuggur to Madras—comes from Vaniambady, while there is over that portion which lies between the latter place and Vellore an additional amount not far, if at all, short of that which joins the present road at Wallajahnuggur from other channels.

63. A rail-road to Vaniambady would thus consist of two portions having a great amount of traffic in common, but each possessing some, peculiar to itself. That in common would be the trade between Coimbatore, Salem, part of Trichinopoly, Dindigul and Madura, the Mysore territories and the Malabar Coast with Madras—the portion of the line which lay between Vellore and Madras would also have the trade between the latter place and North

Arcot, part of the Mysore country, Bellary and Cuddapah—while that between Vellore and Vaniambady (48 miles in length) would facilitate the intercourse, carried on now to some extent, between the western districts and those of Chittoor, Nellore, Guntoor and Cuddapah.

64. It may be argued that the doubts, already expressed, regarding the distant traffic passing on to a short line at Wallajahnuggur would apply equally with respect to that between Vaniambady and Vellore; and so they would, if that were the only line; but, as the town of

Vaniambady, under the influence of the longer line, would become a large and important entrepôt, affording every facility for the custody or trans-shipment of goods, I think it probable that the people of Salem and Coimbatore would avail themselves of the railway in their intercourse with the northern districts, by which a saving of Rs. 2-8 per ton would be effected in the transport of their goods.

65. As regards passenger traffic, whether we consider the servants of Government, the conveyance of Troops and Stores, or the convenience of the community at large, a line starting at Madras that would place them 130 miles on their road to Bangalore, Salem, Coimbatore, Malabar, the Neilgherry and Shevaroy Hills would, without doubt, afford a greater amount of accommodation than any other line, of equal length, that could be selected.

66. A line extended, as here proposed, would derive additional importance from the town of Vellore (83 miles from Madras) a place which far exceeds Wallajahnuggur in population (that of Vellore having been lately estimated at 120,000) and as far surpasses Arcot in Military and Political importance. Both Vellore and Vaniambady would form excellent positions for Salt depôts.

67. I conclude, therefore, upon the above considerations:—

1st. That the proposed railway from Madras to Wallajahnuggur would ultimately pay if we could ensure the whole of the traffic, in that direction, passing over it.

Conclusions.

2dly. That it would be wiser to extend the experimental railway across the two rivers, Pooney and Palar, and even to carry it on to Vaniambady.

3dly. That the maximum rate of charge in this part of India should be As. 1 per ton per mile.

68. Of the desirableness of introducing railways into this country there

Applicability of railways to this country.

Must not expect too much as their immediate consequences.

The greatest evils in the present state of things attributable to the roads.

cannot, I presume, be two opinions—it may also be taken for granted that the doubts once entertained of the practicability of constructing, or maintaining them have been dispelled; and that we are more disposed, now, to recognize their remarkable adaptation to the peculiarities of the climate, as well as to the social necessities of the people. We must, however, be careful not to expect too much as their immediate consequences; or look to the supposed absence of all competition, and the evils attendant on the present system of transport for the realization of their most important results. It has been seen that we must come down at once to a low scale of charges, if we wish to cheapen the present cost of transport; and, although much may be said of the risks and difficulties attendant on the present mode of carriage, we must not forget that these are attributable to the defective state of the roads (which are being improved every day) rather than to evils in the carriage itself.

69. There are some points which demand in this place a passing notice as likely to affect, in a measure, the operations of a railway in the outset. In

Peculiarities in present mode of carriage. the first place we have no such thing as a carrying system—the nearest approach to it is to be found in the man whose stock consists of a bandy and pair of bullocks which, together with his own services, he lets on hire for a given distance; but the business of carrying is not confined to this class. In many cases, petty traders and others keep their own carts and cattle, finding them generally useful for domestic as well as commercial purposes. In like manner the ryot will keep his cart and a pair or two of bullocks which, when not required at home, he employs on a carrying job, satisfied if they earn their own keep in the performance of it. Another curious fact has come to my notice showing that the demand for cattle in the town and port of Madras influences the cost of carriage from the interior. It is by no means uncommon, in those parts of the country where the requisite material is cheap, for men to construct the common Wudder bandy; to bring a load down to Madras, and there dispose of bandy and bullocks to advantage. Again, the Brinjarries are to be still found pursuing their vocation, and carrying goods from one end of the country to the other at a remarkably cheap rate. These people generally prefer the less frequented roads. Their cattle find a livelihood by the way side—the expenses of their drivers are con-

tinued to a mess of ragi; and, as long as the country continues in its present state, it will be difficult to find a cheaper mode of transport than this. Though cheap, however, in one sense, this carriage is of the very worst description. It is remarkably slow and attended with considerable risk. Their employment in this part of India appears to be confined at present to a few articles, of which Salt and Betel-nut are the most important. It is not to be expected that such a system, if system it can be called, will adapt itself so readily to a new state of things as a more regular carrying trade would be found to do. Had we at the present time an Indian Pickford on the Arcot road, he would feel it to be his interest to co-operate with the railway; and would at once become its feeder instead of its competitor.

70. The observations I have made on the extent to which the native bandies might compete with the railway are based on the supposition that an opportunity would be afforded them of entering into fair competition, carrying ton for ton on a clear stage. I am at the same time quite aware, that if a railway were once established, circumstances might arise, or arrangements be made, that would once for all drive the native carts off the field. If, for example, the Government, as proprietors of the railway, were to convey by it the whole of the Salt from hence to a Depot in the interior, this alone would serve as a discouragement to the native bandies, compelling the drivers to raise their charge for carriage in the opposite direction, and diminishing by so much their chance of employment.

71. Doubts have been entertained as to the extent which the Natives of this country are likely to avail themselves of the rail-roads as travellers. There may be at first some difficulty in providing for the social distinctions and the domestic habits peculiar to the people; but the difficulty will be overcome, and the question will depend in this, as in every other country, upon the charges being so framed, and such arrangements made, as to place the railway within the reach of the great mass of the people. We hear it said, the natives do not know the value of time—be it so—the railways will teach them—though it would be more correct to say that time is, to them, of less value than it is in Europe—remembering that it was of much less value there in 1750 than it is now. The natives of this part of India, when duty, social or religious, calls them, will undertake journeys that many Europeans would shrink from; but, though they are not wanting in intelligent curiosity, travelling for its indulgence has been prohibited hitherto by the numberless risks and difficulties attending it.

72. In the management of railways there are few points which require more careful consideration than the tariff. In most cases, one uniform rate, whether for passengers or

Management of railways.

## Tariff.

"For after we have ascertained the safety of the undertaking with this highest practicable charge we may then have to go over the subject again for the purpose of judging whether that charge or one still lower will most conduce to the prosperity of the railway."

Letter to Government from the Chairman of the Bombay Railway Committee, 13th Oct. 1846.—App. E.

goods, would be inadmissible. If the predominant feeling be a desire for the extension of their beneficial influence among the people, the charges will be kept as low as possible. Where the work is the property of Government, it will be its policy to effect this even, if necessary, by an annual charge on the revenues of the country. A private company will lower their scale of charges, until they arrive at a maximum dividend on their capital; but no further.

73. There are two well defined limits to a scale of charges on a rail-road.

## Limits to a tariff.

The maximum is that beyond which the road would come into unfavorable competition with other existing means of transport. The minimum that within which the unit of traffic will do no more than pay its own proper expenses. These expenses are found by experience to be remarkably small; so that a rail-road once established, it will be to its interest so to regulate the charges, whether on passengers or goods, (within the above limits) as to induce traders and travellers of every description to avail themselves of it. It is hardly probable that there would be found any class of persons beyond absolute paupers, or any description of goods that might not thus be conveyed by rail-road with advantage to both parties, though the profits upon each class would necessarily vary according to circumstances.

74. I have fixed on As. 1 per ton as the maximum charge for goods.

In some cases it might be expedient to charge less than As. 1.

Passengers divided into 4 classes.

In some cases as, for example, on the shorter traffic, where the country carriage would come into competition, it might perhaps be found advantageous to reduce it still lower. With respect to passengers, I would divide them into four classes, (at least,) at the following rates. The fourth class to be conveyed by the goods train.

|                | A. | P.          |
|----------------|----|-------------|
| 1st Class..... | 2  | 0 per mile. |
| 2d do. ....    | 1  | 0 do.       |
| 3d do. ....    | 0  | 8 do.       |
| 4th do. ....   | 0  | 2 do.       |

It will convey a better idea of the probable working of this scale if I add that the whole charge to Vaniambady and Vellore would be as follows:—

## To Vellore.

## To Vaniambady.

| Class.   | RS. | A. | RS. | A. |
|----------|-----|----|-----|----|
| 1st..... | 10  | 0  | 16  | 0  |
| 2d.....  | 5   | 0  | 8   | 0  |
| 3d.....  | 3   | 8  | 4   | 0  |
| 4th..... | 0   | 12 | 1   | 5  |

75. The principles upon which our railway should be constructed have

given rise to some difference of opinion. I think it will be admitted as a general rule, that our strength

should be put forth as it is required and no more. To construct any machine of a magnitude and capacity beyond that for which we can find work, is to ensure a certain amount of clear loss. The first thing to be done in projecting a railway, is to ascertain the nature and amount of work likely to be required of it: the next is to make such arrangements in the construction and subsequent maintenance of the work, that the whole annual charge, including interest on capital and working expenses, may be a minimum. The resolution of this problem will determine every important point connected with the subject—as the question of single or double line—the character of the slopes—the size and power of engines—and the weight of rails.

76. The Honorable Court have determined, for reasons given in their

letter in the Financial Department (No. 27) 14th November 1849, that the lines in Bengal shall be laid

at once with a double way. It will be found, I think, that the same reasons will not hold good here. In the first place our estimated traffic is much smaller; and, moreover, the cost of the rails, instead of forming a small portion of the capital required, constitutes on a single line more than one half of the estimated cost of the railway proper. There would thus be an addition of 50 per cent. to the first outlay, and to the annual interest charged on the traffic, with the certainty either that Government must bear that loss, or that, to meet the additional burden, a higher scale of charges must be established—greatly to the prejudice of the interests of the country, probably also to the cause of railway extension.

77. It must be remembered that in a single line we possess a work hav-

ing all the important characteristics of a railway—all that distinguish it and render it so far superior to other yet discovered modes of transport. We have the iron-road, the easy slope—the means of applying steam power. The question of single or double line is one of *quantity* not *quality* of accommodation; and ought in reason to be made dependent on the amount of traffic.

78. We see that the whole of the present traffic on this road, although, in

all probability, sufficient even now to render it a paying line, might be conveyed by one train each way daily—such trains as travel constantly on the English roads. I propose two lighter trains each way. What difficulty or danger can there be in working such a line, though single, with the necessary sideings?

Different circumstances here and in England. There is much connected with the management of rail-roads in England that we should endeavour to forget, or remember only to avoid—when applying them to a country so differently circumstanced as this.

There a rail-road is associated in men's minds with frequent trains—high speed—enormous loads—express trains running down the first class, and these again driving the goods trains, at the rate of 30 miles an hour before them. It is forgotten too that the present state of things, even in England, is now very different from what it was when first these roads gave their impulse to trade and commerce.

The following statement, which I have extracted from a very valuable report by a Committee, of which Captain Mark Huish was Chairman, in 1849, shows the extent to which business has increased on some of the principal lines.

|                                                                             | LIVERPOOL & MANCHESTER. |             | GRAND JUNCTION. |             | LONDON & BIRMINGHAM. |              |
|-----------------------------------------------------------------------------|-------------------------|-------------|-----------------|-------------|----------------------|--------------|
|                                                                             | 1837                    | 1848        | 1837            | 1848        | 1837                 | 1848         |
| Number of trains to and from principal terminus or station in 24 hours..... | 26                      | 90          | 14              | 38          | 10                   | 44           |
| Average weight of engines.                                                  | T.Cwt. 7 0              | T.Cwt. 15 7 | T.Cwt. 15 7     | T.Cwt. 17 3 | T.Cwt. 12 7          | T.Cwt. 18 13 |
| Average speed of goods trains.....                                          | 10                      | 19          | Miles per hour. |             | 16                   | 20           |
| Average weight of goods trains with engine and tender.....                  | Tons. 52                | Tons. 126   | Tons. 133       | Tons. 176   | Tons. 124            | Tons. 160    |

79. There can be little doubt that any one, hitherto accustomed to such things as these, would be astonished at a proposition to work a rail-road each way on alternate days. Nevertheless there would be nothing unreasonable in proposing such a system here, were it considered in any degree conducive to safety, nor will there be found a man among us to deny that trains for goods and passengers travelling at the rate of 10 and 20 miles an hour respectively—arriving from Vaniambady one day and returning the next—would exhibit an unprecedented stride in the way of improvement. I would, therefore, earnestly deprecate the laying down the double line till we have tried the

single. I would say to a railway company—if you can afford a second line you would better consult your own interests and those of the country by putting it down in continuation of the present single way, or forming another line in connection with it. A bridge of 15 feet wide from bank to bank is better than one of 30 half-way across. I should say, therefore, that the wisest plan would be to content ourselves with a single line until the whole of the principal rail-ways in this part of India have been completed, or until actual experience has in any case shown its insufficiency. I would apply the same line of argument in determining the weight of our rails, remembering that if the heavier and more costly have the advantage of lasting longer, they also impose, from the first, an additional annual charge on the work in the shape of interest.

80. The question of speed has also led to some discussion. There can be but one opinion as to the propriety of our adopting the higher rates of speed which have been introduced, (and it is believed at a positive loss), on many of the principal lines in England; but we need not run into the opposite extreme, or propose to construct our lines upon such a refined system of economy, as to render them unsuited to a higher speed than 10 or 12 miles an hour. Kept within the limits of safety, speed is a mere question of expense, and up to 20 or 25 miles, not one of much importance; but the railway once constructed should be capable of bearing any

Chief importance of rail-ways in promoting personal intercourse.

speed required and paid for within the first mentioned limits. My own impression is that it will be chiefly as an improvement on the means of personal communication that railways will affect this country, whether in its social progress, its commercial and manufacturing prosperity, or in the development of its agricultural resources.

81. A reduction of 10 pice per ton per mile in the carriage of goods will doubtless do much; the provision made for their safe and speedy transport will do perhaps more; but it will be by inducing the inhabitants of the several districts and provinces to mix freely and become acquainted with each other—by their operation in fact, upon the national mind, that railways will realize our highest expectations. Our territories in this part of India consist of districts differing widely in climate, soil, and natural products—peopled by classes of men also differing in language, manners and creeds—knowing, and contented to know nothing of each other.

82. There is no doubt that the present imperfect means of communication have the effect also of preventing a more general application of European capital and agency in this country—an effect much to be regretted; for, wherever Europeans of intelligence and respectability have settled, they have exercised a

marked influence for good. We might expect as a consequence of the introduction of railways, that the enterprize and capital of our countrymen would find their way more generally into the interior: and, that the men themselves, no longer deterred by distance and the difficulties attendant on an imperfect and expensive mode of communication with the Coast, would settle among the people—would make common cause with them—would learn something of their character—their pursuits, and the difficulties with which they have to contend—points on which most Europeans not connected with the public service, are now very ignorant. The results of such intercourse could not but prove in the end, highly favorable to the best interests of this country.

83. This line of railway will, if undertaken, be considered as an experiment; and, if the further progress of these works is to depend upon its result, the importance of carrying out the experiment fairly cannot be over-estimated. Its success, as well as the degree of satisfaction to be derived from its results, depends upon the work being executed with the utmost regard to economy, and the railway subsequently managed with the same scrupulous care and integrity. The surest guarantee for a fair experiment will be found in the Government executing the work by its own servants; and the interests of the people will be best consulted by the same authority either retaining the management entirely in its own hands; or, at all events, securing the exercise of a decided influence in that management.

84. Such is the state of society here, and such the position of Government, that no public work of this nature can be successfully prosecuted without the active support of the local authorities. Not only is the Government in a position to carry out these works with a greater degree of facility and economy than any private individual or company; but if it be, as it seems, most desirable that they should be executed and brought into operation with a single eye to the interests of the country, none are so likely thus to view them, as those who feel their own personal interests identified with their success as works of national importance. Experience has shown that there may be, in private companies, directors or managers, possessed of an amount of shares sufficient, as it is supposed, to enlist their services on behalf of the work itself, who may nevertheless attach much greater importance, and devote much more of their attention to the fluctuations of the share market,

Effect of railways in promoting an influx of Europeans.

Success depends on the work being carefully carried out.

Better that Government should do it and exercise a decided influence in its management.

Directors in joint stock companies not necessarily interested in the success of the undertaking.

than to the ultimate success of the railway. Experience has also shown that the state of society in this country is unfavorable to the successful working of such companies.

85. The terms granted in Bengal and Bombay, and solicited here, are chiefly remarkable for the guarantee of 5 per cent. on the capital, and the privilege conceded to the railway company of surrendering the undertaking, after giving six months notice, to the East India Company. It is also provided that the Government should have the power when the dividends exceed 10 per cent. to demand a reduction in the scale of charges; but it is at the same time determined that such interference should not really take place until those dividends have reached 12 or 13 per cent.

86. I should hope that, in this Presidency, the Government might see fit to make the first railway experimental in another sense; and try to what extent the people may be benefitted by making the line a national work. By the above conditions, it seems that the risk of ultimate failure falls on the country; while on the other hand, should it prove successful, a tax, amounting to 5 or 6 per cent. on the capital invested, will be levied in favor of the shareholders, in the shape of tolls, beyond that which is required to meet the ordinary interest of that capital. It appears at first sight, that such a dividend can only be reasonably expected as a return for risk incurred; and it would appear also, in this case, clearly the interest of Government to raise the money and take the work into its own hands. It is at all events due to the country that we should exercise a very strict supervision of works executed literally on its responsibility, to be thrown upon its hands if they prove (from whatever cause) failures; and destined, if successful, to lay a burden on the traffic proportioned to the cost of their original construction.

87. With a Board of Directors seated in London, and all the chief executive Officers appointed from thence, it is to be feared that the control exercised by a Government Officer would be little more than nominal; or, if called into active exercise, would prove in too many cases, a source of dissatisfaction and embarrassment. Under such circumstances, every question relating to the amount of expenditure, or to the proceedings of individual servants of the company, would become the subject of reference Home: and, it seems not too much to prognosticate that arrangements of this nature, for the exercise of authority on the part of Government, would become almost, if not altogether, inoperative.

88. With the exception of the rails and engines, with which we should,

Desirable to make the Madras line experimental in another sense.

Risk ultimately falls on this country.

Difficult to do so by merely appointing an Inspecting Officer.

in the first instance, be provided from England, there is none but the most common place work to be met with on the proposed line. This railway might thus be constructed and worked by means within our reach, with this one

Indo Britons and Natives soon acquire a knowledge of the duties connected with the locomotive department.

exception, that we should at first require men accustomed to the locomotive department from Home. In a very short time we should be independent even of these, and find among the Indo British and Natives, substitutes fully equal to the performance of those duties, and better able to bear unavoidable exposure to the Sun.

89. In the event of this work being carried out, the question will arise in what direction our next line shall proceed—whether towards Bellary, Bangalore or Salem. There can be no doubt of the practicability of laying down a railway to either of these places, nor is any difficulty to be apprehended in selecting the best line in one direction—that of Salem; but a very careful examination of the chain of Ghauts from Naggery to Sholagherry would be necessary, before we can determine, in a satisfactory manner, the best line in the other cases. I have ascertained by personal observation, that there would be no difficulty in carrying a line up to the foot of the Palmanair pass (Mooglee;) but I would not hastily assume that this, though the best and easiest of the ordinary passes, is the most favorable for a railway—nor do I see any reason to doubt the possibility of passing up those Ghauts by a line practicable for locomotive engines.

90. In considering the propriety of sanctioning, under the above circumstances, the longer line, it will be sufficiently near the truth, if we assume that the capital will be double that required for the shorter line to Wallajahnuggur. The distance in the one case would be about 130 miles—in the other 64.

Probable capital required for this line.

The two bridges on the extended line would add from 120 to 150 thousand rupees to the entire cost; but the expense attendant on stations and stock would be relatively less. The first cost estimated for the shorter line in round numbers at 22 lacs of rupees or £220,000 would thus for the other be £440,000. The plans and estimates which I shall have the honor of submitting shortly, will be confined to the projected line to Wallajahnuggur. Should the Government, after weighing the above statements, consider it desirable that plans and estimates should be prepared for a line to Vaniambady, it can be soon done, and at a very small cost.

91. In conclusion, I must apologize for the very great, and, I fear, inconvenient length to which this report has extended. We are not yet very familiar in this country with the consideration of such questions: the subject is one of such vital importance to the people of India, that I considered not

only that it demanded most careful consideration in all its bearings on my part; but that I should do well to submit the information I have received in the most detailed form, in order that Government might have the means of judging of the sufficiency of the data upon which I have based my calculations; and the soundness of the conclusions at which I have arrived.

I have the honor to be,

Sir,

Your most obedient Servant,

T. T. PEARS, MAJOR,

*Engineers.*

MADRAS, 5th March 1851.

## **APPENDIX.**

## APPENDIX.

---

**A**

MAJOR PEARS, C. B.

SIR,

I had the honor to receive your letter of the 30th ultimo, to which a reply has not been earlier sent, as I wished to ascertain whether you could be put in possession of copies of certain plans and surveys, the originals of which were sent to the Railway Committee in London in the month of May last.

I am sorry to find that I cannot at present furnish you with these, no copies having been retained in this country; but, as the London Committee was requested to send out copies, it is hoped that they may be shortly available for your service.

Meanwhile, however, I beg to forward to you a printed pamphlet, which contains the proceedings of this Committee, and the reports and estimates possessed by them. The older reports and surveys of Captain Worster, Colonel Cotton, and Captains Smyth and Collyer, it is presumed you will obtain from the Government records.

I would beg to observe that the railway contemplated by the company projected in London, and which is represented by the Madras Committee, is the line from Madras to Wallajahnuggur.

I have, &c.

(Signed) J. OUCHTERLONY,

*Honorary Secretary,*

*Madras Railway Committee.*

MADRAS,

October 30th, 1850.

(A true Copy.)

(Signed) T. T. PEARS,

*Railway Commissioner.*

**B**

MAJOR PEARS, C. B.

SIR,

In reply to your letter of the 15th instant, I have the honor, by desire of the Madras Railway Committee, to inform you, that the immediate object in view is to connect Madras and Wallajahnuggur by a railway; and that the Committee conceive, that what may prove to be the shortest, and cheapest line, will be the most expedient to adopt for that object.

I have, &amp;c.

(Signed) J. OUCHTERLONY,

Honorary Secretary,  
Madras Railway Committee.

MADRAS,

November 25th, 1850.

(A true Copy.)

(Signed) T. T. PEARS,

Railway Commissioner.

**C**

MADRAS, 23d December, 1850.

FROM J. A. HUDLESTON, Esq.

Collector of Madras.

TO MAJOR T. T. PEARS, C. B.

Engineers.

SIR,

I have the honor to acknowledge the receipt of your letter of the 10th October last, requesting to be furnished with certain particulars connected with the land trade of this Presidency.

2. I regret that the information I am able to afford on the subject is not so complete or satisfactory as I could wish, the records on this subject extending no further than the year 1844, when the customs and town duties were abolished.

3. The following entries shew the declared valuation of the goods im-

1. Imports by Land.

1. Extent of Trade.

1838-39.....75,18,635  
1839-40.....85,50,598  
1840-41.....78,33,338  
1841-42.....94,26,686  
1842-43.....96,52,266

4,25,81,523

Average...85,16,304

ported into Madras, or upon which duty was paid during each of the five years preceding 1844. The average value, it will be seen, is Rupees 85,16,304. It may fairly be supposed that the actual value of the goods imported was considerably higher, and the amount has undoubtedly increased since the abolition of the transit duties.

4. During the years above noted the entire import trade of Madras, with some few additions, was supplied by the following districts in the proportions given in the annexed statement.

| DISTRICTS.      | 1838-39.  | 1839-40.  | 1840-41.  | 1841-42.  | 1842-43.  |
|-----------------|-----------|-----------|-----------|-----------|-----------|
| Masulipatam.... | 1,42,736  | 1,37,922  | 1,58,953  | 4,77,192  | 1,78,100  |
| Gunttoor ....   | 2,20,295  | 2,37,325  | 4,44,700  | 2,77,492  | 1,94,744  |
| Nellore.....    | 8,35,340  | 9,18,691  | 7,57,933  | 8,86,085  | 9,80,527  |
| Cuddapah.....   | 7,01,874  | 14,25,410 | 13,15,736 | 18,71,170 | 25,43,357 |
| Bellary.....    | 1,02,783  | 1,01,371  | 2,21,102  | 4,79,248  | 2,81,676  |
| North Arcot.... | 16,50,616 | 17,49,060 | 13,15,736 | 19,15,494 | 18,48,995 |
| Chingleput....  | 9,10,651  | 7,52,955  | 6,85,054  | 7,95,869  | 7,50,386  |
| South Arcot.... | 1,93,651  | 12,52,440 | 6,81,649  | 13,82,825 | 11,58,921 |
| Coimbatore .... | 1,55,520  | 1,16,801  | 2,06,266  | 1,22,186  | 1,14,169  |
| Madura.....     | 2,04,748  | 1,18,116  | 1,02,363  | 2,71,909  | 2,91,538  |
| Salem.....      | 6,85,126  | 7,89,861  | 7,81,247  | 7,78,357  | 8,33,033  |
| Madras.....     | 4,05,059  | 4,10,119  | 3,74,569  | 2,83,289  | 2,83,242  |

5. It will have been observed that by far the greater portion of this traffic is confined to the districts of Cuddapah, North Arcot, South Arcot, Nellore, Salem and Chingleput, the aggregate value of their imports for 1842-43, the last year in our accounts, being Rupees 81,00,000 or thereabouts.

|        |                  |
|--------|------------------|
| 1..... | 25,43,357        |
| 2..... | 18,48,995        |
| 3..... | 11,58,921        |
| 4..... | 9,80,527         |
| 5..... | 8,33,033         |
| 6..... | 7,50,386         |
|        | <u>81,15,119</u> |

6. The subjoined statement indicates the relative valuation of the chief articles of commerce imported during the 5 years under review, from which a general idea may be formed of the nature of the import trade of Madras.

| Years.   | Piece Goods. | Grain.    | Cotton.  | Indigo.   | Betel.   | Betel Nut. | Ghee.    | Sugar.   | Oil.     | Leather. |
|----------|--------------|-----------|----------|-----------|----------|------------|----------|----------|----------|----------|
| 1838-39. | 27,60,384    | 14,33,743 | 2,33,100 | 10,85,249 | 1,20,716 | 2,36,841   | 3,98,406 | 1,11,466 | 3,33,149 | 73,409   |
| 1839-40. | 29,62,404    | 9,56,012  | 2,32,955 | 23,24,070 | 1,17,713 | 2,80,782   | 3,80,345 | 1,26,009 | 3,45,500 | 10,526   |
| 1840-41. | 27,91,734    | 5,07,565  | 2,21,320 | 15,87,461 | 1,19,121 | 2,92,242   | 5,04,709 | 1,65,280 | 3,32,084 | 3,85,501 |
| 1841-42. | 33,96,727    | 4,48,933  | 7,14,126 | 20,32,512 | 81,058   | 2,63,682   | 4,15,769 | 2,04,899 | 4,53,043 | 1,60,765 |
| 1842-43. | 23,91,716    | 6,53,066  | 6,40,600 | 22,53,593 | 77,413   | 2,84,051   | 5,41,559 | 2,61,080 | 3,20,704 | 1,23,349 |

7. The foregoing two articles form the chief staple productions of the country, both raw and manufactured, of which this branch of the inland traffic is composed. The rest of the import trade, during the period under consideration, was made up of articles of a miscellaneous character, such as redwood, &c., which, being comparatively of trifling value, do not call for further notice.

8. It is only necessary to add, that the entire inland commerce of the

4. Mode of Conveyance. Presidency is carried on by means of the country carts and bullocks.

9. With respect to the question of Exports from Madras by land, I

11. Exports by Land. regret to say that the records of my office supply

1. Extent of Trade. very insufficient data. I am enabled, however, to

extract the following entries, which may prove of some utility, from the printed statements of the trade of Madras, which were furnished by this office to the Collector of Sea Customs.

|                                   | RS.       | A. | P. |
|-----------------------------------|-----------|----|----|
| Amount of Exports in 1836-37..... | 19,73,290 | 0  | 0  |
| " 1840-41.....                    | 13,67,325 | 0  | 0  |
| " 1841-42.....                    | 12,46,350 | 0  | 0  |

10. The countries that formed the principal marts for this traffic are enu-

2. Chief Marts. merated below.

| DISTRICTS.             | 1836-37. | 1840-41. | 1841-42. |
|------------------------|----------|----------|----------|
| Mysore.....            | 2,37,166 | 2,61,121 | 2,27,009 |
| Nizam's Dominions..... | 1,30,118 | 82,156   | 69,744   |
| North Arcot.....       | 3,14,622 | 2,50,179 | 1,74,125 |
| Bellary.....           | 2,65,051 | 1,10,303 | 1,43,420 |
| Masulipatam.....       | 96,339   | 39,714   | 27,854   |
| Cuddapah.....          | 63,390   | 26,736   | 35,509   |
| Chingleput.....        | 1,05,375 | 91,533   | 35,597   |
| South Arcot.....       | 1,33,386 | 69,978   | 73,340   |
| Tanjore.....           | 2,61,482 | 1,33,964 | 1,02,867 |
| Salem.....             | 52,707   | 54,011   | 81,853   |

|                  |                  |
|------------------|------------------|
| Mysore.....      | 2,37,166         |
| Nizam.....       | 3,30,188         |
| North Arcot..... | 3,14,622         |
| South Arcot..... | 1,33,386         |
| Bellary.....     | 2,65,051         |
| Tanjore.....     | 2,61,482         |
|                  | <u>15,41,875</u> |

11. From the foregoing figures it will be observed, that the export trade by land is confined chiefly to the countries noted in the margin; value in 1836-37, aggregating to Rupees 15,41,875.

12. The articles forming the commerce with these countries are of a varied nature—such as drugs, dyes, fruits, liquors

3. Nature of the Trade. of sorts, metals, oils, oilman's stores, piece goods of

British and country manufacture, (both of cotton and silk) spices, timber, &c. Those occupying the largest portion of the trade may be seen from the following statement.

| YEARS.       | Piece Goods. | Liquors. | Cotton Twist. |
|--------------|--------------|----------|---------------|
| 1836-37..... | 1,52,737     | 2,96,724 | 3,99,774      |
| 1840-41..... | 2,73,506     | 1,32,262 | 1,03,779      |
| 1841-42..... | 3,14,349     | 81,546   | 94,583        |

13. On the subject of Salt my information is limited to the transactions III. Salt Trade. at the Madras depôts.

14. It is not in my power to give any details connected with the Salt trade of this Presidency, generally, but I believe that the entire revenue derived by Government from the monopoly of this article may be estimated in round numbers at Rs. 50,00,000.

1. General Trade.

15. It is hardly necessary to observe that the manufacture and sales are conducted at all the maritime districts under this Presidency, the monopoly price being Rupees 120 per garce, or one Rupee per Indian maund.

16. The surplus over the quantity required in each district for Home consumption, is sold for the inland trade; and, when conveyed into the interior, the price to the consumer rises above the rate prevailing at the place of manufacture, in proportion to the distance of the various markets from a maritime district.

17. The amount of Salt exported by land from Madras, is annually increasing; and may be estimated at from 2,500 to 3,000 garce, the value in Rupees being from three lacs to 3,60,000.

2. Madras Trade.

1. Extent.

18. The sales at Madras for inland consumption, date only from 1847,

2. Inland sales chief depôts. prior to which period the entire quantity manufactured at the Pans of this Collectorate was set apart for the consumption of the town and suburbs, and for exportation by sea to Calcutta. The following statement shews the extent of the Salt export trade, from Madras for the last 4 years.

FUSLY 1260.  
Average selling price for Home consumption.  
Maximum. Minimum.  
166 18 8 133 5 4  
per Garce. per Garce.

NOTE.—A small quantity of Salt was annually sold for inland consumption up to the year 1823—but the average value at the then monopoly price 75 rupees the garce did not exceed 20,000 rupees.

| DISTRICTS.                  | 1847.        | 1848.       | 1849.       | 1850.       |
|-----------------------------|--------------|-------------|-------------|-------------|
|                             | G. M. M.     | G. M. M.    | G. M. M.    | G. M. M.    |
| Chingleput.....             | 215 290 0    | 170 100 0   | 317 170 0   | 192 10 0    |
| Chittoor.....               | 287 183 2½   | 150 50 0    | 256 50 0    | 183 250 0   |
| Salem.....                  | 187 10 0     | 58 50 0     | 45 120 0    | 30 210 0    |
| Coimbatore.....             | 24 370 0     | 2 300 0     | 2 40 0      | 9 220 0     |
| Verdachellum.....           | 11 270 0     | 1 370 0     | 3 360 0     | 2 270 0     |
| Trichinopoly.....           | 5 120 0      | 0 0 0       | 0 0 0       | 0 0 0       |
| Cuddapah.....               | 36 320 0     | 7 230 0     | 21 310 0    | 12 220 0    |
| Bellary.....                | 1 310 0      | 0 0 0       | 0 390 0     | 0 380 0     |
| Bangalore.....              | 961 330 0    | 730 90 0    | 443 380 0   | 337 170 0   |
| Mysore.....                 | 552 70 0     | 389 220 0   | 1,534 380 0 | 1,769 100 0 |
| Total Garce or Indian Maund | 2,284 273 2½ | 1,510 210 0 | 2,626 200 0 | 2,538 230 0 |

19. It will thus be seen that the traffic in this article is chiefly directed towards Chingleput, North Arcot, Bangalore and Mysore, the two latter being the principal marts for the Salt exported from Madras.

20. The means of transit adopted by the traders in this article, are, as in other cases, common carts and bullocks. The former

3. Means of transit route pursued and hire of conveyance.

Note.—The trade to Mysore is not carried on by means of hired bullocks.

are capable of carrying from 30 to 40 marcalis (9 to 12 Indian maunds) and the latter from 4 to 6 marcalis (1½ to 1½ Indian maunds) according to the size and strength of the animals—the route pursued is chiefly by Poonamallee through North Arcot, and the time occupied in the conveyance of this article

to Mysore is on an average 10 days, the hire for a cart being from 10 to 12 Rupees.

21. Whether, therefore, we consider the saving of time, expense, and of wastage to the trader, the probable cheapness of this necessary of life to the consumer, or the additional security it would afford to the interests of Government, the value of a railway communication, viewed with reference to this article alone, can scarcely be over-rated.

22. I have no means of ascertaining the annual consumption of the principal

IV. Consumption of Madras.

For 1840-41.  
Total Imports.. 20,100,783  
„ Exports.. 14,825,820  
5,274,963

articles of traffic within the limits of Madras; but, as a general idea, that consumption may be estimated at about fifty lacs of Rupees, this result being obtained by deducting the total value of the trade exported from Madras from the quantity imported both by sea and land; the details of this calculation being seen in the margin.

23. I am unable to state to what extent a trade in Salt fish is at present

V. Salt fish trade.

carried on between Madras and the other districts, an entry in the accounts of 1836-37 shews that about 1,400 Rupees' worth of this article was exported from Madras, which was chiefly consumed in Mysore, Bellary, North Arcot and Tanjore.

24. With reference to the concluding para. of your letter, under acknowledgment, it is hardly necessary to observe that, in my opinion, the probable effects of the establishment of railway communications with the interior will be to the advantage of the trade and general prosperity of the town and neighbourhood of Madras; while, from the statistical data given above of the inland trade of this Presidency, it would appear that the contemplated experimental line to be laid down from

VI. Conclusion. The advantage of Railway communications.

Madras to Wallajahnuggur has been judiciously selected in a commercial point of view.

I have, &c.

MADRAS,  
23d December, 1850.

(Signed) J. A. HUDLESTON,  
Collector.

To Major T. T. PEARS, C. B.

Engineers.

(A true copy.)

(Signed) T. T. PEARS,  
Railway Commissioner.

## D

Value and estimated weight of IMPORTS into Madras by land

| IMPORTS.                     | Mysore.   |             |        |              | Bellary.  |               |        |             | Cuddapah. |             |        |             |
|------------------------------|-----------|-------------|--------|--------------|-----------|---------------|--------|-------------|-----------|-------------|--------|-------------|
|                              | Quantity. |             | Value. |              | Quantity. |               | Value. |             | Quantity. |             | Value. |             |
|                              | Cwts.     | Rups. A. P. | Cwts.  | Rups. A. P.  | Cwts.     | Rups. A. P.   | Cwts.  | Rups. A. P. | Cwts.     | Rups. A. P. | Cwts.  | Rups. A. P. |
| <b>Dyes.</b>                 |           |             |        |              |           |               |        |             |           |             |        |             |
| Chaya root.....              | 0         | 0 0 0       | 0      | 0 0 0        | 0         | 0 0 0         | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| Coosomba powder.....         | 0         | 0 0 0       | 136    | 3,056 0 0    | 226       | 5,082 0 0     | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| B-ngal gram.....             | 0         | 0 0 0       | 391    | 1,050 0 0    | 391       | 1,050 0 0     | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| Condoooloo dhall.....        | 0         | 0 0 0       | 183    | 399 0 0      | 0         | 0 0 0         | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| Grain of sorts.....          | 0         | 0 0 0       | 0      | 0 0 0        | 0         | 0 0 0         | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| Horse gram.....              | 0         | 0 0 0       | 4,958  | 7,875 0 0    | 4,892     | 7,500 0 0     | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| Natcheny.....                | 0         | 0 0 0       | 0      | 0 0 0        | 0         | 0 0 0         | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| Paddy.....                   | 0         | 0 0 0       | 0      | 0 0 0        | 0         | 0 0 0         | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| Rice.....                    | 0         | 0 0 0       | 19,759 | 35,550 0 0   | 35,015    | 63,000 0 0    | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| Wheat.....                   | 0         | 0 0 0       | 750    | 2,925 0 0    | 733       | 2,855 0 0     | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| Nuts.....                    | 0         | 0 0 0       | 25     | 875 0 0      | 220       | 3,171 0 0     | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| Coche nuts.....              | 0         | 0 0 0       | 0      | 0 0 0        | 0         | 0 0 0         | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| Cardemums.....               | 0         | 0 0 0       | 0      | 0 0 0        | 0         | 50 0 0        | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| seeds.....                   | 0         | 0 0 0       | 0      | 0 0 0        | 0         | 0 0 0         | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| Cocounuts.....               | 0         | 0 0 0       | 0      | 0 0 0        | 0         | 0 0 0         | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| Dry.....                     | 0         | 0 0 0       | 0      | 0 0 0        | 2         | 19 0 0        | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| Cotton.....                  | 0         | 0 0 0       | 14,183 | 1,58,850 0 0 | 22,187    | 2,48,500 0 0  | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| Cummin seeds.....            | 0         | 0 0 0       | 23     | 447 0 0      | 399       | 7,785 0 0     | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| Gunjah.....                  | 0         | 0 0 0       | 0      | 0 0 0        | 0         | 0 0 0         | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| Ghee.....                    | lbs. 18   | 4 0 0       | 0      | 0 0 0        | 213       | 5,525 0 0     | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| Gingely oil seeds.....       | 0         | 0 0 0       | 3,872  | 11,287 0 0   | 1,095     | 3,190 0 0     | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| Indigo.....                  | 0         | 0 0 0       | 17     | 3,894 0 0    | 7,978     | 17,87,223 0 0 | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| Jaggery.....                 | 0         | 0 0 0       | 0      | 0 0 0        | 1,612     | 7,769 0 0     | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| Palмира.....                 | 0         | 0 0 0       | 0      | 0 0 0        | 0         | 0 0 0         | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| Iron.....                    | 0         | 0 0 0       | 0      | 0 0 0        | 0         | 0 0 0         | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| Lamp oil seeds.....          | 0         | 0 0 0       | 16     | 423 0 0      | 175       | 4,474 0 0     | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| Leather.....                 | 0         | 0 0 0       | 0      | 0 0 0        | 15        | 138 0 0       | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| Oil, Augutty.....            | 0         | 0 0 0       | 0      | 0 0 0        | 145       | 2,596 0 0     | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| Gingely.....                 | 0         | 0 0 0       | 0      | 0 0 0        | 258       | 3,082 0 0     | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| Lamp.....                    | 0         | 0 0 0       | 0      | 0 0 0        | 0         | 0 0 0         | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| of sorts.....                | 0         | 0 0 0       | 0      | 0 0 0        | 0         | 0 0 0         | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| Opium.....                   | 0         | 0 0 0       | 0      | 0 0 0        | 1         | 576 0 0       | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| milk.....                    | 0         | 0 0 0       | 0      | 0 0 0        | 17        | 9,218 0 0     | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| Red wood.....                | 0         | 0 0 0       | 0      | 0 0 0        | 1,299     | 2,057 0 0     | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| Sandal wood.....             | 0         | 0 0 0       | 0      | 0 0 0        | 21        | 0 0 0         | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| Salt Petre.....              | 0         | 0 0 0       | 0      | 0 0 0        | 260       | 2,756 0 0     | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| Silk thread.....             | 0         | 0 0 0       | 0      | 0 0 0        | 3         | 1,810 0 0     | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| Casara do.....               | 0         | 0 0 0       | 0      | 0 0 0        | 0         | 0 0 0         | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| Sugar.....                   | 0         | 0 0 0       | 0      | 0 0 0        | 2,871     | 72,074 0 0    | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| candy.....                   | 0         | 0 0 0       | 0      | 0 0 0        | 11        | 308 0 0       | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| Sundries.....                | 0         | 0 0 0       | 0      | 0 0 0        | 0         | 68 0 0        | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| Tamarind.....                | 0         | 3 0 0       | 0      | 0 0 0        | 18,426    | 1,25,077 0 0  | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| Timber (assumed weight)..... | 97        | 264 0 0     | 0      | 0 0 0        | 69        | 187 0 0       | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| Tobacco.....                 | 0         | 0 0 0       | 0      | 0 0 0        | 59        | 2,076 0 0     | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| Cheroofs.....                | 0         | 0 0 0       | 0      | 0 0 0        | 0         | 0 0 0         | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |
| Powder.....                  | 0         | 0 0 0       | 0      | 0 0 0        | 0         | 0 0 0         | 0      | 0 0 0       | 0         | 0 0 0       | 0      | 0 0 0       |

in the year 1842-43, from the undermentioned Districts.

| Northern Division<br>of Arcot. |              |        |              | Coimbatore. |              |        |              | Salem.    |              |        |              | Total.    |              |        |              |
|--------------------------------|--------------|--------|--------------|-------------|--------------|--------|--------------|-----------|--------------|--------|--------------|-----------|--------------|--------|--------------|
| Quantity.                      |              | Value. |              | Quantity.   |              | Value. |              | Quantity. |              | Value. |              | Quantity. |              | Value. |              |
| Cwts.                          | Rups. A. P.  | Cwts.  | Rups. A. P.  | Cwts.       | Rups. A. P.  | Cwts.  | Rups. A. P.  | Cwts.     | Rups. A. P.  | Cwts.  | Rups. A. P.  | Cwts.     | Rups. A. P.  | Cwts.  | Rups. A. P.  |
| 8                              | 223 0 0      | 0      | 0 0 0        | 0           | 0 0 0        | 0      | 0 0 0        | 8         | 223 0 0      | 372    | 8,341 0 0    | 0         | 0 0 0        | 372    | 8,341 0 0    |
| 9                              | 203 0 0      | 0      | 0 0 0        | 0           | 0 0 0        | 0      | 0 0 0        | 0         | 0 0 0        | 783    | 2,100 0 0    | 0         | 0 0 0        | 783    | 2,100 0 0    |
| 0                              | 0 0 0        | 0      | 0 0 0        | 0           | 0 0 0        | 0      | 0 0 0        | 0         | 0 0 0        | 402    | 874 0 0      | 0         | 0 0 0        | 402    | 874 0 0      |
| 218                            | 475 0 0      | 0      | 0 0 0        | 0           | 0 0 0        | 0      | 0 0 0        | 0         | 0 0 0        | 982    | 1,265 0 0    | 0         | 0 0 0        | 982    | 1,265 0 0    |
| 982                            | 1,265 0 0    | 0      | 0 0 0        | 0           | 0 0 0        | 0      | 0 0 0        | 0         | 0 0 0        | 13,133 | 20,406 0 0   | 0         | 0 0 0        | 13,133 | 20,406 0 0   |
| 3,282                          | 5,031 0 0    | 0      | 0 0 0        | 0           | 0 0 0        | 0      | 0 0 0        | 0         | 0 0 0        | 4,170  | 5,050 0 0    | 0         | 0 0 0        | 4,170  | 5,050 0 0    |
| 4,170                          | 5,050 0 0    | 0      | 0 0 0        | 0           | 0 0 0        | 0      | 0 0 0        | 0         | 0 0 0        | 40,834 | 51,750 0 0   | 0         | 0 0 0        | 40,834 | 51,750 0 0   |
| 40,834                         | 51,750 0 0   | 0      | 0 0 0        | 0           | 0 0 0        | 0      | 0 0 0        | 0         | 0 0 0        | 93,444 | 1,68,125 0 0 | 0         | 0 0 0        | 93,444 | 1,68,125 0 0 |
| 38,670                         | 69,575 0 0   | 0      | 0 0 0        | 0           | 0 0 0        | 0      | 0 0 0        | 0         | 0 0 0        | 1,483  | 5,780 0 0    | 0         | 0 0 0        | 1,483  | 5,780 0 0    |
| 0                              | 0 0 0        | 0      | 0 0 0        | 0           | 0 0 0        | 0      | 0 0 0        | 0         | 0 0 0        | 8,056  | 2,83,491 0 0 | 0         | 0 0 0        | 8,056  | 2,83,491 0 0 |
| 7,810                          | 2,74,445 0 0 | 0      | 0 0 0        | 0           | 0 0 0        | 0      | 0 0 0        | 0         | 0 0 0        | 0      | 0 0 0        | 0         | 0 0 0        | 0      | 0 0 0        |
| 0                              | 0 0 0        | 0      | 0 0 0        | 0           | 0 0 0        | 0      | 0 0 0        | 0         | 0 0 0        | 27     | 3,156 0 0    | 0         | 0 0 0        | 27     | 3,156 0 0    |
| 27                             | 3,106 0 0    | 0      | 0 0 0        | 0           | 0 0 0        | 0      | 0 0 0        | 0         | 0 0 0        | 2      | 224 0 0      | 0         | 0 0 0        | 2      | 224 0 0      |
| 2                              | 224 0 0      | 0      | 0 0 0        | 0           | 0 0 0        | 0      | 0 0 0        | 0         | 0 0 0        | 0      | 0 0 0        | 0         | 0 0 0        | 0      | 0 0 0        |
| 0                              | 0 0 0        | 0      | 0 0 0        | 0           | 0 0 0        | 0      | 0 0 0        | 0         | 0 0 0        | 0      | 0 0 0        | 0         | 0 0 0        | 0      | 0 0 0        |
| 1                              | 5 0 0        | 0      | 0 0 0        | 0           | 0 0 0        | 0      | 0 0 0        | 0         | 0 0 0        | 2      | 24 0 0       | 0         | 0 0 0        | 2      | 24 0 0       |
| 10,553                         | 1,18,200 0 0 | 3,192  | 35,750 0 0   | 2,933       | 32,850 0 0   | 53,049 | 5,94,150 0 0 | 0         | 0 0 0        | 780    | 15,197 0 0   | 0         | 0 0 0        | 780    | 15,197 0 0   |
| 357                            | 6,965 0 0    | 0      | 0 0 0        | 0           | 0 0 0        | 0      | 0 0 0        | 0         | 0 0 0        | 8      | 1,208 0 0    | 0         | 0 0 0        | 8      | 1,208 0 0    |
| 8                              | 1,208 0 0    | 0      | 0 0 0        | 0           | 0 0 0        | 0      | 0 0 0        | 0         | 0 0 0        | 968    | 25,126 0 0   | 8,593     | 2,23,038 0 0 | 9,937  | 2,57,932 0 0 |
| 968                            | 25,126 0 0   | 8,593  | 2,23,038 0 0 | 9,937       | 2,57,932 0 0 | 19,711 | 5,11,635 0 0 | 5,709     | 16,639 0 0   | 536    | 1,563 0 0    | 0         | 0 0 0        | 206    | 599 0 0      |
| 536                            | 1,563 0 0    | 0      | 0 0 0        | 0           | 0 0 0        | 0      | 0 0 0        | 0         | 0 0 0        | 1,019  | 2,28,218 0 0 | 0         | 0 0 0        | 195    | 43,814 0 0   |
| 1,019                          | 2,28,218 0 0 | 0      | 0 0 0        | 0           | 0 0 0        | 0      | 0 0 0        | 0         | 0 0 0        | 18,757 | 90,356 0 0   | 0         | 0 0 0        | 0      | 0 0 0        |
| 18,757                         | 90,356 0 0   | 0      | 0 0 0        | 0           | 0 0 0        | 0      | 0 0 0        | 0         | 0 0 0        | 1      | 8 0 0        | 0         | 0 0 0        | 0      | 0 0 0        |
| 1                              | 8 0 0        | 0      | 0 0 0        | 0           | 0 0 0        | 0      | 0 0 0        | 0         | 0 0 0        | 0      | 2,655 0 0    | 0         | 0 0 0        | 0      | 0 0 0        |
| 0                              | 2,655 0 0    | 0      | 0 0 0        | 0           | 0 0 0        | 0      | 0 0 0        | 0         | 0 0 0        | 24     | 649 0 0      | 0         | 0 0 0        | 39     | 1,047 0 0    |
| 24                             | 649 0 0      | 0      | 0 0 0        | 0           | 0 0 0        | 0      | 0 0 0        | 0         | 0 0 0        | 3,109  | 29,024 0 0   | 347       | 3,054 0 0    | 3,342  | 29,362 0 0   |
| 3,109                          | 29,024 0 0   | 347    | 3,054 0 0    | 3,342       | 29,362 0 0   | 6,815  | 61,578 0 0   | 145       | 2,596 0 0    | 0      | 0 0 0        | 0         | 0 0 0        | 0      | 0 0 0        |
| 0                              | 0 0 0        | 0      | 0 0 0        | 0           | 0 0 0        | 0      | 0 0 0        | 0         | 0 0 0        | 1,255  | 14,994 0 0   | 56        | 677 0 0      | 6,606  | 78,924 0 0   |
| 1,255                          | 14,994 0 0   | 56     | 677 0 0      | 6,606       | 78,924 0 0   | 8,175  | 97,677 0 0   | 20,353    | 2,04,965 0 0 | 3,197  | 32,185 0 0   | 550       | 5,603 0 0    | 16,605 | 1,67,172 0 0 |
| 3,197                          | 32,185 0 0   | 550    | 5,603 0 0    | 16,605      | 1,67,172 0 0 | 20,353 | 2,04,965 0 0 | 0         | 537 0 0      | 0      | 199 0 0      | 0         | 0 0 0        | 0      | 112 0 0      |
| 0                              | 199 0 0      | 0      | 0 0 0        | 0           | 0 0 0        | 0      | 537 0 0      | 2         | 1,105 0 0    | 1      | 529 0 0      | 0         | 0 0 0        | 0      | 0 0 0        |
| 1                              | 529 0 0      | 0      | 0 0 0        | 0           | 0 0 0        | 2      | 1,105 0 0    | 22        | 11,433 0 0   | 4      | 2,215 0 0    | 0         | 0 0 0        | 0      | 0 0 0        |
| 4                              | 2,215 0 0    | 0      | 0 0 0        | 0           | 0 0 0        | 22     | 11,433 0 0   | 30,464    | 48,226 0 0   | 29,161 | 46,169 0 0   | 0         | 0 0 0        | 0      | 0 0 0        |
| 29,161                         | 46,169 0 0   | 0      | 0 0 0        | 0           | 0 0 0        | 30,464 | 48,226 0 0   | 2,463     | 61,309 0 0   | 6      | 149 0 0      | 2         | 55 0 0       | 2,454  | 61,084 0 0   |
| 6                              | 149 0 0      | 2      | 55 0 0       | 2,454       | 61,084 0 0   | 2,463  | 61,309 0 0   | 4,573     | 46,778 0 0   | 8      | 83 0 0       | 1,195     | 12,169 0 0   | 3,110  | 31,770 0 0   |
| 8                              | 83 0 0       | 1,195  | 12,169 0 0   | 3,110       | 31,770 0 0   | 4,573  | 46,778 0 0   | 3         | 1,810 0 0    | 0      | 0 0 0        | 0         | 0 0 0        | 0      | 0 0 0        |
| 0                              | 0 0 0        | 0      | 0 0 0        | 0           | 0 0 0        | 3      | 1,810 0 0    | 7         | 5,072 0 0    | 5      | 3,497 0 0    | 0         | 0 0 0        | 2      | 1,575 0 0    |
| 5                              | 3,497 0 0    | 0      | 0 0 0        | 0           | 0 0 0        | 7      | 5,072 0 0    | 9,752     | 2,44,840 0 0 | 6,877  | 1,72,652 0 0 | 0         | 0 0 0        | 4      | 114 0 0      |
| 6,877                          | 1,72,652 0 0 | 0      | 0 0 0        | 0           | 0 0 0        | 9,752  | 2,44,840 0 0 | 130       | 3,435 0 0    | 116    | 3,060 0 0    | 0         | 0 0 0        | 2      | 67 0 0       |
| 116                            | 3,060 0 0    | 0      | 0 0 0        | 0           | 0 0 0        | 130    | 3,435 0 0    | 0         | 168 0 0      | 0      | 100 0 0      | 0         | 0 0 0        | 0      | 0 0 0        |
| 0                              | 100 0 0      | 0      | 0 0 0        | 0           | 0 0 0        | 0      | 168 0 0      | 33,463    | 2,27,147 0 0 | 8,908  | 60,469 0 0   | 0         | 0 0 0        | 6,128  | 41,598 0 0   |
| 8,908                          | 60,469 0 0   | 0      | 0 0 0        | 0           | 0 0 0        | 33,463 | 2,27,147 0 0 | 4,583     | 12,362 0 0   | 3,064  | 8,271 0 0    | 0         | 0 0 0        | 1,352  | 3,640 0 0    |
| 3,064                          | 8,271 0 0    | 0      | 0 0 0        | 0           | 0 0 0        | 4,583  | 12,362 0 0   | 7,804     | 2,73,144 0 0 | 7,708  | 2,69,789 0 0 | 0         | 0 0 0        | 37     | 1,279 0 0    |
| 7,708                          | 2,69,789 0 0 | 0      | 0 0 0        | 0           | 0 0 0        | 7,804  | 2,73,144 0 0 | 1,200     | 0 0 0        | 0      | 0 0 0        | 32        | 1,159 0 0    | 1      | 41 0 0       |
| 0                              | 0 0 0        | 32     | 1,159 0 0    | 1           | 41 0 0       | 1,200  | 0 0 0        | 289       | 8,636 0 0    | 42     | 1,269 0 0    | 0         | 0 0 0        | 246    | 7,367 0 0    |
| 42                             | 1,269 0 0    | 0      | 0 0 0        | 246         | 7,367 0 0    | 289    | 8,636 0 0    |           |              |        |              |           |              |        |              |

## Value and estimated weight

| IMPORTS.                | Mysore.   |       |        | Bellary.  |        |        | Cuddapah. |        |        |
|-------------------------|-----------|-------|--------|-----------|--------|--------|-----------|--------|--------|
|                         | Quantity. |       | Value. | Quantity. |        | Value. | Quantity. |        | Value. |
|                         | Cwts.     | Rups. | A. P.  | Cwts.     | Rups.  | A. P.  | Cwts.     | Rups.  | A. P.  |
| Candees.....            | 0         | 0     | 0 0    | 0         | 32     | 0 0    | 0         | 1,293  | 0 0    |
| Cauroovah.....          | 0         | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 0      | 0 0    |
| Cases.....              | 0         | 18    | 0 0    | 0         | 0      | 0 0    | 0         | 10     | 0 0    |
| Chintz.....             | 0         | 0     | 0 0    | 0         | 4,484  | 0 0    | 0         | 22,703 | 0 0    |
| Cholies.....            | 0         | 0     | 0 0    | 0         | 252    | 0 0    | 0         | 403    | 0 0    |
| " Laced.....            | 0         | 0     | 0 0    | 0         | 80     | 0 0    | 0         | 0      | 0 0    |
| Cloths.....             | 0         | 14    | 0 0    | 0         | 22,816 | 0 0    | 0         | 13,843 | 0 0    |
| " Laced.....            | 0         | 174   | 0 0    | 0         | 372    | 0 0    | 0         | 1,018  | 0 0    |
| Cochilas.....           | 0         | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 0      | 0 0    |
| Blue Cumblies.....      | 0         | 0     | 0 0    | 0         | 11,793 | 0 0    | 0         | 613    | 0 0    |
| " Cummbas.....          | 0         | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 0      | 0 0    |
| Checked ".....          | 0         | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 0      | 0 0    |
| Red ".....              | 0         | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 0      | 0 0    |
| Dovetties.....          | 0         | 0     | 0 0    | 0         | 261    | 0 0    | 0         | 4,595  | 0 0    |
| " Laced.....            | 0         | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 43     | 0 0    |
| " Silk.....             | 0         | 10    | 0 0    | 0         | 0      | 0 0    | 0         | 0      | 0 0    |
| Dungries.....           | 0         | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 0      | 0 0    |
| Dutties.....            | 0         | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 896    | 0 0    |
| Ginghams.....           | 0         | 0     | 0 0    | 0         | 88     | 0 0    | 0         | 0      | 0 0    |
| Blue Handkerchiefs..... | 0         | 0     | 0 0    | 0         | 58     | 0 0    | 0         | 0      | 0 0    |
| Checked ".....          | 0         | 0     | 0 0    | 0         | 70     | 0 0    | 0         | 0      | 0 0    |
| Red ".....              | 0         | 0     | 0 0    | 0         | 258    | 0 0    | 0         | 31     | 0 0    |
| Lace, " bundles.....    | 0         | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 0      | 0 0    |
| " Kinvary.....          | 0         | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 269    | 0 0    |
| " Nuckey.....           | 0         | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 0      | 0 0    |
| " Elephant Jools.....   | 0         | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 2,330  | 0 0    |
| Loongies.....           | 0         | 0     | 0 0    | 0         | 5,584  | 0 0    | 0         | 0      | 0 0    |
| Moories.....            | 0         | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 0      | 0 0    |
| " Blue.....             | 0         | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 0      | 0 0    |
| Muslins.....            | 0         | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 98,803 | 0 0    |
| Palempoore.....         | 0         | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 0      | 0 0    |
| Punjam cloth.....       | 0         | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 0      | 0 0    |
| Purses.....             | 0         | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 958    | 0 0    |
| Roomals of sorts.....   | 0         | 0     | 0 0    | 0         | 120    | 0 0    | 0         | 1,240  | 0 0    |
| " Laced.....            | 0         | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 158    | 0 0    |
| Salempores.....         | 0         | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 0      | 0 0    |
| " Blue.....             | 0         | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 1,753  | 0 0    |
| Sarasa.....             | 0         | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 0      | 0 0    |
| Sashes.....             | 0         | 0     | 0 0    | 0         | 49     | 0 0    | 0         | 4,439  | 0 0    |
| " Laced.....            | 0         | 80    | 0 0    | 0         | 0      | 0 0    | 0         | 100    | 0 0    |
| Soosees.....            | 0         | 0     | 0 0    | 0         | 3,201  | 0 0    | 0         | 299    | 0 0    |
| Silk Cloth.....         | 0         | 44    | 0 0    | 0         | 150    | 0 0    | 0         | 204    | 0 0    |
| " Cholies.....          | 0         | 13    | 0 0    | 0         | 0      | 0 0    | 0         | 0      | 0 0    |
| " Coottoonies.....      | 0         | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 109    | 0 0    |
| " Keincobs.....         | 0         | 2,185 | 0 0    | 0         | 0      | 0 0    | 0         | 1,703  | 0 0    |
| " Soosees.....          | 0         | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 0      | 0 0    |
| Shawls.....             | 0         | 594   | 0 0    | 0         | 0      | 0 0    | 0         | 50     | 0 0    |
| Table Cloths.....       | 0         | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 0      | 0 0    |
| Towels.....             | 0         | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 13     | 0 0    |
| Tuppies.....            | 0         | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 27     | 0 0    |

Piece Goods.

## of IMPORTS, &amp;c.--continued.

| Northern Division of Arcot. |        |        | Coimbatore. |       |        | Salem.    |        |        | Total.    |          |        |
|-----------------------------|--------|--------|-------------|-------|--------|-----------|--------|--------|-----------|----------|--------|
| Quantity.                   |        | Value. | Quantity.   |       | Value. | Quantity. |        | Value. | Quantity. |          | Value. |
| Cwts.                       | Rups.  | A. P.  | Cwts.       | Rups. | A. P.  | Cwts.     | Rups.  | A. P.  | Cwts.     | Rups.    | A. P.  |
| 0                           | 165    | 0 0    | 0           | 9,164 | 0 0    | 0         | 56,662 | 0 0    | 0         | 47,316   | 0 0    |
| 0                           | 1,267  | 0 0    | 0           | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 1,267    | 0 0    |
| 0                           | 104    | 0 0    | 0           | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 132      | 0 0    |
| 0                           | 50,144 | 0 0    | 0           | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 77,331   | 0 0    |
| 0                           | 1,241  | 0 0    | 0           | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 1,896    | 0 0    |
| 0                           | 0      | 0 0    | 0           | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 80       | 0 0    |
| 0                           | 40,293 | 0 0    | 0           | 16    | 0 0    | 0         | 148    | 0 0    | 0         | 77,130   | 0 0    |
| 0                           | 526    | 0 0    | 0           | 0     | 0 0    | 0         | 48     | 0 0    | 0         | 2,138    | 0 0    |
| 0                           | 2,560  | 0 0    | 0           | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 2,560    | 0 0    |
| 0                           | 0      | 0 0    | 0           | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 12,406   | 0 0    |
| 0                           | 23,086 | 0 0    | 0           | 0     | 0 0    | 0         | 1,958  | 0 0    | 0         | 25,044   | 0 0    |
| 0                           | 883    | 0 0    | 0           | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 883      | 0 0    |
| 0                           | 24,871 | 0 0    | 0           | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 883      | 0 0    |
| 0                           | 48,194 | 0 0    | 0           | 67    | 0 0    | 0         | 22,948 | 0 0    | 0         | 76,065   | 0 0    |
| 0                           | 780    | 0 0    | 0           | 70    | 0 0    | 0         | 2,548  | 0 0    | 0         | 3,441    | 0 0    |
| 0                           | 102    | 0 0    | 0           | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 112      | 0 0    |
| 0                           | 4      | 0 0    | 0           | 0     | 0 0    | 0         | 7,776  | 0 0    | 0         | 7,780    | 0 0    |
| 0                           | 0      | 0 0    | 0           | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 896      | 0 0    |
| 0                           | 15     | 0 0    | 0           | 0     | 0 0    | 0         | 16     | 0 0    | 0         | 119      | 0 0    |
| 0                           | 6,823  | 0 0    | 0           | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 6,881    | 0 0    |
| 0                           | 9,076  | 0 0    | 0           | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 9,152    | 0 0    |
| 0                           | 2,826  | 0 0    | 0           | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 3,115    | 0 0    |
| 0                           | 0      | 0 0    | 0           | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 0        | 0 0    |
| 0                           | 0      | 0 0    | 0           | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 269      | 0 0    |
| 0                           | 0      | 0 0    | 0           | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 0        | 0 0    |
| 0                           | 0      | 0 0    | 0           | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 2,330    | 0 0    |
| 0                           | 991    | 0 0    | 0           | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 6,575    | 0 0    |
| 0                           | 192    | 0 0    | 0           | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 192      | 0 0    |
| 0                           | 167    | 0 0    | 0           | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 167      | 0 0    |
| 0                           | 6,574  | 0 0    | 0           | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 1,05,377 | 0 0    |
| 0                           | 10,718 | 0 0    | 0           | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 10,718   | 0 0    |
| 0                           | 0      | 0 0    | 0           | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 0        | 0 0    |
| 0                           | 1      | 0 0    | 0           | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 959      | 0 0    |
| 0                           | 1,753  | 0 0    | 0           | 11    | 0 0    | 0         | 0      | 0 0    | 0         | 3,124    | 0 0    |
| 0                           | 0      | 0 0    | 0           | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 158      | 0 0    |
| 0                           | 777    | 0 0    | 0           | 0     | 0 0    | 0         | 424    | 0 0    | 0         | 1,201    | 0 0    |
| 0                           | 0      | 0 0    | 0           | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 0        | 0 0    |
| 0                           | 60,515 | 0 0    | 0           | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 60,515   | 0 0    |
| 0                           | 237    | 0 0    | 0           | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 4,725    | 0 0    |
| 0                           | 45     | 0 0    | 0           | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 225      | 0 0    |
| 0                           | 669    | 0 0    | 0           | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 9,169    | 0 0    |
| 0                           | 2,216  | 0 0    | 0           | 0     | 0 0    | 0         | 35     | 0 0    | 0         | 2,649    | 0 0    |
| 0                           | 920    | 0 0    | 0           | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 933      | 0 0    |
| 0                           | 1,749  | 0 0    | 0           | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 1,858    | 0 0    |
| 0                           | 0      | 0 0    | 0           | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 3,888    | 0 0    |
| 0                           | 350    | 0 0    | 0           | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 350      | 0 0    |
| 0                           | 40     | 0 0    | 0           | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 684      | 0 0    |
| 0                           | 0      | 0 0    | 0           | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 0        | 0 0    |
| 0                           | 15     | 0 0    | 0           | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 27       | 0 0    |
| 0                           | 1      | 0 0    | 0           | 0     | 0 0    | 0         | 0      | 0 0    | 0         | 38       | 0 0    |

## Value and estimated weight.

| IMPORTS.                                   | Mysore.   |       |        |    | Bellary.  |       |        |    | Cuddapah. |        |        |    |
|--------------------------------------------|-----------|-------|--------|----|-----------|-------|--------|----|-----------|--------|--------|----|
|                                            | Quantity. |       | Value. |    | Quantity. |       | Value. |    | Quantity. |        | Value. |    |
|                                            | Cwts.     | Rups. | A.     | P. | Cwts.     | Rups. | A.     | P. | Cwts.     | Rups.  | A.     | P. |
| Piece Goods. { Cot lace.....               | 0         | 0     | 0      | 0  | 0         | 0     | 0      | 0  | 0         | 0      | 0      | 0  |
| Gunnies.....                               | 0         | 0     | 0      | 0  | 0         | 0     | 0      | 0  | 0         | 2,190  | 0      | 0  |
| Jamarcolam.....                            | 0         | 0     | 0      | 0  | 0         | 317   | 0      | 0  | 0         | 185    | 0      | 0  |
| Turbands.....                              | 0         | 0     | 0      | 0  | 0         | 0     | 0      | 0  | 0         | 816    | 0      | 0  |
| „ Chintz.....                              | 0         | 0     | 0      | 0  | 0         | 0     | 0      | 0  | 0         | 11,084 | 0      | 0  |
| „ Laced.....                               | 0         | 0     | 0      | 0  | 0         | 0     | 0      | 0  | 0         | 0      | 0      | 0  |
| Tent rope.....                             | 0         | 0     | 0      | 0  | 0         | 0     | 0      | 0  | 0         | 0      | 0      | 0  |
| Piece goods of sorts.....                  | 0         | 48    | 0      | 0  | 0         | 60    | 0      | 0  | 0         | 1,450  | 0      | 0  |
| Total.....                                 |           |       |        |    |           |       |        |    |           |        |        |    |
| Total estimated weight of piece goods..... |           |       |        |    |           |       |        |    |           |        |        |    |
| Grand Total.....                           |           |       |        |    |           |       |        |    |           |        |        |    |

## of IMPORTS, &amp;c.--continued.

| Northern Division of Arcot. |       |        |    | Coimbatore. |       |        |    | Salem.    |       |        |    | Total.    |           |        |    |
|-----------------------------|-------|--------|----|-------------|-------|--------|----|-----------|-------|--------|----|-----------|-----------|--------|----|
| Quantity.                   |       | Value. |    | Quantity.   |       | Value. |    | Quantity. |       | Value. |    | Quantity. |           | Value. |    |
| Cwts.                       | Rups. | A.     | P. | Cwts.       | Rups. | A.     | P. | Cwts.     | Rups. | A.     | P. | Cwts.     | Rups.     | A.     | P. |
| 0                           | 4,277 | 0      | 0  | 0           | 0     | 0      | 0  | 0         | 0     | 0      | 0  | 0         | 4,277     | 0      | 0  |
| 0                           | 1,654 | 0      | 0  | 0           | 0     | 0      | 0  | 0         | 0     | 0      | 0  | 0         | 3,844     | 0      | 0  |
| 0                           | 2,858 | 0      | 0  | 0           | 700   | 0      | 0  | 0         | 0     | 0      | 0  | 0         | 4,060     | 0      | 0  |
| 0                           | 4,817 | 0      | 0  | 0           | 0     | 0      | 0  | 0         | 0     | 0      | 0  | 0         | 5,633     | 0      | 0  |
| 0                           | 485   | 0      | 0  | 0           | 0     | 0      | 0  | 0         | 0     | 0      | 0  | 0         | 11,569    | 0      | 0  |
| 0                           | 0     | 0      | 0  | 0           | 0     | 0      | 0  | 0         | 0     | 0      | 0  | 0         | 0         | 0      | 0  |
| 0                           | 2,537 | 0      | 0  | 0           | 0     | 0      | 0  | 0         | 0     | 0      | 0  | 0         | 2,537     | 0      | 0  |
| 0                           | 523   | 0      | 0  | 0           | 0     | 0      | 0  | 0         | 120   | 0      | 0  | 0         | 2,201     | 0      | 0  |
|                             |       |        |    |             |       |        |    |           |       |        |    | 401,877   |           | 0      | 0  |
|                             |       |        |    |             |       |        |    |           |       |        |    | 3,809     |           | 0      | 0  |
|                             |       |        |    |             |       |        |    |           |       |        |    | 405,686   | 58,05,053 | 0      | 0  |
| Or Tons.....                |       |        |    |             |       |        |    |           |       |        |    | 20,284    |           | 0      | 0  |

(Signed) T. T. PEARS,  
Railway Commissioner.

**E**

**Value and estimated weight of EXPORTS from Madras by**

| EXPORTS.                     | Mysore.   |        |       |       | Bellary.  |        |       |       | Cuddapah. |        |       |       |
|------------------------------|-----------|--------|-------|-------|-----------|--------|-------|-------|-----------|--------|-------|-------|
|                              | Quantity. | Value. |       |       | Quantity. | Value. |       |       | Quantity. | Value. |       |       |
|                              |           | Cwts.  | Rups. | A. P. |           | Cwts.  | Rups. | A. P. |           | Cwts.  | Rups. | A. P. |
| Allum.....                   | 0         | 0      | 0     | 0     | 0         | 0      | 0     | 0     | 0         | 0      | 0     |       |
| Benjamin.....                | 0         | 300    | 0     | 0     | 0         | 0      | 0     | 0     | 0         | 0      | 0     |       |
| Books.....                   | 0         | 2,177  | 0     | 0     | 0         | 3,350  | 0     | 0     | 190       | 0      | 0     |       |
| Corks.....                   | 0         | 677    | 0     | 0     | 0         | 420    | 0     | 0     | 20        | 0      | 0     |       |
| Cotton thread twist, &c..... | 0         | 4,840  | 0     | 0     | 0         | 13,530 | 0     | 0     | 50        | 0      | 0     |       |
| Drugs, Camphor.....          | 0         | 240    | 0     | 0     | 0         | 0      | 0     | 0     | 0         | 0      | 0     |       |
| „ Musk.....                  | 0         | 270    | 0     | 0     | 0         | 100    | 0     | 0     | 320       | 0      | 0     |       |
| Dyes, Indigo.....            | 0         | 0      | 0     | 96    | 18,636    | 0      | 0     | 0     | 0         | 0      | 0     |       |
| „ Munjesty.....              | 0         | 0      | 0     | 0     | 0         | 0      | 0     | 0     | 0         | 0      | 0     |       |
| Fruits, Cocoa-nuts.....      | 0         | 33     | 0     | 0     | 0         | 0      | 0     | 0     | 0         | 0      | 0     |       |
| Glass ware.....              | 0         | 1,025  | 0     | 0     | 0         | 1,932  | 0     | 0     | 4,500     | 0      | 0     |       |
| Carpets.....                 | 0         | 0      | 0     | 0     | 0         | 150    | 0     | 0     | 312       | 0      | 0     |       |
| Jaggery.....                 | 0         | 0      | 0     | 0     | 0         | 0      | 0     | 0     | 0         | 0      | 0     |       |
| „ Palmira.....               | 0         | 0      | 0     | 0     | 0         | 34     | 0     | 0     | 0         | 0      | 0     |       |
| Arrack.....                  | 0         | 48,598 | 0     | 0     | 0         | 3,666  | 0     | 0     | 0         | 0      | 0     |       |
| Beer.....                    | 0         | 12,442 | 0     | 0     | 0         | 9,749  | 0     | 0     | 2,611     | 0      | 0     |       |
| Brandy.....                  | 0         | 14,064 | 0     | 0     | 0         | 5,670  | 0     | 0     | 1,581     | 0      | 0     |       |
| „ Sherry.....                | 0         | 249    | 0     | 0     | 0         | 240    | 0     | 0     | 0         | 0      | 0     |       |
| Champagne.....               | 0         | 2,296  | 0     | 0     | 0         | 1,080  | 0     | 0     | 180       | 0      | 0     |       |
| Claret.....                  | 0         | 764    | 0     | 0     | 0         | 758    | 0     | 0     | 200       | 0      | 0     |       |
| Gin.....                     | 0         | 594    | 0     | 0     | 0         | 316    | 0     | 0     | 306       | 0      | 0     |       |
| Liquors of sorts.....        | 0         | 9,126  | 0     | 0     | 0         | 658    | 0     | 0     | 3,591     | 0      | 0     |       |
| Sherry.....                  | 0         | 8,873  | 0     | 0     | 0         | 9,770  | 0     | 0     | 4,581     | 0      | 0     |       |
| Wines of sorts.....          | 0         | 0      | 0     | 0     | 0         | 0      | 0     | 0     | 0         | 0      | 0     |       |
| „ Maderia.....               | 0         | 4,937  | 0     | 0     | 0         | 2,272  | 0     | 0     | 0         | 0      | 0     |       |
| „ Port.....                  | 0         | 4,577  | 0     | 0     | 0         | 2,292  | 0     | 0     | 2,011     | 0      | 0     |       |
| Copper.....                  | 0         | 3,490  | 0     | 0     | 0         | 0      | 0     | 0     | 0         | 0      | 0     |       |
| Iron.....                    | 0         | 1,201  | 0     | 0     | 0         | 4,534  | 0     | 0     | 1,797     | 0      | 0     |       |
| Tutenague.....               | 0         | 0      | 0     | 0     | 0         | 0      | 0     | 0     | 0         | 0      | 0     |       |
| Millinery.....               | 0         | 175    | 0     | 0     | 0         | 0      | 0     | 0     | 670       | 0      | 0     |       |
| Oil, Gingely.....            | 0         | 0      | 0     | 0     | 0         | 0      | 0     | 0     | 364       | 0      | 0     |       |
| „ Lamp.....                  | 0         | 0      | 0     | 0     | 0         | 348    | 0     | 0     | 104       | 0      | 0     |       |
| „ of sorts.....              | 0         | 40     | 0     | 0     | 0         | 0      | 0     | 0     | 36        | 0      | 0     |       |
| Cheese.....                  | 0         | 389    | 0     | 0     | 0         | 964    | 0     | 0     | 50        | 0      | 0     |       |
| Hams.....                    | 0         | 286    | 0     | 0     | 0         | 1,086  | 0     | 0     | 0         | 0      | 0     |       |
| Oilman's stores.....         | 0         | 0      | 0     | 0     | 0         | 0      | 0     | 0     | 0         | 0      | 0     |       |
| Sauces.....                  | 0         | 149    | 0     | 0     | 0         | 200    | 0     | 0     | 0         | 0      | 0     |       |
| Plated ware.....             | 0         | 2,402  | 0     | 0     | 0         | 750    | 0     | 0     | 0         | 0      | 0     |       |
| Chintz.....                  | 0         | 150    | 0     | 0     | 0         | 1,100  | 0     | 0     | 506       | 0      | 0     |       |
| Long cloth.....              | 0         | 2,742  | 0     | 0     | 0         | 5,080  | 0     | 0     | 0         | 0      | 0     |       |
| Muslins.....                 | 0         | 0      | 0     | 0     | 0         | 0      | 0     | 0     | 172       | 0      | 0     |       |
| Cauthy.....                  | 0         | 0      | 0     | 0     | 0         | 0      | 0     | 0     | 0         | 0      | 0     |       |
| Chiniz.....                  | 0         | 84     | 0     | 0     | 0         | 0      | 0     | 0     | 0         | 0      | 0     |       |
| Cholies.....                 | 0         | 57     | 0     | 0     | 0         | 0      | 0     | 0     | 90        | 0      | 0     |       |
| Comboy, Blue.....            | 0         | 135    | 0     | 0     | 0         | 0      | 0     | 0     | 0         | 0      | 0     |       |
| Cloth of sorts.....          | 0         | 614    | 0     | 0     | 0         | 115    | 0     | 0     | 257       | 0      | 0     |       |
| „ Laced.....                 | 0         | 0      | 0     | 0     | 0         | 0      | 0     | 0     | 0         | 0      | 0     |       |

**land into the undermentioned Districts, in the year 1841-42.**

| Northern Division<br>of Arcot. |             |        |             | Coimbatore. |             |        |             | Salem.    |             |        |             | Total.    |             |        |             |
|--------------------------------|-------------|--------|-------------|-------------|-------------|--------|-------------|-----------|-------------|--------|-------------|-----------|-------------|--------|-------------|
| Quantity.                      |             | Value. |             | Quantity.   |             | Value. |             | Quantity. |             | Value. |             | Quantity. |             | Value. |             |
| Cwts.                          | Rups. A. P. | Cwts.  | Rups. A. P. | Cwts.       | Rups. A. P. | Cwts.  | Rups. A. P. | Cwts.     | Rups. A. P. | Cwts.  | Rups. A. P. | Cwts.     | Rups. A. P. | Cwts.  | Rups. A. P. |
| 0                              | 650 0 0     | 0      | 0 0 0       | 0           | 0 0 0       | 0      | 410 0 0     | 364       | 1,060       | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 160 0 0     | 0      | 0 0 0       | 0           | 0 0 0       | 0      | 0 0 0       | 15        | 460         | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 140 0 0     | 0      | 0 0 0       | 105         | 0 0 0       | 0      | 380 0 0     | 0         | 6,342       | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 107 0 0     | 0      | 0 0 0       | 0           | 0 0 0       | 0      | 0 0 0       | 0         | 1,224       | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 3,247 0 0   | 0      | 0 0 0       | 2,900       | 0 0 0       | 0      | 12,115 0 0  | 409       | 30,682      | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 1,325 0 0   | 0      | 0 0 0       | 0           | 0 0 0       | 0      | 0 0 0       | 17        | 1,565       | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 760 0 0     | 0      | 0 0 0       | 0           | 0 0 0       | 0      | 0 0 0       | 0         | 1,450       | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 29                             | 5,625 0 0   | 0      | 0 0 0       | 0           | 0 0 0       | 0      | 0 0 0       | 126       | 24,261      | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 17                             | 450 0 0     | 0      | 0 0 0       | 0           | 0 0 0       | 0      | 0 0 0       | 17        | 450         | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 252 0 0     | 0      | 0 0 0       | 0           | 0 0 0       | 0      | 0 0 0       | 91        | 285         | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 70 0 0      | 0      | 0 0 0       | 0           | 0 0 0       | 0      | 0 0 0       | 0         | 7,527       | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 300 0 0     | 0      | 0 0 0       | 0           | 0 0 0       | 0      | 0 0 0       | 59        | 762         | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 16                             | 151 0 0     | 0      | 0 0 0       | 0           | 0 0 0       | 0      | 0 0 0       | 16        | 151         | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 854 0 0     | 0      | 0 0 0       | 0           | 0 0 0       | 0      | 0 0 0       | 227       | 888         | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 8,375 0 0   | 0      | 0 0 0       | 0           | 0 0 0       | 0      | 0 0 0       | 2,908     | 60,659      | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 5,692 0 0   | 0      | 0 0 0       | 468         | 0 0 0       | 0      | 347 0 0     | 3,131     | 31,309      | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 5,319 0 0   | 0      | 0 0 0       | 1,419       | 0 0 0       | 0      | 282 0 0     | 809       | 28,335      | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 160 0 0     | 0      | 0 0 0       | 0           | 0 0 0       | 0      | 0 0 0       | 8         | 649         | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 875 0 0     | 0      | 0 0 0       | 0           | 0 0 0       | 0      | 0 0 0       | 587       | 4,431       | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 0 0 0       | 0      | 0 0 0       | 0           | 0 0 0       | 0      | 28 0 0      | 45        | 1,750       | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 1,910 0 0   | 0      | 0 0 0       | 330         | 0 0 0       | 0      | 444 0 0     | 16        | 3,900       | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 2,722 0 0   | 0      | 0 0 0       | 0           | 0 0 0       | 0      | 1,032 0 0   | 331       | 17,129      | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 5,757 0 0   | 0      | 0 0 0       | 0           | 0 0 0       | 0      | 180 0 0     | 64        | 29,161      | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 0 0 0       | 0      | 0 0 0       | 0           | 0 0 0       | 0      | 0 0 0       | 0         | 0           | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 1,952 0 0   | 0      | 0 0 0       | 0           | 0 0 0       | 0      | 1,158 0 0   | 119       | 10,319      | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 1,032 0 0   | 0      | 0 0 0       | 234         | 0 0 0       | 0      | 0 0 0       | 261       | 10,146      | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 3,200 0 0   | 0      | 0 0 0       | 0           | 0 0 0       | 0      | 0 0 0       | 28        | 6,690       | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 8,616 0 0   | 0      | 0 0 0       | 1,984       | 0 0 0       | 0      | 6,540 0 0   | 7,105     | 24,672      | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 490 0 0     | 0      | 0 0 0       | 0           | 0 0 0       | 0      | 0 0 0       | 49        | 490         | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 650 0 0     | 0      | 0 0 0       | 50          | 0 0 0       | 0      | 100 0 0     | 0         | 1,645       | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 148 0 0     | 0      | 0 0 0       | 0           | 0 0 0       | 0      | 0 0 0       | 42        | 512         | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 174 0 0     | 0      | 0 0 0       | 0           | 0 0 0       | 0      | 0 0 0       | 57        | 626         | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 313 0 0     | 0      | 0 0 0       | 0           | 0 0 0       | 0      | 0 0 0       | 0         | 389         | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 248 0 0     | 0      | 0 0 0       | 44          | 0 0 0       | 0      | 0 0 0       | 15        | 1,695       | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 272 0 0     | 0      | 0 0 0       | 0           | 0 0 0       | 0      | 0 0 0       | 14        | 1,644       | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 0 0 0       | 0      | 0 0 0       | 0           | 0 0 0       | 0      | 0 0 0       | 0         | 0           | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 595 0 0     | 0      | 0 0 0       | 0           | 0 0 0       | 0      | 0 0 0       | 0         | 944         | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 0 0 0       | 0      | 0 0 0       | 0           | 0 0 0       | 0      | 0 0 0       | 0         | 3,152       | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 200 0 0     | 0      | 0 0 0       | 150         | 0 0 0       | 0      | 0 0 0       | 0         | 2,106       | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 2,891 0 0   | 0      | 0 0 0       | 0           | 0 0 0       | 0      | 0 0 0       | 0         | 10,713      | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 307 0 0     | 0      | 0 0 0       | 0           | 0 0 0       | 0      | 0 0 0       | 0         | 479         | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 553 0 0     | 0      | 0 0 0       | 0           | 0 0 0       | 0      | 0 0 0       | 0         | 553         | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 280 0 0     | 0      | 0 0 0       | 40          | 0 0 0       | 0      | 0 0 0       | 0         | 404         | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 88 0 0      | 0      | 0 0 0       | 0           | 0 0 0       | 0      | 178 0 0     | 0         | 413         | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 4,871 0 0   | 0      | 0 0 0       | 0           | 0 0 0       | 0      | 0 0 0       | 0         | 5,006       | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 1,209 0 0   | 0      | 0 0 0       | 180         | 0 0 0       | 0      | 206 0 0     | 0         | 2,509       | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |
| 0                              | 0 0 0       | 0      | 0 0 0       | 0           | 0 0 0       | 0      | 0 0 0       | 0         | 0           | 0      | 0           | 0         | 0 0 0       | 0      | 0 0 0       |

## Value and estimated weight

| EXPORTS,                                   | Mysore.   |        |       | Bellary.  |        |       | Cuddapah. |       |       |
|--------------------------------------------|-----------|--------|-------|-----------|--------|-------|-----------|-------|-------|
|                                            | Quantity. |        |       | Quantity. |        |       | Quantity. |       |       |
|                                            | Cwts.     | Rups.  | A. P. | Cwts.     | Rups.  | A. P. | Cwts.     | Rups. | A. P. |
| Dowties.....                               | 0         | 220    | 0 0   | 0         | 1,413  | 0 0   | 0         | 20    | 0 0   |
| „ Laced.....                               | 0         | 0      | 0 0   | 0         | 0      | 0 0   | 0         | 0     | 0 0   |
| Handkerchiefs.....                         | 0         | 96     | 0 0   | 0         | 120    | 0 0   | 0         | 1,603 | 0 0   |
| „ Blue.....                                | 0         | 0      | 0 0   | 0         | 0      | 0 0   | 0         | 0     | 0 0   |
| „ Checked.....                             | 0         | 260    | 0 0   | 0         | 440    | 0 0   | 0         | 0     | 0 0   |
| Moories.....                               | 0         | 0      | 0 0   | 0         | 1,389  | 0 0   | 0         | 0     | 0 0   |
| Muslins.....                               | 0         | 98     | 0 0   | 0         | 0      | 0 0   | 0         | 0     | 0 0   |
| Piece goods of sorts.....                  | 0         | 109    | 0 0   | 0         | 0      | 0 0   | 0         | 176   | 0 0   |
| Rumals of sorts.....                       | 0         | 8      | 0 0   | 0         | 30     | 0 0   | 0         | 148   | 0 0   |
| Salampores.....                            | 0         | 0      | 0 0   | 0         | 0      | 0 0   | 0         | 0     | 0 0   |
| Soosies.....                               | 0         | 86     | 0 0   | 0         | 125    | 0 0   | 0         | 0     | 0 0   |
| Tafita.....                                | 0         | 110    | 0 0   | 0         | 64     | 0 0   | 0         | 0     | 0 0   |
| Tuppies.....                               | 0         | 22     | 0 0   | 0         | 0      | 0 0   | 0         | 0     | 0 0   |
| Turbands of sorts.....                     | 0         | 56     | 0 0   | 0         | 0      | 0 0   | 0         | 96    | 0 0   |
| Cloth, Silk.....                           | 0         | 0      | 0 0   | 0         | 0      | 0 0   | 0         | 0     | 0 0   |
| Keincobs.....                              | 0         | 0      | 0 0   | 0         | 0      | 0 0   | 0         | 0     | 0 0   |
| Moonga cloth.....                          | 0         | 147    | 0 0   | 0         | 0      | 0 0   | 0         | 0     | 0 0   |
| Provisions, Ghee.....                      | 0         | 0      | 0 0   | 0         | 0      | 0 0   | 0         | 0     | 0 0   |
| Raw silk.....                              | 0         | 0      | 0 0   | 0         | 840    | 0 0   | 0         | 0     | 0 0   |
| Saddlery.....                              | 0         | 440    | 0 0   | 0         | 0      | 0 0   | 0         | 625   | 0 0   |
| Stationery.....                            | 0         | 0      | 0 0   | 0         | 200    | 0 0   | 0         | 260   | 0 0   |
| Snuff.....                                 | 0         | 207    | 0 0   | 0         | 45     | 0 0   | 0         | 0     | 0 0   |
| Sugar.....                                 | 0         | 0      | 0 0   | 0         | 0      | 0 0   | 0         | 17    | 0 0   |
| „ Candy.....                               | 0         | 0      | 0 0   | 0         | 0      | 0 0   | 0         | 0     | 0 0   |
| Stick lac.....                             | 0         | 0      | 0 0   | 0         | 0      | 0 0   | 0         | 0     | 0 0   |
| Cardamum seeds.....                        | 0         | 0      | 0 0   | 0         | 0      | 0 0   | 0         | 0     | 0 0   |
| Pepper.....                                | 0         | 915    | 0 0   | 0         | 683    | 0 0   | 0         | 8     | 0 0   |
| Sundries, Europe.....                      | 0         | 25     | 0 0   | 0         | 100    | 0 0   | 0         | 282   | 0 0   |
| „ Country.....                             | 0         | 92,642 | 0 0   | 0         | 46,106 | 0 0   | 0         | 6,328 | 0 0   |
| Tea.....                                   | 0         | 1,076  | 0 0   | 0         | 72     | 0 0   | 0         | 61    | 0 0   |
| Timber.....                                | 0         | 350    | 0 0   | 0         | 378    | 0 0   | 0         | 290   | 0 0   |
| „ Reapers.....                             | 0         | 140    | 0 0   | 0         | 0      | 0 0   | 0         | 200   | 0 0   |
| Wearing apparel.....                       | 0         | 0      | 0 0   | 0         | 400    | 0 0   | 0         | 0     | 0 0   |
| Wax candles.....                           | 0         | 1,240  | 0 0   | 0         | 2,215  | 0 0   | 0         | 890   | 0 0   |
| Shawls.....                                | 0         | 180    | 0 0   | 0         | 0      | 0 0   | 0         | 0     | 0 0   |
| Woollens.....                              | 0         | 207    | 0 0   | 0         | 0      | 0 0   | 0         | 0     | 0 0   |
| Total.....                                 | 0         | 469    | 0 0   | 0         | 0      | 0 0   | 0         | 0     | 0 0   |
| Total estimated weight of piece goods..... |           |        |       |           |        |       |           |       |       |
| Grand Total.....                           |           |        |       |           |        |       |           |       |       |

## of EXPORTS, &amp;c.--continued.

| Northern Division of Arcot. |        |    |    | Coimbatore. |       |    |    | Salem.    |        |    |    | Total.                              |                                 |    |    |
|-----------------------------|--------|----|----|-------------|-------|----|----|-----------|--------|----|----|-------------------------------------|---------------------------------|----|----|
| Quantity.                   |        |    |    | Quantity.   |       |    |    | Quantity. |        |    |    | Quantity.                           |                                 |    |    |
| Cwts.                       | Rups.  | A. | P. | Cwts.       | Rups. | A. | P. | Cwts.     | Rups.  | A. | P. | Cwts.                               | Rups.                           | A. | P. |
| 0                           | 637    | 0  | 0  | 0           | 0     | 0  | 0  | 0         | 112    | 0  | 0  | 0                                   | 2,402                           | 0  | 0  |
| 0                           | 0      | 0  | 0  | 0           | 0     | 0  | 0  | 0         | 0      | 0  | 0  | 0                                   | 0                               | 0  | 0  |
| 0                           | 1,715  | 0  | 0  | 0           | 4     | 0  | 0  | 0         | 172    | 0  | 0  | 0                                   | 3,710                           | 0  | 0  |
| 0                           | 0      | 0  | 0  | 0           | 0     | 0  | 0  | 0         | 0      | 0  | 0  | 0                                   | 0                               | 0  | 0  |
| 0                           | 220    | 0  | 0  | 0           | 0     | 0  | 0  | 0         | 0      | 0  | 0  | 0                                   | 920                             | 0  | 0  |
| 0                           | 2,763  | 0  | 0  | 0           | 0     | 0  | 0  | 0         | 0      | 0  | 0  | 0                                   | 4,152                           | 0  | 0  |
| 0                           | 51     | 0  | 0  | 0           | 0     | 0  | 0  | 0         | 0      | 0  | 0  | 0                                   | 325                             | 0  | 0  |
| 0                           | 346    | 0  | 0  | 0           | 0     | 0  | 0  | 0         | 60     | 0  | 0  | 0                                   | 663                             | 0  | 0  |
| 0                           | 150    | 0  | 0  | 0           | 0     | 0  | 0  | 0         | 0      | 0  | 0  | 0                                   | 194                             | 0  | 0  |
| 0                           | 6,752  | 0  | 0  | 0           | 0     | 0  | 0  | 0         | 0      | 0  | 0  | 0                                   | 6,752                           | 0  | 0  |
| 0                           | 391    | 0  | 0  | 0           | 0     | 0  | 0  | 0         | 18     | 0  | 0  | 0                                   | 620                             | 0  | 0  |
| 0                           | 175    | 0  | 0  | 0           | 250   | 0  | 0  | 0         | 24     | 0  | 0  | 0                                   | 623                             | 0  | 0  |
| 0                           | 1,994  | 0  | 0  | 0           | 0     | 0  | 0  | 0         | 0      | 0  | 0  | 0                                   | 2,016                           | 0  | 0  |
| 0                           | 41     | 0  | 0  | 0           | 0     | 0  | 0  | 0         | 0      | 0  | 0  | 0                                   | 193                             | 0  | 0  |
| 0                           | 440    | 0  | 0  | 0           | 0     | 0  | 0  | 0         | 0      | 0  | 0  | 0                                   | 440                             | 0  | 0  |
| 0                           | 240    | 0  | 0  | 0           | 0     | 0  | 0  | 0         | 0      | 0  | 0  | 0                                   | 240                             | 0  | 0  |
| 0                           | 187    | 0  | 0  | 0           | 140   | 0  | 0  | 0         | 0      | 0  | 0  | 0                                   | 474                             | 0  | 0  |
| 0                           | 46     | 0  | 0  | 0           | 0     | 0  | 0  | 0         | 0      | 0  | 0  | 0                                   | 46                              | 0  | 0  |
| 0                           | 30     | 0  | 0  | 0           | 0     | 0  | 0  | 0         | 60     | 0  | 0  | 0                                   | 930                             | 0  | 0  |
| 0                           | 250    | 0  | 0  | 0           | 0     | 0  | 0  | 0         | 0      | 0  | 0  | 0                                   | 1,315                           | 0  | 0  |
| 0                           | 18     | 0  | 0  | 0           | 0     | 0  | 0  | 0         | 0      | 0  | 0  | 0                                   | 478                             | 0  | 0  |
| 0                           | 3,125  | 0  | 0  | 0           | 0     | 0  | 0  | 0         | 0      | 0  | 0  | 0                                   | 3,377                           | 0  | 0  |
| 0                           | 118    | 0  | 0  | 0           | 36    | 0  | 0  | 0         | 16     | 0  | 0  | 133                                 | 187                             | 0  | 0  |
| 0                           | 144    | 0  | 0  | 0           | 401   | 0  | 0  | 0         | 48     | 0  | 0  | 21                                  | 593                             | 0  | 0  |
| 0                           | 1,290  | 0  | 0  | 0           | 0     | 0  | 0  | 0         | 840    | 0  | 0  | 0                                   | 2,130                           | 0  | 0  |
| 0                           | 1,053  | 0  | 0  | 0           | 132   | 0  | 0  | 0         | 351    | 0  | 0  | 854                                 | 3,142                           | 0  | 0  |
| 0                           | 12,249 | 0  | 0  | 0           | 0     | 0  | 0  | 0         | 250    | 0  | 0  | 633                                 | 12,906                          | 0  | 0  |
| 0                           | 61,896 | 0  | 0  | 0           | 9,553 | 0  | 0  | 0         | 28,580 | 0  | 0  | 0                                   | 2,45,105                        | 0  | 0  |
| 0                           | 2,636  | 0  | 0  | 0           | 0     | 0  | 0  | 0         | 30     | 0  | 0  | 0                                   | 3,875                           | 0  | 0  |
| 0                           | 260    | 0  | 0  | 0           | 20    | 0  | 0  | 0         | 50     | 0  | 0  | 0                                   | 1,348                           | 0  | 0  |
| 0                           | 1,161  | 0  | 0  | 0           | 0     | 0  | 0  | 0         | 0      | 0  | 0  | 0                                   | 1,501                           | 0  | 0  |
| 0                           | 137    | 0  | 0  | 0           | 0     | 0  | 0  | 0         | 0      | 0  | 0  | 0                                   | 537                             | 0  | 0  |
| 0                           | 100    | 0  | 0  | 0           | 0     | 0  | 0  | 0         | 0      | 0  | 0  | 0                                   | 4,445                           | 0  | 0  |
| 0                           | 100    | 0  | 0  | 0           | 0     | 0  | 0  | 0         | 0      | 0  | 0  | 34                                  | 230                             | 0  | 0  |
| 0                           | 0      | 0  | 0  | 0           | 0     | 0  | 0  | 0         | 0      | 0  | 0  | 1                                   | 207                             | 0  | 0  |
| 0                           | 400    | 0  | 0  | 0           | 0     | 0  | 0  | 0         | 0      | 0  | 0  | 0                                   | 869                             | 0  | 0  |
|                             |        |    |    |             |       |    |    |           |        |    |    | 18,272                              | 0                               | 0  | 0  |
|                             |        |    |    |             |       |    |    |           |        |    |    | 352 <sup>2</sup> / <sub>18</sub>    | 0                               | 0  | 0  |
|                             |        |    |    |             |       |    |    |           |        |    |    | 18,624 <sup>2</sup> / <sub>18</sub> | 6,52,532                        | 0  | 0  |
|                             |        |    |    |             |       |    |    |           |        |    |    | Or Tons.....                        | 931 <sup>1</sup> / <sub>2</sub> | 0  | 0  |

(Signed) T. T. PEARLS,  
Railway Commissioner.

5. The situation of the above towns, as understated, is in a flat, open, but rocky country, with a small river passing through it, the Shevaroy Hills being distant 5' miles.
- Salem. Partially encircled by Hills, on an undulating plain.
- Raizepoor. Towards the west of the Collymally Hills, a  
Namgherrypettah. partially rocky, flat country.
- Namcul. In a rocky plain, about 16 miles from the main road between Salem and Trichinopoly; near the Collymally Hills, from which various agricultural productions are brought down and exported to Trichinopoly.
- Thathiengarpett. A small place near the above.
- Morciputty. Seven miles from the road on the Trichinopoly side of Namcul, also near the Collymally Hills.
- Saynthamungalum. 20 miles from the road, on the bank of the Cauvery, by which certain local produce, chiefly paddy, is carried on basket-boats to Trichinopoly.
- Vayloor. On the high road from Salem to Cuddalore and Madras, a river passing close to it; 31 miles from Salem and about 80 miles from Cuddalore. A very fair traffic is carried on here in iron: stony country, near a range of hills.
- Ahtoor. In a flat open country, 20 miles from Salem and 10 miles from the road between Salem and Coimbatore, of little importance.
- Yadapaddy. On the bank of the Cauvery and on the road from Salem to Coimbatore, from the former of which it is 35 miles distant: a sandy-soil with stones, rather undulating plain.
- Pullepolliem. On the Coimbatore road, 24 miles from Salem, in an undulating rocky plain.
- Senkerrydroog. 20 miles from Salem and 2 miles from the road between Salem and Cuddalore—of little consequence.
- Yathapoor. 7 miles from Senkerrydroog, is the Cusbah of the Talook and an important place; in a rocky plain.
- Trichingode. On the high roads from Madras and Bangalore to Salem, &c., about 27 miles from the Topoor pass, a thriving trading town in an open plain.
- Darampoory.

Pulcode.

On the road from Bangalore to Salem, 14 miles on the Bangalore side of Darampoory, in an open plain.

Kistnagherry.

On the high road from Madras to Bangalore. In an open stony country; its principal trade is in oil and paddy.

Cauveryputnam.

Eight miles from the above on the bank of the Pennar river.

Tripattoor.

On the high road from Madras to Salem, 15 miles from Vaniembaddy. At the foot of the Javady and Yalagherry Hills, in an open country.

Vaniembaddy.

On the high road from Madras to Bangalore and Salem; a rich and thriving town, closely inhabited. It is on the bank of the Ponneeear and Jonnapar rivers. Is the principal entrepôt of trade of this district.

Denkencottah.

In a thickly wooded country 17 miles from Ossoor, to which place is a good road; the trade of the town is chiefly in timber.

Ossoor.

On the high road from Madras to Bangalore, from the latter of which places it is distant 26 miles. The adjacent country is a continued succession of hills and valleys.

6. The principal agricultural produce of this district, of the above places, and of the Talooks about them is paddy, raggy, jowaree, bajera, toovur, pessaloo, olo-onthoo, bulleo, horse gram, oil seed, till, tobacco, saffron, jaggery, palmyra jaggery, tamarind, ghee, seekai, coffee, gingely oil, lamp oil, cocoa-nut, betel-nut, red-dye bark, sandal-wood, honey and iron ore.

7. The main articles of local manufacture are pig-iron, iron bars, saltpetre, indigo, steel-bars, cloth, gunny bags, cumblies, vessels of brass and copper, bullock carts, dubbers, split-bamboo matting, and skins of kinds.

8. The chief articles of Export and Import to and from this district are shown below.

### EXPORTS.

To Madras—Cloth, ghee, gingely and lamp oil, honey, saltpetre, skins, indigo, seekai, saffron, tamarind, coffee, steel-bars and pig-iron.

„ Pondicherry—Pessaloo, jaggery, lamp oil, and oil nut; till, horse gram, saffron, coarse brown sugar, saltpetre, tamarind, ghee, cloths and timber.

„ Bangalore—Cloth, timber, brass vessels, raggy and rice.

To *Chittoor*—Gingely oil, lamp oil, ghee, tamarind, jaggery, indigo, till, cloth, and timber.

„ *Calicut*—Cloths, Selumpore cloths, cumblies and iron.

„ *Mangalore*—Cloth.

„ *Bombay*—Cloth.

„ *Madura, Combaconum, Trichinopoly, and Tinnevely*—Cloth, coarse brown sugar, jaggery, saffron, steel bars and iron.

„ *Coimbatore*—Jaggery, sugar, saffron, cloths, iron and steel.

### IMPORTS.

From *Madras*—Salt, miscellaneous articles, cloths of European manufacture, brandy and other spirits, copper, lead, tootinagum, hard-ware.

„ *Pondicherry and Porto-Novo*—Lead, copper plates, tootinagum, black lead, sundry articles, coloured thread, drugs and salt.

„ *Calicut*—Betel, pepper, asafetida, seekai, cloves, cardamums, and articles of wood manufacture.

„ *Colombo*—Silk.

„ *Combaconum*—Vessels of brass, and other metals, and cloth.

„ *Madura*—Red coloured cloths and salt.

„ *Mysore*—Pepper, betel, dry cocoa-nut, sugar, silk and wheat.

„ *Arnes in the Chittoor District*—Cloths.

„ *Bellary*—Thread and brass vessels.

„ *Guntoor*—Coloured cloth (in Hindoostany “Soosy”) and coloured handkerchiefs.

„ *Masulipatam*—Coloured chintz.

„ *Nellore*—Fine white cloths.

9. The agricultural produce of this district, above described, is believed to be mainly consumed within its own limits.

10. Consequent on the abolition of the sayer, the Collector of a district does not now possess, officially, any information on which to found an opinion of what may be the extent of the traffic or amount of trade carried on within the limits of his charge, and the approximate value, which might be ascertained in some districts from reference to the Veesabuddy tax, is not available here, where the Veesabuddy impost is not levied. I am, however, impressed with the belief that the trade of the entire Collectorate may be taken at 50 lacs of Rupees annually.

11. The markets for the above mentioned articles of local production are given in para. 8. The ordinary means of conveyance are carts, with pairs of bullocks and pack bullocks. In regard to the nature of the traffic between this district and Madras. I would refer to paras. 8 and 9. Its amount is roughly estimated at 15 lacs of Rupees, but, as above explained, we have at present no

official data whereby to frame any safe calculation of its real value. The same observation applies to the trade between Porto-Novo and Pondicherry, which is stated to me to be in value about 50,000 Rupees.

12. The trade between the Collectorate and the coast is confined to the above mentioned three places.

13. There are but two principal roads used in the transport of articles brought into the district from the coast, one is by Ahtoor passing through Ahtoor and Thullavapul into the Cuddalore Collectorate, and so by Palaveram to the Presidency. The other is by Darampoory, Tripatoor and Vaniembaddy to Vellore.

14. The road to Pondicherry is by Ahtoor, Thullavapul and Cuddalore. Occasionally merchandize is conveyed to Porto-Novo by Moganoor and Pulepolliem, across the Cauvery at the latter place. There is a smooth good road (the intervening ghaut being much less abrupt than that at Topoor) from Salem to Vaniembaddy through the Munjawaddy Pass; but it is not liked or generally resorted to, owing to the supposed unhealthiness of some parts of the line, and the small number of villages on it.

15. The distance between Salem and Madras being 220 miles, carts can always be had for 11 Rupees or at  $\frac{1}{2}$  Rupee per 10 miles; but when there is no pressing demand for them they can be procured even for 9 Rupees. Pack-bullocks are procurable for the trip at  $5\frac{1}{2}$  Rupees or  $\frac{1}{4}$  Rupee per ten miles, but these too can at times be had for  $4\frac{1}{2}$  Rupees. Return carts and cattle from either place may be engaged at half the first rates of hire.

16. The inhabitants of this district have so long been accustomed to the very excellent roads by which it is intersected through its most important parts, that I do not anticipate any very immediate or general abandonment of the mode usually adopted by them for the transport of their produce and merchandize to the ordinary markets, unless the rail-road rates are in a marked degree lower than the present cost of the ancient, and more primitive system of carriage.

17. If, however, what is now conveyed to Madras on bandies and bullocks, can be carried from Arcot to its destination for something less than the hire of the present day, I believe that there is a very good disposition on the part of the Salem mercantile community to take advantage of the opening.

18. There will nevertheless be the greater difficulty in effecting the relinquishment of the system to which they have so long been accustomed, that the advantages of the new one will not be clear to the inhabitants of the district, until the rail-road is at their own doors. I therefore think it by all means desirable that the line proposed to Arcot should, without delay, be extended through Salem to Vulliappetty, a central village 8 miles beyond Namcul.

19. The whole of the commerce carried on by means of carts, bullocks.

and coolies between the Trichinopoly district and Madras, passes through Vulliaputty, where it enters on the great high road to Arcot by Salem and Vaniembaddy. The traffic in a similar direction of the Madura and Dindigul districts, which now reaches Caroor and thence goes by Salem to Madras, would, it is fair to infer, be drawn towards Vulliaputty when the rail-road is there available, instead of being taken on by the present more direct road; and, now that the bridge across the river between Bawany and Comarapolliem has approached completion, and that the difficulties connected with crossing the Cauvery at that spot will be surmounted, I consider that a large portion of the trade of Coimbatore would also be attracted towards a rail-road through Salem, in preference to being conveyed to the western coast. These are the principal advantages of opening the road in question, which occur to me; any remarks on the minor benefits resulting to the native community, and to the Government of the country by such a system of communications would be trite and superfluous.

20. Opinions as to the line to be selected for laying down the rail-road from Arcot through the northern part of the Salem district to Salem, will probably be divided between the roads down the Topoor and Munjawaddy ghauts. The latter undoubtedly is the more easy line, and the rate of communication on a rail-road will necessary remove all objections on the score of its being a less healthy part of the country than the road through Tripatoor and Darampoory. The Engineering difficulties by the Topoor would be great; but that line to my idea would be the preferable one, on reference to the relative prosperity and condition of the talooks through which it would pass.

SALEM DISTRICT, YATHAPOOR,  
COLLECTOR'S CUTCHERRY,  
30th January, 1851.

I have the honor to be, &c.

(Signed) H. D. PHILLIPS,  
Collector.

To MAJOR T. T. PEARS, C. B.

Engineers,

Madras.

(A true Copy.)

(Signed) T. T. PEARS,

Railway Commissioner.

# Note to Para. 35.

It is intended here to exhibit merely an approximate general Statement of the cost of working the proposed line; to do full justice to the present project it is necessary to consider how greatly the cost of carriage by railways (which have been always hitherto worked with a view to the payment not only of the current expenses, but also of a fair interest on the capital) how greatly this depends upon the original cost of the line; the actual tractive power being obtained at a very small cost. In calculating from data drawn from experience in Europe we have to bear in mind, on the one hand, the higher price here of fuel, and of all European agency; and, on the other, the advantages arising out of a light traffic, and moderate speed, contemplated in the present instance, contrasted with the high pressure (so to speak) under which many of the English lines work. The following table, submitted to the Gauge Commission in 1846, shews the several items which, in six different railways, constituted the entire charge upon each train per mile.

COMPARATIVE working expenses of the Great Western, Birmingham, South Western, Brighton, Leeds, and Paris and Rouen Railways.

|                                             | 1844           | 1844        | 1844           | 1844      | July to Dec. 1844 | 1843 and 1844 1 year. |
|---------------------------------------------|----------------|-------------|----------------|-----------|-------------------|-----------------------|
|                                             | Great Western. | Birmingham. | South Western. | Brighton. | Leeds.            | Paris and Rouen.      |
|                                             | £. d.          | £. d.       | £. d.          | £. d.     | £. d.             | £. d.                 |
| Locomotive.....                             | 0 11·927 0     | 12·728 0    | 13·238 0       | 15·949 0  | 8·460             | 0 16·995              |
| Repairs of Carriages....                    | „ 0            | 1·883 0     | 3·302 0        | 2·702 1   | 3·346             | 0 2·629               |
| Repairs of Waggon....                       | 0 1·476 0      | 0·598 0     | 1·224 0        | 0·432 0   | 0·751             | 0 5·819               |
| Passengers and goods, guards and porters... | 0 6·514 0      | 3·075 0     | 4·477 0        | 3·831 0   | 2·875             | 0 3·111               |
| Police.....                                 | „ 0            | 2·163 0     | 1·475 0        | 2·175 0   | 0·315             | 0 4·469               |
| Direction and management.....               | 0 4·441 0      | 2·827 0     | 3·244 0        | 4·780 0   | 3·005             | 0 4·716               |
| General charges.....                        | 0 3·191 0      | 3·327 0     | 4·944 0        | 6·696 0   | 1·920             | 0 2·079               |
| Depreciation.....                           | 0 3·201 0      | 5·588       | „              | „         | 0 2·079           | „                     |
|                                             | 2 6·750 2      | 8·234 2     | 7·904 3        | 0·565 1   | 8·751             | 3 1·739               |
| Passenger duty.....                         | 0 4·624 0      | 5·137 0     | 4·635 0        | 5·669 0   | 2·043             | 0 3·609               |
| Rates and taxes.....                        | 0 3·790 0      | 3·346 0     | 4·456 0        | 5·934 0   | 3·019             | 0 0·284               |
| Rent, toll, interest, &c....                | 3 3·138 1      | 3·741 0     | 11·129 4       | 6·418 1   | 10·591            | 1 3·303               |
| Maintenance.....                            | 0 7·332 0      | 8·388 0     | 10·712 0       | 7·469 0   | 2·679             | In Locomotive 4 8·935 |
|                                             | 7 1·634 5      | 4·846 5     | 2·836 9        | 2·055 4   | 3·083             |                       |

It will be seen that the charge for locomotive power ranges on the English lines, from 31 to 36 per cent. of the total expenses, exclusive of taxes, duty, &c. On some railways this charge was much lower—falling in one case (the Hartlepool Dock) as low as 5½ pence. That, including maintenance, for the French line appears as high as 15 per cent. When these expenses

come to be divided among the units of work, the cost per unit becomes singularly small as shown upon the same authority below.

STATEMENT of Locomotive expenses per ton per mile (Goods Trains) on various English Railways from Reports submitted to the Gauge Commission in 1846.

| NAMES OF RAILWAYS.              | Cost per Ton per mile. | Average gross Load. | REMARKS. |
|---------------------------------|------------------------|---------------------|----------|
| Manchester and Leeds. ....      | Pence 0·04             | 177                 |          |
| London and South Western. ....  | — 0·10                 | 121                 |          |
| Birmingham and Gloucester. .... | — 0·09                 | 152                 |          |
| Great Western. ....             | — 0·06                 | 265                 |          |
| Grand Junction. ....            | — 0·13                 | 152                 |          |
| London and Birmingham. ....     | — 0·12                 | 162                 |          |

Had I taken the highest of these as the Locomotive charge per ton per mile, and trebled it for the total working expenses, the entire cost of working the proposed line to Wallajahnuggur, with the present estimated traffic would have been  $32,00,000 \times 2$  (for gross load)  $= 64,00,000 \times 0·13 \times 3 = 2,496,000$  pence or Rupees 104,000 instead of Rs. 141,110\*  
 \*157,610—16500=141,110. allowed by my calculations in para. 85.

The total expense ("special charges") involved in the conveyance of 1 ton for 1 mile on the Belgian railways is, according to Belpaire, (0·1d.) one tenth of a penny.

The circumstances under which this railway would be worked, contrasted with those of the railways at home, render it certain that our expenses would be, per train, less than theirs—per unit of work, more.

(Signed) T. T. PEARS.

## I

FROM MAJOR T. T. PEARS,

Engineers.

TO THE CHAIRMAN OF THE  
CHAMBER OF COMMERCE.

Madras.

SIR,

Government has been pleased to appoint me to survey and report upon the lines of railway proposed in this Presidency, and I am at present engaged in the examination of a line proposed between Madras and Arcot, and the consideration of the probable results to be anticipated from the construction of that line. May I request the Chamber of Commerce will favor me with their assistance; and furnish me with such information as it may be in their power to offer upon the following points.

1st—Looking at the effects likely to be produced on the exports and imports of Madras by sea, what are the districts in the Madras Presidency, which stand most in need of improved means of communication with Madras, and from the opening up of which the greatest benefits are likely to accrue?

2d—What are the principal articles of trade likely to be affected by the establishment of railway communication to, or towards such districts? and to what extent might we reasonably expect them to be affected thereby?

3d—What is the present average annual importation by land into Madras of the chief articles of Commerce as cotton, sugar, indigo, betel, grain, oil, timber? and from what district brought? what proportion the land carriage bears to the local market price? for what market chiefly destined? and what the proportion per cent. of the land carriage in this country to the ultimate selling price?

4th—Of the above articles what quantity is believed to pass along the present road from Wallajahnuggur? and from what district that amount is originally brought?

2. The line of railway proposed between Madras and Arcot is to be considered not merely with reference to the country through which it passes, and the towns constituting its proposed termini; but also with a view to the districts beyond likely to be immediately affected by it, and the direction in which it would ultimately be extended.

3. We have to consider, therefore, mainly the province of Mysore, the districts of Bellary, Cuddapah, North Arcot, Salem and Coimbatore; their relative claims in a commercial point of view, and the prospect which they severally hold out of benefitting by the establishment of railway communication with Madras.

4. The information which I have now solicited is that which occurs to me at present as embracing points of primary importance; but I need scarcely observe, that I shall be thankful for any further information it may be in your power to afford me, or that I shall be glad to be favored with the opinion of the Chamber of Commerce generally, upon the subject which I have under consideration.

(Signed) T. T. PEARS,

Railway Commissioner.

RAJAH'S CHOULTRY, }  
4th November, 1850. }

(A true Copy.)

(Signed) T. T. PEARS,

Railway Commissioner.



No. 200, NORTH ARCOT,

COLLECTOR'S CUTCHERRY, CHITTOOR, 20th December, 1850.

FROM J. D. BOURDILLON, Esq.

*Collector of North Arcot.*

TO MAJOR T. T. PEARS, C. B.

*Engineers.**Madras.*

SIR,

Para. 1. I have the honor to acknowledge your letter of the 19th November, asking for some further information on the subject of the production and price of sugar and salt, with reference to the proposal of a railway from Madras to Palmanair.

2. In my letter of the 12th November, I stated the quantity of sugar taken from this district for export by sea in Fusly 1259; I now give you in the margin a statement of the quantity similarly exported in each of the five years since Fusly 1255 inclusive; the trade appears to have commenced a few years previously, but the particulars of the first two or three years are missing,

|                 |          |
|-----------------|----------|
|                 | Maunds.  |
| Fusly 1255..... | 4,31,641 |
| " 1256.....     | 3,64,944 |
| " 1257.....     | 1,15,462 |
| " 1258.....     | 1,89,978 |
| " 1259.....     | 3,59,702 |

\* No. 1.

I enclose a statement\* of the whole extent of sugar cane cultivation for all purposes, consumption as well as export, for the 15 years—Fusly 1246 to Fusly 1259, with the exception of Fusly 1255, the accounts of which are not forthcoming.

3. You will perceive that the production of sugar for export by sea is of very recent origin in this district; the act under which the export takes place, passed in 1839 (Act XV;) and I believe certificates were first given in this district in 1841 or 1842. In Fusly 1255 (1845-46) the trade was at its maximum; it had perhaps been pushed too far for the capital engaged in it; and the commercial crisis in England in 1846, the consequent fall in the price of sugar, and the simultaneous rise in freight (caused by the unusual demand for shipping to convey corn) gave it a shock which it has not recovered. You will see in the statement (No. 1) of cultivation, that the extent of Government land occupied with cane has nearly doubled during the last fifteen years, the increase being probably due in great part to the demand for export to Europe. I have no returns for the Zemindary and Enam lands except for the last Fusly 1259, but it seems likely that the increase there has been concurrent with that in the Government lands. I am aware of no obstacle to the continued extension of the cultivation of cane much further; and I have no hesitation in stating my conviction that the export of sugar is a branch of trade capable of

very large extension, in various parts of this district; the requisite condition being that the price in England shall be steadily such, with reference to the cost at the place of export, as to enable the merchants to give a liberal price to the grower.

4. One item in that cost is the carriage to the coast, but it is not a very important one. The mere carriage hire for a ton of sugar from Palmanair to Madras is about 15 Rupees, or  $\frac{1}{4}$  Rupee a hundred weight. Taking the average price in the English market of the qualities brought from Palmanair at 35 shillings, this would be about 2 per cent. of the ultimate price. Assuming that this cost might be reduced to one-fourth by a railway, the saving would amount to  $1\frac{1}{2}$  per cent. on the final price. This does not appear much, but the proportion of the saving to the net profit of the exporter would be much more considerable, and I cannot but think that the diminution of charge, small as it appears in comparison with the whole price of the commodity, would not be without considerable effect as an encouragement of the trade.

5. Nor would the mere pecuniary saving be all; much, perhaps, more than that would be gained in speed and safety to the commodity. As to speed, the ordinary time by a bandy in fine weather is about ten days from Palmanair to Madras; and I was told lately by a gentleman extensively engaged in the trade, that a number of bandies with sugar belonging to him had been out thirty days and still had not reached the Poonnay river, being delayed by bad roads and swollen streams. As to the safe carriage of the sugar; it is no very uncommon sight to see sugar bandies upset or broken down, and the load scattered about the road, or piled up, till the bandy can be repaired; and in bad weather the contents of a bandy, independently of accidents, must always be somewhat exposed; on the whole, therefore, I cannot but think that a railway would be of material assistance to this branch of trade.

6. With respect to salt, I enclose a statement\* of the average retail price at each talook Cusbah of the district, for the five Fusly years 1255 to 1259; these prices are

\* No. 2.  
taken from the usual monthly returns received from the talooks; I will not vouch for their truth, but with the exception of Sholinghur and Penamerray, they seem to vary pretty nearly with the distance from the coast; and that is an argument in their favour. The wholesale prices are given for the two towns of Vellore and Arnee, from which only they are received. I am unable to explain the variations in price from year to year; and there are some inconsistencies between the several talooks, which I am unable to reconcile on the assumption of their being all correct; I regret that I have no materials whatever for estimating the actual consumption of salt in this district. If the Rowanah system were strictly enforced, the Rowanahs of salt taken for con-

sumption within it would afford some criterion; but, under the present lax practice, an appeal to them would only mislead.

7. Some idea may be formed, however, as to the cost of a wholesome quantity of salt. In England the annual consumption is variously reckoned at from 16 pounds for each adult, to 22 pounds a head; and the common food of this country being almost exclusively vegetable.

Maculloch's Commercial Dictionary and the Penny Cyclopaedia.

a large quantity is required, but I will suppose 20 pounds to each person. I find that the retail price of salt in the Chittoor bazars, amounts after the separation of the dirt, to nearly 3 pounds for one Anna; twenty pounds would therefore cost about seven Annas. In out-villages it would be more, and in parts nearer the coast it would be less. This does not seem an amount of much moment in the course of the year, but it must be remembered that the

wages of common agricultural labour do not exceed, at the out side 20 Rupees\* a year; and the salt of an average family at the allowance above given, costing probably two Rupees a year, would obviously bear an excessively large proportion to the earnings of the family; I cannot but think, therefore, that the present price must greatly operate to limit consumption.

8. But, fortunately, some insight into the truth may be gained by looking at the actual results of a large reduction in the price in our own country. In England from 1805 to 1823 there was an excise duty of 15 shillings a bushel on salt used for domestic purposes; in 1823 this was reduced to 2 shillings, and in 1825 it was abolished. During the existence of the high duty the retail price of salt was 4½d. a pound, it is now something under ½d.

and the following was the result. In the eight years from 1810 to 1817, the average consumption of salt, according to the excise accounts, was 19,18,598; from 1827 to 1834 inclusive, the average was 10,358,002 or above five-fold increase;

and deducting one-fifth of the whole, for the increase of population in the interval between 1814 and 1831, the consumption per head in the later period, may be taken at four times what it was in the earlier.

9. Nominally the present price at Chittoor is equal to the present price in England, but compared with the price of labour, it is higher than the price was there under the high duty. For, taking the ordinary wages of common field labour in this country at 20 Rupees a year, I find that the price of 16 pounds of salt equals one 64th of a labourers annual wages; and taking 28£ as the earnings of an ordinary agricultural labourer in England, (and this is no more than fair including the harvest month,) the price of 16 pounds of salt

in England is equal to one 840th part of such annual earnings; so that the price in India is in effect about thirteen times as high as it now is in England. The price, therefore, must be regarded as very high; and, bearing in mind that prior to the reduction of the duty the price in England was in effect already lower than it now is here, I think I am fully justified in anticipating a large increase of consumption in India also, from any material reduction of price.

10. The foregoing remarks have reference primarily to a district like that of North Arcot, which is near the sea, and most parts of which are accessible by roads, bad as they are; but they have much more force when applied to some other tracts. In the western parts of the Mysore country, as I have been recently informed by a gentleman who has very good opportunities of knowing, sea salt is an article almost unknown; earth salt being substituted, or the use of the condiment being more or less dispensed with. In Bellary also, the use of sea salt is extremely limited, earth salt being made and used in large quantities; and probably Salem and Coimbatore are similarly circumstanced. Yet sea salt is universally allowed to be a far superior article; and there appears no doubt that if offered at a moderate price, it would quite supersede earth salt.

11. It may be objected, perhaps, to any inferences drawn from the increased consumption in England, that it has resulted in great part from the increased use of salt in manufactures and in agriculture, to which it is not likely to be applied in India. But, in the first place, it is obvious that there is a great vacuum in the ordinary domestic consumption of the country, which has yet to be filled; and 2dly, such reasoning is rash; no man can say beforehand what benefits will not result from such a reduction of duty, or to what new uses an article so much reduced in price will not be put. How often have even the advocates of improvements been themselves surprised to see the beneficial effects of enlightened fiscal legislation displaying themselves not only in a degree much greater than even they had anticipated, but in totally new and different directions. Among other uses to which salt might probably be put, if cheap, I think it very likely that it would be largely given to cattle.

12. There is yet another aspect in which this subject may be regarded, viz., in connection with the influence of smuggling on the revenue, I will not venture a conjecture as to the proportion borne by the smuggled salt to that which pays revenue; but I am satisfied from observation that it is large, and

NOTE, viz.—According to the price paid for it to the ryot, at the different pangs.

it would contradict all experience to suppose that it was otherwise, even in so bulky a commodity, when the Government tax amounts to from 600 to 1,200 per cent. on the cost of production. A material reduction in price would bring the whole or the greater part of this smuggled salt to pay revenue.

13. In the foregoing remarks, I have had in mind a material reduction

| Fuslies.  | R.   | A. | P. |
|-----------|------|----|----|
| 1250..... | 184  | 8  | 0  |
| 1251..... | 178  | 1  | 5  |
| 1252..... | 184  | 8  | 0  |
| 1253..... | 182  | 13 | 1  |
| 1254..... | 196  | 14 | 9  |
| 1255..... | 185  | 0  | 11 |
| 1256..... | 220  | 8  | 8  |
| 1257..... | 196  | 11 | 11 |
| 1258..... | 175  | 12 | 11 |
| 1259..... | 169  | 12 | 3  |
| Total..   | 1874 | 11 | 11 |

\* NOTE, viz.—120 Indian maunds of 80 pounds each.

in the tax on salt and perhaps the abolition of the monopoly, and the imposition of an excise duty; I will now come to the subject more immediately in hand. The question is, what part of the supposed good effects of a reduction in the price of salt, would be secured by a railway from Madras to Palmanair. I give in the margin the retail prices of a garce of salt at Palmanair, (Cuddapanuttum talook) in the last ten years; the average is 187½ Rupees, of which 120 Rupees must be taken as the cost price on the coast. A garce of salt weighs 9,600\* pounds, and I am told that the ordinary load for a bandy is 40 marcals or 960 pounds, so that a garce would require ten bandies. Taking the full hire of a bandy from the coast to Palmanair at 6 Rupees, the transport of a garce would cost 60 Rupees, leaving on the average only 7½ Rupees for profit to the dealers, which is obviously too little. I cannot but think, however, that the cost of the conveyance of salt to Palmanair, depends much on the prosperity of the sugar trade; and I cannot but ascribe the material fall of price there in Fuslies 1258 and 1259, (larger as it was than in other parts of the district) in great part to the greater number of return sugar bandies, which will often bring a load for half hire. If this is the case, the cost of the carriage of salt must not be calculated at the full bandy rate; I will assume the actual cost of the transport of a garce to Palmanair at only 40 Rupees on an average; and supposing that a railway would reduce it to 15 Rupees (being the fourth of full bandy hire) the reduction in the price of a garce of salt would be 25 Rupees or from 187½ to 162½ Rupees, being 13½ per cent. I think it cannot be doubted that a permanent reduction of price to even this amount would cause increased consumption; but I do not think it would be reasonable to expect any very marked increase, or the application of salt to other than its present uses. In this case also, as in that of sugar, the increased speed and security of a railway would be a benefit independently of the direct saving of expense.

NORTH ARCOT;  
COLLECTOR'S CUTCHERRY,  
CHITTOOR, 20th December, 1850.

To MAJOR T. T. PEARS, c. b.

Engineers.

(A true copy.)

(Signed) T. T. PEARS,

Railway Commissioner.

No. 1.

MEMO. of the extent of Sugar Cane Cultivation in North Arcot District, from Fusly 1245 to 1259 inclusive.

| Fuslies. | Poonjah.  | Nunjah. | Total.    | Total. | REMARKS. |     |      |     |
|----------|-----------|---------|-----------|--------|----------|-----|------|-----|
|          | Caw-nies. | As.     | Caw-nies. | As.    |          |     |      |     |
| 1245     | 18        | 3½      | 860       | 14½    | 2        | 7½  | 881  | 9½  |
| 1246     | 31        | 2       | 865       | 1½     | 3        | 2   | 899  | 5½  |
| 1247     | 21        | 4       | 930       | 12½    | 3        | 15½ | 956  | 0   |
| 1248     | 47        | 3½      | 1013      | 7½     | 4        | 10½ | 1065 | 5½  |
| 1249     | 23        | 7       | 975       | 4½     | 2        | 13½ | 1001 | 8½  |
| 1250     | 35        | 14½     | 920       | 1½     | 6        | 3½  | 962  | 4½  |
| 1251     | 20        | 4½      | 1100      | 15½    | 3        | 8   | 1124 | 12½ |
| 1252     | 63        | 1½      | 1511      | ½      | 2        | 15½ | 1577 | 1½  |
| 1253     | 69        | 8½      | 1606      | 8½     | 6        | 9½  | 1682 | 10½ |
| 1254     | 190       | 14      | 2135      | 7½     | 7        | 11½ | 2334 | 1½  |
| 1255     |           |         |           |        |          |     |      |     |
| 1256     | 114       | 4½      | 2186      | 15     | 7        | 6½  | 2308 | 10½ |
| 1257     | 123       | 12      | 1965      | 13½    | 4        | 2½  | 2093 | 12½ |
| 1258     | 118       | 3½      | 1350      | 3      | 6        | 5½  | 1474 | 11½ |
| 1259     | 91        | 2       | 1462      | 11½    | 5        | 6½  | 1559 | 3½  |

The accounts for Fusly 1255 are not forthcoming.

The accounts for Fusly 1255 are not forthcoming.

NOTE—The above refers to Government lands only; there is no record of the cultivation in Zemindary Palliam, Enam, &c., lands, except for Fusly 1259, in which year it was 1198 cawnies. It is probable that this also has been much increased during the last fifteen years, as is the case in the Government lands.

(Signed) J. D. BOURDILLON, Collector.

NORTH ARCOT;  
COLLECTOR'S CUTCHERRY,  
CHITTOOR, 20th December, 1850.

(A true copy.)

(Signed) T. T. PEARS,  
Railway Commissioner.

## I

STATEMENT shewing the average retail price of Salt at the undermentioned places in the District of North Arcot, from Fusly 1255 to Fusly 1259 inclusive, and the probable cost of carriage from Madras in each case.

| NAMES OF PLACES.           | Average Retail price per garce. |    |    | Deduct Depôt price and profit. |    |    | Distance from Madras. |      | Rate per Ton per Mile. |    |    |
|----------------------------|---------------------------------|----|----|--------------------------------|----|----|-----------------------|------|------------------------|----|----|
|                            | Rups.                           | A. | P. | Rups.                          | A. | P. | Miles.                | Fur. | Rups.                  | A. | P. |
| Chittoor.....              | 171                             | 13 | 8  | 35                             | 0  | 0  | 98                    | 0    | 0                      | 1  | 3  |
| Tirputty.....              | 169                             | 10 | 9  | 33                             | 0  | 0  | 84                    | 2    | 0                      | 1  | 5  |
| Caverypauk.....            | 155                             | 14 | 2  | 30                             | 0  | 0  | 68                    | 0    | 0                      | 1  | 7  |
| Sholinghur.....            | 174                             | 9  | 3  | 37                             | 0  | 0  | 65                    | 4    | 0                      | 2  | 1  |
| Tirvalum.....              | 163                             | 7  | 6  | 27                             | 0  | 0  | 75                    | 0    | 0                      | 1  | 3  |
| Satghur.....               | 160                             | 5  | 0  | 24                             | 0  | 0  | 107                   | 5    | 0                      | 0  | 9  |
| Caddapa Nuttum.....        | 189                             | 9  | 4  | 51                             | 0  | 0  | 124                   | 2    | 0                      | 1  | 5  |
| Arcot.....                 | 153                             | 11 | 9  | 18                             | 0  | 0  | 70                    | 0    | 0                      | 0  | 11 |
| Vellore.....               | 163                             | 3  | 2  | 27                             | 0  | 0  | 84                    | 0    | 0                      | 1  | 2  |
| Tirvatoor.....             | 157                             | 0  | 9  | 22                             | 0  | 0  | 75                    | 0    | 0                      | 1  | 1  |
| Polloor.....               | 162                             | 15 | 7  | 26                             | 0  | 0  | 102                   | 0    | 0                      | 0  | 11 |
| Wandiwash.....             | 153                             | 10 | 2  | 18                             | 0  | 0  | 70                    | 0    | 0                      | 0  | 11 |
| Sutward.....               | 128                             | 0  | 0  | 0                              | 0  | 0  | 50                    | 0    | 0                      | 0  | 0  |
| Penamernay.....            | 200                             | 11 | 10 | 60                             | 0  | 0  | 113                   | 0    | 0                      | 1  | 11 |
| Vencutaggherry Cottah..... | 203                             | 5  | 0  | 63                             | 0  | 0  | 154                   | 0    | 0                      | 2  | 1  |
| Arnee Jaghire.....         | 162                             | 13 | 5  | 26                             | 0  | 0  | 81                    | 5    | 0                      | 1  | 2  |

Average cost of Carriage .. 0 1 3

(Signed) T. T. PEARS,  
Railway Commissioner.

STATEMENT shewing the extent to which the cost of Carriage, as well as the market value, of some of the chief Articles of commerce would be affected by the Railway to Wallajahmuggur.

| NAMES OF ARTICLES. | From whence Derived. | Total saving per ton by Railway. | Per cent on present cost of Carriage. | Per cent on present market value at Madras. | REMARKS.                                                                                                                                                                         |
|--------------------|----------------------|----------------------------------|---------------------------------------|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cotton.....        | Cuddapah             | Rs. 3                            | 16 per cent.                          | 1-2                                         | One Ton valued at Rs. 3,200.<br>Do. at Rs. 30.<br>Do. at Rs. 45.<br>Do. at Rs. 330.<br>Do. at Rs. 200.<br>Do. at Rs. 25.<br>Do. at Rs. 35.<br>Do. at Rs. 200.<br>Do. at Rs. 180. |
|                    | Bellary              |                                  | 8 "                                   |                                             |                                                                                                                                                                                  |
|                    | North Arcot          |                                  | 32 "                                  |                                             |                                                                                                                                                                                  |
|                    | Coimbatore           |                                  | 9 "                                   |                                             |                                                                                                                                                                                  |
| Indigo... ..       | Salem                | Rs. 3                            | 15 "                                  | 0-1                                         |                                                                                                                                                                                  |
|                    | Cuddapah             |                                  | 16 "                                  |                                             |                                                                                                                                                                                  |
|                    | North Arcot          |                                  | 32 "                                  |                                             |                                                                                                                                                                                  |
|                    | Salem                |                                  | 15 "                                  |                                             |                                                                                                                                                                                  |
| Grain... ..        | Bellary              | Rs. 3                            | 8 "                                   | 11                                          |                                                                                                                                                                                  |
|                    | Cuddapah             |                                  | 16 "                                  |                                             |                                                                                                                                                                                  |
|                    | North Arcot          |                                  | 32 "                                  |                                             |                                                                                                                                                                                  |
|                    | Salem                |                                  | 15 "                                  |                                             |                                                                                                                                                                                  |
| Rice.....          | Bellary              | Rs. 3                            | 8 "                                   | 7-8                                         |                                                                                                                                                                                  |
|                    | Cuddapah             |                                  | 16 "                                  |                                             |                                                                                                                                                                                  |
|                    | North Arcot          |                                  | 32 "                                  |                                             |                                                                                                                                                                                  |
|                    | Salem                |                                  | 15 "                                  |                                             |                                                                                                                                                                                  |
| Ghee... ..         | Cuddapah             | Rs. 3                            | 16 "                                  | 1 per cent.                                 |                                                                                                                                                                                  |
|                    | Salem                |                                  | 15 "                                  |                                             |                                                                                                                                                                                  |
| Oils.....          | Salem                | Rs. 3                            | 15 "                                  | 1-6                                         |                                                                                                                                                                                  |
| Redwood.....       | Salem                | Rs. 3                            | 15 "                                  | 14                                          |                                                                                                                                                                                  |
| Tamarind. ..       | Cuddapah             | Rs. 3                            | 16 "                                  | 9                                           |                                                                                                                                                                                  |
|                    | Salem                |                                  | 15 "                                  |                                             |                                                                                                                                                                                  |
|                    | North Arcot          |                                  | 32 "                                  |                                             |                                                                                                                                                                                  |
|                    | Palmanair            |                                  | 22 "                                  |                                             |                                                                                                                                                                                  |
| Sugar... ..        | Cuddapah             | Rs. 3                            | 16 "                                  | 1-6                                         |                                                                                                                                                                                  |
|                    | Salem                |                                  | 15 "                                  |                                             |                                                                                                                                                                                  |
| Saltpetre... ..    | Coimbatore           | Rs. 3                            | 9 "                                   | 1-8                                         |                                                                                                                                                                                  |
|                    | Salem                |                                  | 15 "                                  |                                             |                                                                                                                                                                                  |

(Signed) T. T. PEARS,  
Railway Commissioner.

## IV

No. 340, NORTH ARCOT;  
COLLECTOR'S CUTCHERRY, CHITTOOR, 12th November, 1850.  
FROM J. D. BOURDILLON, Esq.

Collector of North Arcot.

TO MAJOR T. T. PEARS, C. B.

Engineers.

SIR,

Para. 1. I have the honor to acknowledge your letter of the 22d Octo-

ber, requesting information on certain points connected with the statistics of this district, with reference to the proposed railway from Madras towards Bangalore. I enclose a statement (No. 1) giving the information required respecting the names, situations, and population of the chief towns, and their distance from Madras, and some other particulars.

2. The district is chiefly agricultural, and its agriculture is for the most part confined to articles of country consumption, by which I mean grain, chiefly paddy, tamarind, chillies, &c. There are a number of large towns in it which go far to consume this produce, but a considerable quantity goes from the eastern parts to Madras, and some from the south eastern, even to Pondicherry. Indigo has long been grown, and made in this district to a limited extent, and the manufacture shows no tendency to material increase. For the most part this is manufactured according to the European system, and the greater part of the produce is taken to Madras. Of late years the growth of the sugar cane has very much increased, with the view to exportation; the talooks where this product is most general are Cuddapanuttum, Vencatagerry Cottah, and Congoondy, (the talooks above the ghauts,) Chittoor, and Arcot. The quantity of sugar carried to Madras for export in the Fusly year 1259, 1849-50, was 3,59,712 maunds; and the quantity of Rum passed out of the district in the same period was 9,686 gallons, chiefly to Madras; large quantities of fire-wood are also taken to Madras from the Sutwaid talook and parts of the Calustry and Cauvetnugger Zemindaries, part of this enters Madras by the Northern road, part by country roads, and part by the Cochrane Canal.

3. Of the towns of the district some of the most populous, as Arcot, Ranipett, Vellore, Tripetty, cultivate no special branch of industry, and owe their growth not to trade, or manufactures, but to their being, from various causes, favourite places of residence to certain classes having income to spend; such places, are not without the common manufactures necessary to the convenience of their own population, but they consume more than they produce, and have few or no exportable commodities; other towns are principally places of business, and of these the chief are Wallajahpett and Amboor. The former has long been a large emporium for the trade between the coast and the interior, and also possesses an extensive manufacture of chintz, much of which is, I believe, exported to the eastward; a good deal of cloth is also woven there. Amboor is a place of very active trade, it is inhabited by a number of wealthy and enterprising merchants of the lubbay class, who collect the country produce, sugar, ghee, chillies, &c. and transport it to Madras. It also contains manufactures of indigo. Trivatoor and Arnee may also be mentioned as manufacturing cloths extensively.

4. With respect to the situation of the various towns and their communication with Madras; Wallajahpett, Ranipett, Arcot, Vellore, Goriatum, Trivullum, and Amboor, are all either on the high western road or within a few miles of it, and that is of course their line of road to the coast. I need say nothing of its condition, which must be well known to you; though much abused, and certainly extremely bad compared with any high road in Europe, it is infinitely better than the common country roads. Arnee, Poloor, Trivatoor, and Wandiwash, also communicate with Madras by the high western; the two former coming into it at Arcot, the two latter near Conjevaram. As to the central and western parts of the district, Chittoor, Penameray, Cuddapanuttum and Vencatgherry-cottah, the traffic from these parts also falls into the high western road at Ranipett or Wallajahpett; the route by Sholinghur would be shorter, but being in a very bad state it is little used. The northern and north eastern talooks, Tripetty, Colastry, Cavetnugger, and Sutwaid, communicate with the Presidency principally by the Cuddapah road, and partly by the northern road. I will only add here that the roads by which the high western road is reached, are universally extremely bad, so as to offer a very serious impediment to traffic; the same is true of the Cuddapah road.

5. With respect to the amount of traffic on the various roads, I have some tables which were taken last year for the Damulchervoo, Nuggery and Naicknairy passes; these I enclose; I will not offer an opinion as to the amount of credit to which they are entitled, though it was my endeavour to have them accurately taken. I will cause similar returns to be prepared for the Moogly pass and the Arcot road at Poonnay. There are no other passes either possessing much traffic, or offering facilities for it; the Naicknairy pass indeed is now in such a state as to be almost impassable for wheel conveyances, and its natural defects as a road are so great that it has been thought inexpedient to repair it. Even the sugar from Vencatgherry-cottah and from Congoondy is sent to Madras by Palmanair, Chittoor and Wallajahpett, over very bad roads, to avoid that pass.

6. As to the increase in the population of Wallajahpett and Arcot, (by which latter you probably intend Ranipett) I regret that I can afford you no precise information; as my records contain no authentic or trustworthy accounts of the population at former periods. There is no doubt, however, that both Ranipett and Vellore have been very much extended during the last twenty years, and I have no doubt that the population of Wallajahpett also has increased within the same period.

7. I entertain no doubt that a railway passing through this district from Madras would be a great benefit to it; by cheapening transport and so increasing the value of its products. But to give full effect to this improvement it

would be absolutely necessary at the same time to improve the branch roads by which commodities would reach the railway; at present some of the chief arteries of the district are so bad as to be barely passable for wheel conveyances, I may mention, especially, the roads from Chittoor to Arcot, and to Vellore, and from Tripetty to Chittoor. If these branch lines continue in their present condition, the advantages of a railway would be very much restricted.

I have the honor to be, &c.,

(Signed) J. D. BOURDILLON,  
Collector.

NORTH ARCOT;  
COLLECTOR'S CUTCHERRY,  
CHITTOOR, 12th November, 1850. }

To  
MAJOR T. T. PEARS, C. B.  
Engineers.

(A true Copy.)

(Signed) T. T. PEARS,  
Railway Commissioner

Statement shewing the Names, Situation and Population

| Talook.                       | Towns.                    | Situation of the Towns.                                                                                   | Population of the Towns. |  |
|-------------------------------|---------------------------|-----------------------------------------------------------------------------------------------------------|--------------------------|--|
| 1                             | 2                         | 3                                                                                                         | 4                        |  |
| Chittoor.....                 | Chittoor.....             | Twenty-two miles north of Vellore                                                                         | 9,383                    |  |
| Tripatty .....                | Tripatty.....             | Forty-four miles north of Madras ; and about 10 miles from the high road between Madras and Cuddapah..... | 8,996                    |  |
| Cavertypauk .....             | Wallajapett.....          | West of Madras and on the great western road.....                                                         | 20,000                   |  |
| Ditto .....                   | Raneepett.....            | Do. do.....                                                                                               | 18,000                   |  |
| Sholinghur.....               | Sholinghur.....           | West of Madras and 10 miles north of the great western road.....                                          | 4,000                    |  |
| Tirvulum.....                 | Tirvulum.....             | West of Madras and 4 miles north of the Palar river and of the great western road.....                    | 1,357                    |  |
| Satghur.....                  | Goriatum.....             | Do. do.....                                                                                               | 10,788                   |  |
| Cuddapanuthum.....            | Palmanair.....            | Twenty-six miles west of Chittoor, and at the top of the Moogly Ghaut.....                                | 2,201                    |  |
| Arcot.....                    | Arcot.....                | West of Madras, and south of the Palar river, and the great western road.....                             | 16,000                   |  |
| Vellore.....                  | Vellore.....              | West of Madras on the great western road.....                                                             | 1,20,000                 |  |
| Ditto.....                    | Amboor.....               | Ditto.....                                                                                                | 11,000                   |  |
| Trivattoor.....               | Trivattoor.....           | South-west of Madras, and 20 miles south of the great western road.....                                   | 6,000                    |  |
| Poloor.....                   | Poloor.....               | Ditto.....                                                                                                | 4,000                    |  |
| Arnee Jaghire.....            | Arnee.....                | Ditto.....                                                                                                | 16,000                   |  |
| Wandiwash.....                | Wandiwash.....            | Ditto.....                                                                                                | 3,000                    |  |
| Sutwaid.....                  | Nagalapoorum.....         | North-west of Madras.....                                                                                 | 1,880                    |  |
| Penamurray .....              | Penamurray.....           | Fifteen miles north of Chittoor.                                                                          | 1,428                    |  |
| Vencatagherry Cottah.....     | Vencatagherry Cottah..... | West of Madras and above the Ghauts.....                                                                  | 500                      |  |
| Cavateenuggur Zemin-dary..... | Narnavanum.....           | West of Madras.....                                                                                       | 6,000                    |  |
| Ditto.....                    | Tritany.....              | Ditto.....                                                                                                | 6,000                    |  |
| Calastry Zemindary.....       | Calastry.....             | North-west of Madras.....                                                                                 | 7,000                    |  |

NOTE—The population, as given in this Statement, must

NORTH ARCOT; COLLECTOR'S CUTCHERRY,  
CHITTOOR, 12th November, 1850.

of the chief Towns in the District of North Arcot.

| Remarks as to the nature of the roads to Madras.                                                | Chief Produce of the Towns.                                            | Principal Market to which taken.                        | Remarks. |
|-------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------|----------|
| 6                                                                                               | 7                                                                      | 8                                                       | 9        |
| The road from Chittoor to Raneepett is extremely bad; thence on the high western road           | Grain, tamarind, jaggery, sugar, chillies, tobacco and cloths.         | Vellore, Arcot, Wallajah-nuggur and Madras.             |          |
| In a very bad state.                                                                            | Grain, tamarind and cloths.                                            | None.                                                   |          |
| In good order.                                                                                  | Grain, indigo, chintz and different sorts of cloths.                   | Madras.                                                 |          |
| Ditto.                                                                                          | None.                                                                  | None.                                                   |          |
| The road to Madras is in very bad order.                                                        | Grain, indigo and cloths.                                              | Wallajahnuggur, Arcot and Madras.                       |          |
| The road from Tirvullum to Arcot is pretty good; the remainder is the great western road.       | Grain, indigo, chillies, tamarind and cloths.                          | Vellore, Arcot, Wallajah-nuggur and Madras.             |          |
| The road from Goriatum to Pullicondah is bad; the remainder is the great western road.          | Grain, indigo, cloths, tamarind, chillies, tobacco, jaggery and sugar. | Vellore, Arcot, Wallajah-nuggur and Madras.             |          |
| From Palmanair to Chittoor is in tolerable order.                                               | Grain, tamarind, jaggery, sugar, rum and cumblies.                     | Chittoor, Raneepett, Vellore and Madras.                |          |
| The great western road.                                                                         | Grain, sugar, indigo, chintz and cloths.                               | Wallajahnuggur, Raneepett and Madras.                   |          |
| Ditto.                                                                                          | Grain, cloths, tamarind and indigo.                                    | The towns of Vellore, Arcot, Wallajahnuggur and Madras. |          |
| Ditto.                                                                                          | Grain.                                                                 | Vellore, Arcot, Wallajahnuggur and Madras.              |          |
| The road as far as Roynjee Choultry is bad; the rest is the great western.                      | Grain, indigo and cloths.                                              | Conjevaram and Madras.                                  |          |
| Ditto.                                                                                          | Grain and cloths.                                                      | Conjevaram, Vellore, Arnee and Madras.                  |          |
| Ditto.                                                                                          | Grain, indigo and cloths.                                              | Conjevaram, Wallajahbad and Madras.                     |          |
| Ditto.                                                                                          | Grain and cloths.                                                      | Conjevaram and Madras.                                  |          |
| A common country road.                                                                          | Grain and cloths.                                                      | Razanagaram & Trevalloor.                               |          |
| The road to Chittoor very bad; thence as above.                                                 | Grain, chillies, tamarind, jaggery and sugar.                          | Arcot, Chittoor, Wallajapet and Madras.                 |          |
| To Palmanair (26 miles) very bad; thence as above.                                              | Grain, tamarind, jaggery and sugar.                                    | Chittoor, Arcot, Wallajapet and Madras.                 |          |
| NOTE—The direct road by the Naick-nairy pass is 136 miles, but that Pass is too bad to be used. |                                                                        |                                                         |          |
| The high road between Madras and Cuddapah in bad order.                                         | Grain and cloths.                                                      | None.                                                   |          |
| A country road in bad order.                                                                    | Grain.                                                                 | None.                                                   |          |
| Ditto.                                                                                          | Grain and cloths.                                                      | None.                                                   |          |

only be taken as an approximation to the fact.

(Signed) J. D. BOURDILLON,  
Collector.

P

Note to para. 30.

This calculation is not strictly correct. The "profits" alone, arising from the conveyance of mails and troops, should have been taken into account in this place. We cannot calculate, however, with any approach to accuracy, the expense attending their conveyance, as this depends so very greatly on the number of other passengers. With sufficient passenger traffic to load a train each way every day, the conveyance of mails would cost almost nothing; with no passengers, or only a few, the mails could only be conveyed daily at a very high charge. Under any circumstances, a special grant would probably be made by Government on their account.

(Signed) T. T. PEARS.

No. 298—1850.

PALGHAUT, 16th November, 1850.

FROM W. ROBINSON, Esq.

Head Assistant Collector.

To H. V. CONOLLY, Esq.

Collector of Malabar.

SIR,

With reference to the papers noted marginally, I have the honor to give

From the Collector of Malabar dated 31st October 1850, No. 1876, and enclosure.

cover to a return I have had taken of the traffic on the principal roads leading through the Palghaut gap, viz. On the trunk road No. 5, to and from Salem, Coimbatore, the northern talooks of the district of Coimbatore, and the Neilgherry Hills.

2dly. By the lower road to and from Tinnevelly, Madura, Dindigul, and the southern talooks of the district of Coimbatore via Palny, Udumalá Kuttá, Pulachy, Colinjamparra and Yellapully, and joining the trunk road in the neighbourhood of Palghaut.

2. These are the only roads on which any thing of a brisk bandy traffic is maintained, and the only two lines as yet used by merchants and others from a distance.

3. The returns are taken on both for a few weeks last year only, but they afford data from which a guess may be made at the probable traffic, and they are, as far as they go, very perfect for both roads.

4. Its natural peculiarity indicates the Palghaut gap as the proper passage for any great line of traffic joining the east and west coasts of the Peninsula, whether it be by a line of rail, or good continuous road; and as such, this natural passage is now, and is becoming every year, more important and more thronged. The bulk of the traffic from this district itself, and from the

Statement of the quantity of salt supplied to the undermentioned Districts in Fyuly 1259.

|                  | North Arcot. | Salem. | Coimbatore. | Cuddapah. | Bellary. | Bangalore. | Mysore. |
|------------------|--------------|--------|-------------|-----------|----------|------------|---------|
| Madras.....      | 208          | 31     | 3           | 14        | 1        | 276        | 1,667   |
| North Arcot..... | 0            | 0      | 0           | 96        | 12       | 0          | 20      |
| Tinnevelly.....  | 0            | 0      | 37          | 0         | 0        | 0          | 0       |
| Madura.....      | 0            | 45     | 510         | 0         | 0        | 0          | 0       |
| Tanjore.....     | 0            | 195    | 274         | 0         | 0        | 0          | 0       |
| South Arcot..... | 6            | 719    | 327         | 0         | 0        | 0          | 236     |
| Chingleput.....  | 144          | 325    | 88          | 162       | 25       | 0          | 1,506   |
| Nellore.....     | 211          | 0      | 0           | 505       | 446      | 0          | 0       |
| Guntoor.....     | 0            | 0      | 0           | 0         | 0        | 0          | 0       |
| Malabar.....     | 570          | 1,315  | 1,239       | 777       | 484      | 276        | 3,429   |
| Canara.....      | 0            | 0      | 374         | 0         | 0        | 0          | 436     |
|                  |              |        | 0           | 0         | 0        | 0          | 1,383   |
|                  |              |        | 374         |           |          |            | 1,619   |
|                  |              |        | 1,613       |           |          |            | 5,248   |

Note.—The supplies from the Northern Circars are not given for this year, but of these Guntoor alone, judging from former years, appears to supply any of the above districts, and that to a very small extent.

(Signed) T. T. PEARS,  
Railway Commissioner.

seaward, (Bombay, &c.) with the interior of this side of India, now passes up the Palghaut gap, and probably most of the exports from the interior districts, east of the ghauts towards Bombay and the west coast, finds its way to Palghaut, and thence for embarkation to the coast at Calicut, Ponany, or Cochin. Many Bombay and Coast merchants have agents at Palghaut, purchasing and transmitting produce from the interior. The business done here in piece goods alone from Tinnevely and Madura is estimated at upwards of two lacs of Rupees a year, while the whole of the cotton wool grown in Coimbatore, &c. comes this way for shipment.

5. It is, however, in its being an outlet from the interior of this side of India towards the west coast and vice versa, chiefly, that the importance of the Palghaut gap does now, and is likely still to, consist.

6. The advantage, if any, of joining Madras and such districts as those of Arcot, Salem, &c., directly with this district, or with the west coast, must be of a very general nature; and for any great outlay on such a project, I think

NOTE—There is still some trade in coarse piece goods from Salem for local and domestic consumption of Malabar.

the return, present or prospective, doubtful. At present there is little or no direct communication between Malabar and Madras, or between Malabar and the western coast generally, (Bombay, &c.) and those towns and districts lying beyond the Cavery and Salem. The trade of those districts seeks the east coast, and the countries on the Cavery make use probably of that river.

7. My impression is, that for the commerce of this district and the west coast, whether rails or roads, lines taking an easterly or E. S. E. direction from the Palghaut gap into the interior, are those required, and likely to pay throughout, and not a line pursuing a N. E. direction, as would any joining this district with Madras or Arcot direct. The portion beyond Salem to the N. E. might possibly pay, but it is difficult to see how the portion on this side could do so. I have never heard what the traffic on the trunk line, which

\* These include also the bandies en route to Trichinopoly via Coimbatore and to Coimbatore itself.

does take this N. E. direction, amounts to annually, east of Coimbatore; but the communication of those districts with Malabar, as the return\* of traffic along the trunk road near Palghaut shew, is not great; and I do not think the traffic with the west coast likely to increase, when the facilities of transport from those districts to the east coast become added to, as they must be, by such a line.

8. The N. E. line has been chosen for the great trunk line, and as a Political, Military and Postal line, it is an important one; but as a trade line and one to meet the wants of the country, and open the producing districts towards the sea, the returns of traffic shew beyond a doubt, that the S. E. line via Pulachy, Udamala Kutta and Dindigul, (or I would say generally, a line in

that direction) were far more valuable and likely to pay, even now, despite the wretched and disgraceful state of this road; a commercial traffic in point of value and bulk much greater than there is on the fine trunk road, passes over this S. E. line.

9. A comparison of the returns for the last year, as far as they go,

|                 | Ban-<br>dies. | Bul-<br>locks. |
|-----------------|---------------|----------------|
| East to west... | 18            | 106            |
| West to east... | 26            | 131            |
| Total...        | 44            | 237            |

NOTE.—This return of bandies was taken of those passing the newly built bridge at Nargumpully, 5 miles east of Palghaut, and was made with a view to ascertain the local as well as the general commercial value of that work. From the position of the bridge the return taken there comes to include, besides the general commercial traffic, also all the bandies of firewood for local consumption. The country for miles round Palghaut is supplied with firewood from the Waiyar jungle, and it must all cross the bridge. In estimating the general traffic along the trunk road from such return, the whole of the bandies entered in the west to east line under the head of "timber, wrought wood, and firewood" in this return must be deducted, as they are all of that description (firewood bandies.) There is no trade from the east towards Malabar in wood. The tobacco monopoly also throws the whole of that trade, unnaturally, on this line.

will shew this. The return of traffic on the trunk road, reduced as shewn in the marginal note, will give a daily transit of carts, during the brisk season, bearing commercial goods and passengers, as in the margin, and does not, perhaps, greatly exceed 40 to 45 bandies and 240 bullocks daily, carrying perhaps, 100 to 120 candies of goods; on the south line\* the traffic amounts to 80 bandies and 280 bullocks per diem, carrying, perhaps, 150 to 200 candies of goods.

10. At Palghaut, this traffic falls into the trunk line, and west of Palghaut; the trunk line is of great value, and is the only bandy road leading direct to the coast.

|                 | Ban-<br>dies. | Bul-<br>locks. |
|-----------------|---------------|----------------|
| East to west... | 43            | 153            |
| West to east... | 37            | 123            |
| Total...        | 80            | 276            |

11. The travellers from Bombay to the Hills and native travellers towards Coimbatore and Trichinopoly, quadruple the passenger traffic on the trunk line over that on the other; but I have little doubt that most of this, too, leaves the trunk line at Coimbatore; and I fear there is a break of 100 to 150 miles between that and Salem, where a line of rail would do little or nothing in return for the outlay.

12. A general system of rails were of course most desirable; but if they are to pay, I think the requirements of the west coast must be considered irrespective of Madras or any line direct from Arcot towards Palghaut, and

that, as was most judiciously done in the case of the trunk road in 1845; such lines must be begun at the coast (the portions nearest the coast will pay the best) and carried inward through the Palghaut gap, and thence extended to the interior. The nature of the country will confine such a line to the valley of the Ponany river for 35 to 40 miles from the coast, but from thence the paying line would leave, perhaps, both Palghaut (a few miles only) and Coimbatore to the north, and go down the centre of the Palghaut valley and due east by Darapoorum, &c., or by Pulachy. Were the Madras line of rail eventually carried out to Trichinopoly, the indirect junction with the west

|                                                         | Pay of 3 Men<br>at 5 Rs each<br>per month. | Per year. |
|---------------------------------------------------------|--------------------------------------------|-----------|
|                                                         | Rs.                                        | Rs.       |
| On the trunk road<br>at Wallyar or at<br>Nargumpully... | 15                                         | 180       |
| On the South road<br>via Pulachy ....                   | 15                                         | 180       |
| At Talasanyam on<br>the Nellyat road.                   | 15                                         | 180       |
| Rupees.....                                             |                                            | 540       |

coast might be formed there with fairer prospects of paying than any other, and more direct line, would afford. Now that the subject of rails is occupying public attention, I would beg to urge the absolute necessity of adopting measures for obtaining accurate statistics of the traffic on each road leading east and west through the Palghaut gap; and I therefore place in the margin an estimate for taking this throughout the ensuing year, (1851) whereby at the small outlay of 500 Rupees, invaluable data

would be secured from the three principal roads of this district.

I have, &c.

(Signed) W. ROBINSON,  
*Head Assistant Collector.*

(True Copy.)  
(Signed) H. V. CONOLLY,  
*Collector.*

(A true Copy.)  
(Signed) T. T. PEARS,  
*Railway Commissioner.*

No. 2143—1850.

CALICUT, the 21st December, 1850.

FROM H. V. CONOLLY, Esq.  
*Collector of Malabar.*

To MAJOR T. T. PEARS, C. B.  
*Engineers.*  
*Madras.*

SIR,

I thought it well on receiving your letter of the 26th October last, to forward it to my Head Assistant, whose attention has, for some years past,

been particularly attracted to the traffic in the road leading through the Palghaut gap. His answer is appended, and I concur, generally, in his remarks.  
Dated 26th November, 1850.

2. By the enclosed abstract statement, it will be seen that the traffic of this district with Madras and other ports on the Coromandel coast by sea, is not very considerable. The value of exports averages Rupees 4,94,909, and of the imports, Rupees 3,03,070 per annum.

I am unable to furnish a similar table as regards our commercial intercourse with Madras by land, there being now no official data upon which the same could be framed.

I have, &c.

CALICUT ;  
21st December, 1850. }

(Signed) H. V. CONOLLY,  
*Collector.*

To MAJOR T. T. PEARS, C. B.

*Engineers,*  
*Madras.*

(A true Copy.)

(Signed) T. T. PEARS,  
*Railway Commissioner.*

COIMBATORE; PRINCIPAL COLLECTOR'S OFFICE,  
12th November, 1850.

No. 178.

FROM E. B. THOMAS, Esq.  
*Acting Principal Collector of Coimbatore.*

To MAJOR T. T. PEARS, C. B.  
*Engineers.*

SIR,

In reply to your letter of the 26th ultimo, requesting my sentiments with regard to the benefits that might be expected to result from the construction of a line of railway between Madras and the western coast, through the district of Coimbatore, I beg to observe that I think this end of a railway line (if one should ever be carried out in Coimbatore) would be almost the only portion of value here; so much of the line as reached from Coimbatore to the nearest point of the western coast (our natural sea road and outlet) would be the channel through which the exports and produce of this district would flow.

None would, of course, take the much longer distance to Madras. The Madras end of the line would, in like manner, be available and valuable for Arcot, Salem, and all commerce naturally flowing that way; but I cannot suppose that much traffic, of any kind, would use the *whole* line, or traverse from Madras to the west coast, across the continent, or vice versa; such unbroken continuous line would only, I should conceive, be of use politically, for movement of treasure or troops, with the tappal, not commercially. The trade between this and *Madras* is small; cotton, piece goods, &c., go to the western coast, the nearer point, usually Ponnany, about 90 miles.

I have, &c.

(Signed) E. B. THOMAS,  
*Acting Principal Collector.*

COIMBATORE;  
PRINCIPAL COLLECTOR'S OFFICE, }  
12th November, 1850.

To MAJOR T. T. PEARS, C. B.  
*Engineers.*

(A true Copy.)

(Signed) T. T. PEARS,  
*Railway Commissioner.*

END OF THE APPENDIX.

## SUPPLEMENTARY REPORT.

FROM MAJOR T. T. PEARS, C. B.  
*Engineers.*

To THE CHIEF SECRETARY TO GOVERNMENT,  
*Fort St. George.*

SIR,

I have the honor to forward a copy of a letter from the Collector of Bellary, having reference to the subject of my report of the 5th instant. Anxious that no more time should be lost, I was compelled most unwillingly to prepare that report upon information (as far as Bellary and Cuddapah are concerned) that I have gathered from various sources, and without having the benefit of that most to be relied upon, from the Collectors themselves.

The Collector of Cuddapah has not yet replied to my letters; but the opinion which I have given regarding the probable effect of a railway to Arcot upon the district of Bellary, derives confirmation from the several facts stated, and the sentiments expressed, in the accompanying letter from the Collector of that district.

MADRAS, }  
11th March, 1851. }  
I have, &c. &c.  
(Signed) T. T. PEARS, MAJOR,  
*Engineers.*

BELLARY; COLLECTOR'S OFFICE,  
28th February, 1851.

FROM C. PELLY, Esq.  
*Collector of Bellary.*

To MAJOR T. T. PEARS, C. B.  
*Engineers.*

SIR,

I have the honor to acknowledge the receipt of your letters of the 26th October, 27th November, and 24th December, 1850, and with reference to the 1st of these letters, I have the honor to subjoin the information on the 4 points alluded to in para. 3d.

1st Point. In this district there are 17 chief towns as follows: the population and the classes into which that population is divided is specified. The relative situation of these towns is shewn in the annexed sketch.\*

\*Enclosure No. 1.

**Memorandum of the Principal Towns in the Bellary District.**

| Talooks.              | Chief Towns.         | Tradesmen. |          | Cultivators. |          | Labourers. |          | Independent. |          | Total.  |          |
|-----------------------|----------------------|------------|----------|--------------|----------|------------|----------|--------------|----------|---------|----------|
|                       |                      | Houses.    | Persons. | Houses.      | Persons. | Houses.    | Persons. | Houses.      | Persons. | Houses. | Persons. |
| 1 Bellary.....        | Bellary..            | 799        | 3,528    | 601          | 2,816    | 3,830      | 17,075   | 2,631        | 13,707   | 7,861   | 37,126   |
| 2 Kurnool.....        | Kurnool..            | 312        | 1,528    | 34           | 156      | 665        | 3,282    | 420          | 1,941    | 1,431   | 6,907    |
| 3 Hurpohully.....     | Hurpohully..         | 269        | 1,165    | 17           | 64       | 737        | 2,850    | 429          | 1,918    | 1,472   | 5,997    |
| 4 Koodlighee.....     | Koodlighee..         | 285        | 1,359    | 36           | 168      | 1,136      | 5,316    | 303          | 1,478    | 1,760   | 8,321    |
| 5 Hovenhadagally..... | Hovenhadagally..     | 188        | 1,008    | 1            | 5        | 383        | 1,706    | 79           | 376      | 651     | 3,095    |
| 6 Adonie.....         | Adonie.....          | 487        | 2,132    | 56           | 239      | 1,283      | 6,650    | 1,799        | 10,450   | 3,625   | 19,471   |
| 7 Panchapollem.....   | Putteconda & Munrope | 189        | 767      | 108          | 515      | 725        | 3,467    | 245          | 1,107    | 1,267   | 5,856    |
| 8 ".....              | Paypally.....        | 112        | 493      | 55           | 267      | 621        | 2,910    | 182          | 804      | 970     | 4,474    |
| 9 Gooty.....          | Gooty.....           | 82         | 312      | 87           | 384      | 511        | 2,351    | 303          | 1,438    | 983     | 4,485    |
| 10 Yadakee.....       | Pandy.....           | 71         | 285      | 68           | 379      | 832        | 4,419    | 59           | 364      | 1,030   | 5,447    |
| 11 Raidroog.....      | Raidroog.....        | 143        | 681      | 88           | 426      | 565        | 2,942    | 280          | 1,349    | 1,076   | 5,198    |
| 12 Taudputry.....     | Taudputry.....       | 124        | 540      | 108          | 768      | 621        | 3,248    | 250          | 1,098    | 1,103   | 5,654    |
| 13 Anantapoor.....    | Anantapoor.....      | 92         | 384      | 41           | 198      | 415        | 2,004    | 315          | 1,590    | 863     | 4,176    |
| 14 Pencondah.....     | Pencondah.....       | 44         | 197      | 137          | 660      | 389        | 1,932    | 250          | 1,407    | 820     | 4,196    |
| 15 Kodecondah.....    | Hindoooor.....       | 165        | 843      | 81           | 424      | 406        | 1,966    | 152          | 678      | 804     | 3,911    |
| 16 Madagaserah.....   | Madagaserah.....     | 104        | 534      | 135          | 576      | 522        | 2,399    | 151          | 910      | 912     | 4,419    |
| 17 Dhurmavaram.....   | Dhurmavaram.....     | 116        | 478      | 130          | 509      | 770        | 3,688    | 308          | 1,460    | 1,324   | 6,085    |
| Total.....            |                      | 3,602      | 16,234   | 1,783        | 8,554    | 14,411     | 67,955   | 8,156        | 42,075   | 27,952  | 1,34,818 |

( 3 )

*2d Point.* The principal produce, whether manufacture or agricultural in this district, which will also be applicable to each of the towns, is as follows :

**MANUFACTURES.**

- |                                   |                                         |
|-----------------------------------|-----------------------------------------|
| 1. Piece goods, cotton, and silk. | 1. Muddy-chucka, a bark-used for dying. |
| 1. Carpets, cotton.               | 1. Puppaly-chucka, another kind do.     |
| 1. Do. woollen.                   | 1. Indigo.                              |
| 1. Blankets or cumblies.          | 1. Ghee.                                |
| 1. Iron.                          | 1. Oil of different kinds.              |
| 1. Earth salt.                    |                                         |

**AGRICULTURAL PRODUCE.**

- |               |                                          |
|---------------|------------------------------------------|
| 1. Cotton.    | 1. Turmeric.                             |
| 1. Jaggery.   | 1. Fruits.                               |
| 1. Sugar.     | 1. Curry stuff, such as cummin seed, co- |
| 1. Cocoa-nut. | 1. Tobacco. [riander, &c. &c.            |
| 1. Betel-nut. | 1. Roots, eatable, of a few kinds.       |

*3d Point.* The nature of the exports and imports at the above towns may be ascertained from the following list, but I am unable to state the amount of each pettah. The aggregate amount of imports into the district may, however, be stated, at about 15,00,000 Rupees, and exports at 10,00,000. The places with which the traffic is carried on is stated : the traffic is chiefly carried on bullocks, some also on carts.

**THE CHIEF IMPORTS ARE**

| <i>Names of Articles.</i>                      | <i>From whence Imported.</i>                                        |
|------------------------------------------------|---------------------------------------------------------------------|
| 1. Silk thread.....                            | } Chiefly from Bombay,<br>and partly from the Ni-<br>zam's country. |
| 1. European piece goods.....                   |                                                                     |
| 1. Cherunjee, a fine bark for dying purposes.. | } Nizam's dominions.                                                |
| 1. Coosoombah flower for dying.....            |                                                                     |
| 1. Cotton.....                                 |                                                                     |
| 1. Cotton thread.....                          |                                                                     |
| 1. Grain of kinds.....                         |                                                                     |
| 1. Cumblies or blankets.....                   |                                                                     |
| 1. Ghee.....                                   |                                                                     |
| 1. Oil.....                                    |                                                                     |
| 1. Saltpetre.....                              |                                                                     |

| <i>Names of Articles.</i>                 | <i>From whence Imported.</i>                      |
|-------------------------------------------|---------------------------------------------------|
| 1. Marine salt.....                       | Nellore and Chingleput.                           |
| 1. Betel-nut.....                         |                                                   |
| 1. Dried Cocoa-nut.....                   | Nagpur in the Mysore country and Canara district. |
| 1. Pepper.....                            |                                                   |
| 1. Dates.....                             |                                                   |
| 1. Cardamums.....                         |                                                   |
| 1. Indigo.....                            | Poodootoor in the Cuddapah district.              |
| 1. Turmeric.....                          |                                                   |
| 1. Piece goods.....                       |                                                   |
| 1. Sugar.....                             | Bangalore in the Mysore country.                  |
| 1. Raw sugar, or molasses or jaggery..... |                                                   |
| 1. Silk thread.....                       | From Madras.                                      |
| 1. Iron tyers.....                        |                                                   |
| 1. Copper and other metal.....            |                                                   |

#### CHIEF EXPORTS.

|                     |                                                                                 |
|---------------------|---------------------------------------------------------------------------------|
| Cotton.....         | To Madras, Wallajahpett in Chittoor Zillah, Coeeta in Canara, and to Bangalore. |
| Cotton thread.....  |                                                                                 |
| Piece goods.....    | To Bangalore in the Mysore country.                                             |
| Cumblies.....       |                                                                                 |
| Tobacco.....        |                                                                                 |
| Grain.....          | To Kurnool and Nizam's country.                                                 |
| Iron.....           | To Nizam's country.                                                             |
| Betel-nut.....      | To Cuddapah, Madras and Wallajahpett.                                           |
| Black cumblies..... |                                                                                 |

*4th Point.* The nature of the trade between this district and Madras is chiefly cotton and cotton thread, oil seeds, betel-nut, and cumblies, which are sent to the Coasts; and salt, iron bars, and military stores, and European articles, which are imported. The amount I am unable to state with any accuracy. The roads are by Cuddapah and Nundidroog, which are not good. The hire of a bullock is about 10, and a bandy 22 to 25 rupees to Madras from Bellary. A bandy load of cotton is about 40 to 48 maunds. Marine salt is imported from four places on the Eastern coasts to Bellary district, namely:

|                                          |     |                 |
|------------------------------------------|-----|-----------------|
| From the Depôts of Escapully in Nellore. |     |                 |
| Do.                                      | do. | of Gogalapully. |
| Do.                                      | do. | of Madraspatam. |
| Do.                                      | do. | of Chingleput.  |

The salt is conveyed on cattle: the owners are bringaries, vuddawar, and corchawar; and they traverse through the Cuddapah district into Bellary and other markets of the district, and thence they carry the salt into the Nizam's country for sale.

The quantity consumed in this district is estimated at 100 garce per year. The original authorized cost of this salt, per garce, is 120 rupees. The hire of bringary, &c. cattle (which are of a very small size) each carrying 6 mercals or 72 pukka seers, requiring about 67 bullocks per garce for 240 miles, would be 2 annas each per 10 miles, and would amount to Rupees 201 per garce.

At the foregoing rate, the whole one hundred garce would cost 32,100 Company's rupees, original price rupees 12,000, and hire rupees 20,100. But it is evident that these bringaries, who generally take goods to the coast, do not calculate the hire back of salt at even this low rate, as the wholesale price of marine salt in this district is only from 220 to 240 rupees, the first cost being 120 Rupees. In your 4th para. you state your object is to ascertain "to what amount the traffic already tending towards Madras might be expected to increase with the establishment of the superior means of communication offered by a railway, and also how far we might look for a diversion "of the trade now taking other channels into the line thus thrown open." I do not think, that under the present state of the district, any very great increase of traffic towards Madras would take place in consequence of the proposed rail-road as far as Arcot. Cotton is the great staple article of this district. The market value of the article at Madras, compared with the market price given for it at Bombay and the western coast ports, would generally regulate the line of traffic; and it is very doubtful whether the cost of carriage would be lessened by the rail-road. A rail-road the whole distance into the heart of the district would probably command the whole traffic in cotton, but not unless the rail would convey it at a price equally low as at present. The cost of conveyance of a bandy of cotton now to Madras may be stated at about from 11 to 12½ Rupees. The quantity of cotton exported from this district, which could be increased according to demand, is not known: it may, perhaps, amount to about 8000 candies; the whole cost of which, in carriage to Madras, would be 70,000 Rupees. The rail-road would probably effect a change in the sea salt expenditure in this district. Earth salt manufactured in the district is universally used. Many attempts have been made to introduce the marine salt; but the great distance from the coast, and the expence of hire, has hitherto quite rendered the attempts abortive. But a rail-road could probably bring sea salt in such abundance, at such a cheap rate, as to enable the people to purchase it at a price not exorbitantly above the price of earth salt; and could that be effected, there would be, in the course of time, a consumption of sea salt from five to ten times the amount now consumed.

I beg to subjoin, as near as possible, the information on salt asked for in your letter of the 27th November, in the following statement:—

IMPORTS.

| Fusly year. | From Nellore. |          |                                                                                | From Chingleput. |          |                                      | Total     |          |                                | Wholesale price at Bellary, per garce. | Retail price in the district, per garce. |
|-------------|---------------|----------|--------------------------------------------------------------------------------|------------------|----------|--------------------------------------|-----------|----------|--------------------------------|----------------------------------------|------------------------------------------|
|             | Quantity.     |          | Cost of carriage to Bellary reckoned at 2 ann. per 10 miles, per bullock load. | Quantity.        |          | Conveying hire per garce to Bellary. | Quantity. |          | Wholesale price at the Depôts. |                                        |                                          |
|             | Garce.        | Mercial. |                                                                                | Garce.           | Mercial. |                                      | Garce.    | Mercial. |                                |                                        |                                          |
|             |               |          |                                                                                |                  |          |                                      |           |          |                                |                                        |                                          |
| 1256        | 11            | 360      | 201                                                                            | 3                | 310      | 226-2                                | 15        | 270      | 120                            | 206½                                   | 215                                      |
| 1257        | 19            | 93       | 201                                                                            | 1                | 170      | 226-2                                | 20        | 263      | 120                            | 233                                    | 245                                      |
| 1258        | 43            | 324      | 201                                                                            | 1                | 110      | 226-2                                | 45        | 34       | 120                            | 248                                    | 262½                                     |
| 1259        | 9             | 122      | 201                                                                            | 0                | 0        | 0                                    | 9         | 122      | 120                            | 220                                    | 230                                      |
| 1260        | 8             | 190      | 201                                                                            | 0                | 0        | 0                                    | 8         | 190      | 120                            | 224                                    | 240                                      |
|             | 92            | 289      | 1,005                                                                          | 6                | 190      | 678-6                                | 99        | 79       | 600                            | 1131-12                                | 1,192½                                   |
| Average.    | 18            | 217      | 201                                                                            | 2                | 63       | 226-2                                | 19        | 89       | 120                            | 226-4                                  | 238-8                                    |

On the whole, I am not sanguine that any very beneficial results will accrue to Bellary by the formation of a rail-road to Arcot. If extended to Bellary, some manifest benefit, in the course of time, would certainly follow, to what extent I will not venture to predict.

I have, &c.

(Signed) C. PELLY,  
Collector.

(A true copy.)

(Signed) T. T. PEARS,  
Railway Commissioner.

## RESOLUTION OF GOVERNMENT.

PUBLIC DEPARTMENT.

No. 465.

Dated 26th May, 1851.

1. The Right Honorable the Governor in Council has perused with deep interest Major Pears's valuable report, in which the importance and feasibility of constructing a rail-road from Madras westward, he considers, have been clearly shown; as also the beneficial results, direct and indirect, which must follow the introduction of rail-roads into this Presidency.

2. It appears that Major Pears, in the first instance, applied himself to the determination of the best line for a railway between Madras and Wallajah-nuggur, as the points contemplated by the Madras Railway Committee, and submits the above report in anticipation of his surveys and estimates, which are not yet ready, in order to lay before Government as early as possible the information he has obtained, and the conclusions he has arrived at, in regard to the expediency of adopting the line proposed by the Railway Committee; or rather of confining it within the limits contemplated by the Committee.

3. The Governor in Council fully concurs in the views expressed by Major Pears, that the proposed railway should be a Government undertaking; that a single line, with the means of laying down a double line, will be sufficient for the present; and, that it is not necessary to adopt the highest rates of speed attained in England.

Para. 83.

Paras. 76 to 79.

4. With regard to the direction of the line there can be no doubt that it should be westward, but to what point is a question of considerable importance.

5. Major Pears expresses strongly his conviction, that the line to Wallajah-nuggur is too short to furnish a satisfactory experiment, or to produce any marked improvement. He notices as an unfavorable circumstance that the proposed terminus falls short of two rivers, the Poonnay and the Palar, both unbridged.

6. He thinks that the railway should be extended to Vaniambady as the line upon which there is the greatest amount of traffic, and one which, from the favorable circumstances under which it might be constructed and worked, is most likely to exhibit favorable results.

\* The population of Wallajah-nuggur and the towns of Raneeper and Arcot, within 2 miles of it, amounts to 44,000.

Vaniambady, he observes, has a population of from 6 to 8000, including the suburbs.\* It is situated at a point where the traffic from Madras branches into two channels towards Salem, Coimbatore and Malabar by the one; the

Mysore territories and Canara by the other. The advantages of this line, according to his view, are a greater amount of traffic in proportion to its extent, than any other that could be selected, and greater cheapness of construction as involving fewer works of magnitude: the bridges across the Poonnay and Palar being the only works of magnitude, and those attended with no difficulty and no expense that would not be amply counterbalanced by the cheapness of the line, and the importance which the railway would derive from the passage of those two rivers.

7. He asserts that the traffic over each mile of this extended line is, even now, not much below that on the shorter one, but the longer line would exercise a far greater influence on its amount, and the profits arising from it would probably be greater, while its usefulness would be much more extended. Already, he observes, there is a considerable traffic by the trunk road from the districts of Trichinopoly, Madura and Diudigul, which would be increased by a railway terminating at Vaniambady. Major Pears reckons that, at present, by far the greater part of the traffic which passes from Wallajahnuggur to Madras comes from Vaniambady; while there is, between the latter place and Vellore, an additional amount not far, if at all, short of that which joins the present at Wallajahnuggur from other channels. The railway being extended to Vaniambady, Major Pears assumes, troops and military stores for the Southern Division of the Army, would be sent by this route. As regards passengers and the conveyance of troops and stores, he remarks that a line starting at Madras that would place them 130 miles on their road to Bangalore, Salem, Coimbatore, Malabar, the Neilgherry and Shevaroy Hills, would afford greater accommodation than any other line of equal length. Finally, he observes, that this would derive additional importance from the town of Vellore with a population of 1,20,000 (83 miles from Madras) far surpassing Arcot in Political and Military importance.

8. Major Pears proposes Vaniambady; but, perhaps, Goriatum or Vellore would be a more advantageous position for the terminus.

9. Bangalore is slightly to the North of a line running due west of Wallajahnuggur, while Vaniambady is 17 or 18 miles to the south of it. Goriatum and the old Nackanairy pass are pretty nearly due west. The road by Vaniambady to Bangalore is disapproved, both on account of the additional distance, caused by the line trending so far to the south, and also on account of the difficulties from the natural features of the country between Vaniambady and Ossoor, which render it the least eligible way of access to the Mysore territories. It is, therefore, in contemplation to change the line of the high road from Madras to Bangalore, and to carry it by Chittoor and the Moogly pass. When the road to Chittoor is made, and the Moogly pass improved, as proposed, there can be no doubt that

the most part of that main portion of the traffic by Vaniambady, which Major Pears speaks of as branching off at that point to the Mysore territories and Canara, will cease to pass that way.

10. For this reason, while Vaniambady would probably be a good terminus for traffic to and from Salem, Coimbatore, Malabar, &c., it would not answer so well for Mysore, &c. Major Pears himself shows that the extension of the railway to Vaniambady would not benefit the Ceded Districts, nor the western talooks of North Arcot above the Ghauts: Bellary, he observes, might be benefited by its being carried across the Poonnay river, 6 or 7 miles west of Wallajahnuggur, but not further.

11. The point which he last indicates (a place called Trivellum) is that at which the new road, by Chittoor and the Moogly pass, into Mysore and towards the districts of Cuddapah and Bellary, is to commence; by which, no doubt, a large part of the exportable produce of Mysore, Bellary, Cuddapah and the Balaghat talooks of North Arcot, (in which sugar is now growing into importance) will, in future, pass Coast-ward. Trivellum is a small place with a population numbering only 1,357; but it is the chief station of a talook, and would, therefore, not be ineligible for a railway station, if there were not a better farther on. Perhaps a better place for a station, if not a terminus, in this line,

NOTE.—About 4 miles from Vellore but on the opposite bank of the river.

Population 1,20,000,  
\*4 miles distant.

would be the point of junction between the railway and the road from Vellore to Chittoor, with which the road from Trivellum is to be united. This extension would carry on the railway 15 miles, to the vicinity\* of Vellore, the importance of which is not over-rated by Major Pears; but it might be carried on further, for the sake of the traffic by Vaniambady, in the direction of Salem, if, at the same time, it could be made serviceable to that of Mysore and the Ceded Districts, &c.

12. Under this view, Goriatum would appear to be an eligible place for the terminus, if, as Major Pears thinks not only possible but very likely, a pass can be formed, instead of that of Nackanairy, leading directly above the ghauts and issuing between the head of the old pass and Palmanair; or, otherwise, if a road could be made easily from Goriatum to fall into the road from Chittoor at the foot of the Moogly pass, the distance being apparently much the same as from Vellore to Chittoor, say 20 miles. Goriatum is a fit point of divergence and convergence for the traffic by Vaniambady: it is a more considerable place than Vaniambady, the population numbering 10,788, and it is not far from Amboor, which has a population of 11,000. It is, as before observed, nearly

About 104 miles from Madras, and 34 or 35 from Wallajahnuggur.

Para. 58.

On No. 78 of Arrowsmith's Atlas, there is the trace of such a road.

due west from Wallajahnuggur; and if, failing a better pass by which, eventually, the railway might be carried directly above the ghauts and forward to Bangalore or towards Bellary, a road could be made to Moogly of not greater distance than the proposed one from Trivellum, or that from Vellore to Chittoor. Every desideratum would apparently be obtained in fixing the terminus at Goriatum. It would command all the traffic from Mysore and the upper talooks of North Arcot, Bellary and Cuddapah, which would, otherwise, go by Trivellum, and it would command the traffic from Vaniambady; while the line, so far, would be an excellent commencement for an extended railway to Bangalore, or by Salem towards Malabar.

13. On the other hand, by fixing the terminus at Vellore, the rail would traverse the Palar river, with its wide and sandy bed, and do away with one great and serious obstacle to the traffic from the western districts and Mysore. The terminus too, would be at a large and important town, united by a good road with Chittoor and the Moogly ghaut, and leading thence to Bellary and Cuddapah: Vellore would also be a good terminus, as connected with the direct lines into Mysore; whether through the Satghur or other more eligible pass, as well as with the line through Vaniambady to Bangalore.

14. But a chief reason for naming Vellore, is, that it is the point, rather than Arcot, at which the large traffic of the western districts and Mysore would naturally rest.

15. It would not only be a greater distance from Madras, but the carts would avoid the heavy and trying drag across the bed of the Palar, at all times severe upon the bullocks, and the river itself is occasionally impassable. It may, therefore, be reasonably supposed that if the terminus were fixed at Vellore, the cart traffic would stop at that point.

16. It may also be found that the traffic from Madras westward, would seek the rail-road to Vellore more readily than to Arcot; for the same reason, that whilst the road from Madras to Arcot offers no impediment to carts, and they would, therefore, probably continue to work, and compete with the rail, they could not readily compete with it to Vellore, so long as the Palar is unbridged.

17. But as the fixing on a place for the western terminus is a point deserving the fullest enquiry, the Governor in Council Resolution, deems it advisable to call for the opinions of Major Cotton, now at Madras, and of Captain Best, Superintendent of Roads, upon the question, where, supposing it to be determined to carry the railway further to the westward but short of the ghauts, the terminus ought to be fixed; with particular reference to the above suggestions touching Goriatum and Vellore: a similar reference will be made to Mr. Bourdillon, who, as Collector of North Arcot, must be well acquainted with the line of country and the particular localities.

18. Major Pears will furnish, as early as possible, the estimate promised in his report, with a complete survey of the line to Wallajahnuggur; deferring, till further instructions, the survey and estimate for his proposed extended line. He will, afterward, submit a full and minute survey of the first five miles of the line to Wallajahnuggur in its course to Poonamallee, accompanied by a full statement of the probable cost of every yard, the price of land, the earth-work, the tunnels for water, channels, boundary banks or hedges, laying down the rails, &c. &c. Estimating for every item of local expenditure with a rateable charge for supervision per mile.

19. With the view of this Government availing itself of the experience of the Bombay Company, which has already entered into contracts for the supply of rails, &c., to a great extent, it is resolved that application be made to the Bombay Government to procure all the information obtainable on this head.

(A true Extract.)

(Signed) H. C. MONTGOMERY,

Chief Secretary.

## SURVEYS AND ESTIMATES.

FROM MAJOR T. T. PEARS, C. B.

Engineers.

TO THE CHIEF SECRETARY TO GOVERNMENT,

Fort St. George.

SIR,

I have the honor to forward a survey, with the estimate of the proposed line of railway, between Madras and Wallajahnuggur.

2. It will be seen from the estimates themselves, and the memorandum which accompanies them, that the following is the actual result of my calculation:

|                         |                                           |           |
|-------------------------|-------------------------------------------|-----------|
|                         | Total cost of construction and stock..... | 22,08,716 |
|                         | Total of working expenses (annual) Rs..   | 171,340   |
|                         | „ of Income.....                          | 288,250   |
| Result of calculations. | Balance..                                 | 116,910   |
|                         | Interest on Capital at 5 per cent..       | 110,185   |
|                         | Difference (profits).....                 | 6,725     |

3. Having remarked, in the memorandum referred to, on the several items contained in the estimates, I need only observe here, that I believe the probable expense of the undertaking to be provided for therein; while, in the estimated income, I have only calculated upon the traffic I believe to be now actually in existence upon the present high road.

4. I have, in every particular, advanced somewhat upon the present charge for work of a similar nature, not with the view simply of being on the safe side, but because I apprehend, that a work of this magnitude, to be executed within a given limited time, would inevitably raise the cost of labor to some extent.

5. While, however, trusting to make this estimate safe, by making it, to the best of my ability, correct, I have in every case where there existed a doubt, adopted the higher rate.

6. The value of the land has not been included in the estimate, but I have endeavoured to ascertain it as near as possible. Between the present proposed terminus at Madras (which is just without the Presidency limits) and Wallajahnuggur, the line passes across the several discriptions of land to the extent indicated in the annexed statement:—

|                           |                      |
|---------------------------|----------------------|
| Nunjah.....28,236½ yards. | Tope..... 819 yards. |
| Poonjah.....21,053½ „     | Waste.....52,358 „   |
| Garden..... 384½ „        | Manium.....2,973½ „  |

The average height (or depth) of earthwork throughout the whole line being 4½ feet, we may assume that, for a double line, the average width of land required, including fencing, would be 25 yards. This would give the following superficial extent of each of the above description of land.

|                         |                      |
|-------------------------|----------------------|
| Nunjah Cawnies.....1103 | Tope cawnies..... 32 |
| Poonjah „ ..... 822     | Waste „ ..... 116    |
| Garden „ ..... 15       | Manium „ ..... 414   |

I take the following as the average actual value of these lands per cawny:

|                        |                      |
|------------------------|----------------------|
| Nunjah.....175 rupees. | Tope.....100 rupees. |
| Poonjah..... 50 „      | Waste..... 0 „       |
| Garden.....175 „       | Manium.....175 „     |

We thus have for the value of the whole land required:

|                           |                       |
|---------------------------|-----------------------|
| Nunjah.....19,250 rupees. | Tope..... 320 rupees. |
| Poonjah..... 4,110 „      | Waste..... 0 „        |
| Garden..... 260 „         | Manium..... 2,130 „   |

Total Rupees...22,070 or about 360Rs.

per mile. The course of the proposed line, according to the accompanying survey, lies through several tanks. In some cases, these are not used for irrigation. In all cases, they are shallow and of small capacity and value, and in only a few instances will they be affected by the proposed work beyond the reduction of their capacity by the formation of an embankment through their beds.

7. In the course of my enquiries as to the best direction for a railway westward, I have carefully examined three different lines, and have also had trial sections and rough surveys taken on the greater portion of them. These lines are indicated on the accompanying sheet of the Indian Atlas, upon which also are marked, by bold black lines, the principal roads affecting the proposed railway, either as feeders or competitors.

8. Of these three lines, the 1st is that of which a survey and estimate is now forwarded, and is marked by a strong blue line. The 2d, marked red on the map, leads to Vellore by Tripassoor and Sholingur, with a branch from the bank of the Poonnay to Vencatagherry, near the foot of the Palmanair ghaut. The 3d (marked yellow, as far as it deviates from No. 2) follows the preceding line as far as Menil, and thence leaving towards Arcot at the village of Aumoor, crosses the river Poonnay at Trivallum, and runs up the left bank of the Palar to a point opposite Vellore.

9. The general features of these lines, in an engineering point of view, exhibit very little difference. That difference is, however, in favor of No. 3.

10. The object of No. 1, which is the object of the present Railway Committee, is to furnish the most direct and the cheapest line to Wallajahnuggur. Should this line be ultimately extended, the distance by it, from Black Town (Madras) to Vellore, would be 79½ miles.

11. The 2d recommends itself as offering the best course for a trunk line, on the supposition (which I consider justifiable) that the best passage up the ghauts will be found near the Palmanair pass; and that the town of Wallajahnuggur is not intrinsically of sufficient importance to warrant its

being made the terminus of a railway. The length of this line from Black Town to Vellore would be 82½ miles, of which 65 would form a portion of the line by Palmanair to Bellary and Bangalore, as well as of that to Vellore, Salem, &c.

12. The 3d line may be considered as a sort of compromise between the other two. It does not run to Wallajahnuggur, but passes at the nearest point, about 3 miles, north of that town: it would be probably mile for mile the cheapest. The whole distance from Black Town to Vellore would be 82½ miles; of which, supposing a branch ultimately to be sent up by Palmanair, 50 miles would serve for the Bellary, and Bangalore, as well as the Vellore line.

13. Should the line be carried, as it has been proposed, to Wallajahnuggur, and the route shown in the present survey be adopted, it would be extended to Vellore from a point shown on the plan, and over a favorable

country; but if it were desired subsequently to connect with it a line from Bellary by Palmanair, the latter, the most important line in this Presidency, would have to make a considerable detour, yielding thus to a line second to itself in importance.

14. Under the above circumstances, should it be the desire of Government to meet the wishes of the Railway Company, by promoting a line direct to Wallajahnuggur, I would recommend the line as now surveyed. On the other hand, should the Government desire, without any special reference to that town, to lay down the best trunk line westward as a suitable basis of a system of railways in this Presidency, I would recommend the construction of a line to Vaniambady, or at least to Vellore; the adoption of the line No. 2, as marked red in the map, carrying it out at once as far as Menil, and leaving the question of its prolongation thenceforward, whether by Annmoor or Sholin-gur, to depend upon the determination of the best pass up the ghauts; a question that might easily be settled while the first portion of the line was under construction.

15. It is no light recommendation of this line that, without any material deviation from the direct course westward, it passes (at the 25th mile from Madras) the town of Trivaloor, situated on the direct road to Cuddapah by Naggery. In regard to the goods traffic, the influence which this circumstance would exercise on the character of the line would be, not, perhaps, at first very important; but the passenger traffic on the Trivaloor road is considerable. The several temples in that direction, as Trivaloor, Trittany and Treeputty, attract a far greater number of people from Madras, than those of Conjeveram. If this line, therefore, were preferred, the first 25 miles would come into useful operation as a passenger line at once; and would, I doubt not, monopolize the conveyance of all the cheap and bulky description of goods traffic which now passes over that road in the shape of firewood and straw, &c. &c., for the supply of the town of Madras.

16. I beg in conclusion to state that, after much consideration of the subject, I cannot entertain a doubt that any one of these lines, carried even as far as Vellore, constructed with a judicious economy, and worked under a proper system, would assuredly prove a remunerative undertaking. I should rather say, would not only prove at once eminently advantageous to the country, but would, at the same time, create such an amount of traffic as would enable the Government to make it still more so by adopting rates of charge, for passage and carriage, much below that which I have assumed in my calculations. My only reasons for doubting whether a

line to Wallajahnuggur, would prove so surely successful, were explained in my report of the 5th March last.

17. Since writing the above, I have had the honor of receiving an extract from Minutes of Consultation, No. 583, in the Public Department, dated 25th June 1851, forwarding copies of a letter from the Secretary to the Government of India, and the Honorable the Court of Directors, and reminding me of the necessity of considering and reporting upon this subject with a view to the political character and influence of the projected railway. My report of the 5th March will show, that I had been made aware of the wishes of the Honorable Court on this point: as, however, I did not state particularly my reasons for considering a railway running west from Madras of primary importance in a political point of view, I shall take an early opportunity of submitting those reasons in a separate letter for the consideration of Government.

I have, &c. &c.

(Signed) T. T. PEARS, MAJOR,

MADRAS, 4th July, 1851.

Engineers.

*Abstract Statement of the probable cost of constructing and stocking a single line of railway between Madras and Wallajahnuggur.*

| NATURE OF WORK.                                      | Amount.         | REMARKS.          |
|------------------------------------------------------|-----------------|-------------------|
| Earthwork embankment.....                            | 99,290 1 3      | Vide Statement B. |
| "    cutting.....                                    | 39,381 9 7      | do. do. do.       |
| Stone facing.....                                    | 1,560 0 0       | do. do. do.       |
| Side drains.....                                     | 8,210 0 0       | do. do. do.       |
| Foot bridges.....                                    | 40,000 0 0      | do. do. do.       |
| Level crossing.....                                  | 5,700 0 0       | do. do. do.       |
| Bridges and drains.....                              | 94,075 0 0      | do. do. C.        |
| Catch drains.....                                    | 1,500 0 0       |                   |
| Fencing, inclusive of 2,200 yards of wall..          | 12,500 0 0      |                   |
| Permanent way.....                                   | 1,168,500 0 0   | do. do. D.        |
| Rolling stock.....                                   | 269,000 0 0     | do. do. E.        |
| Water tanks (6).....                                 | 6,000 0 0       |                   |
| Switches, crossings, guard rails, &c.....            | 4,000 0 0       |                   |
| Buildings and stations.....                          | 150,000 0 0     |                   |
| Turn tables, travelling platforms, and rails for do. | 10,000 0 0      |                   |
| Furniture, fittings, tools.....                      | 50,000 0 0      |                   |
| Superintendence.....                                 | 144,000 0 0     |                   |
| Contingencies.....                                   | 100,000 0 0     |                   |
| Total Rupees..                                       | 2,203,716 10 10 |                   |

(Signed) T. T. PEARS, MAJOR,  
Engineers.

*Estimate of the probable result of the working of the proposed railway to Wallajahnuggur, assuming the following amount of goods and passengers.*

|                                        |  |  |  |  |              |
|----------------------------------------|--|--|--|--|--------------|
| Goods.....                             |  |  |  |  | 50,000 Tons. |
| Passengers, 1st Class, per annum . . . |  |  |  |  | 3,000        |
| "      2d    "    "    "    "    "     |  |  |  |  | 6,000        |
| "      3d    "    "    "    "    "     |  |  |  |  | 10,000       |
| "      4th   "    "    "    "    "     |  |  |  |  | 20,000       |

| EXPENSES.                                                                               |        | RECEIPTS.                           |         |
|-----------------------------------------------------------------------------------------|--------|-------------------------------------|---------|
| Management and police.....                                                              | 53,000 | 50,000 Tons at 1 anna.....          | 187,500 |
| Maintenance of way 60 miles at Rupees 700.....                                          | 42,000 | 3,000 1st Class at 2 annas.....     | 22,500  |
| Locomotive expenses at 8 annas per train per mile, 6 trains 60 miles, for 313 days..... | 56,340 | 6,000 2d " at 1 anna.....           | 22,500  |
| Repair to waggons and carriages..                                                       | 12,500 | 10,000 3d " at 6 pice.....          | 18,750  |
|                                                                                         |        | 20,000 4th " at 2 pice.....         | 12,500  |
|                                                                                         |        | Mails.....                          | 12,000  |
|                                                                                         |        | Troops, &c.....                     | 12,500  |
|                                                                                         |        |                                     |         |
|                                                                                         |        | Total Rupees.....                   | 288,250 |
|                                                                                         |        | Deduct expenses.....                | 171,340 |
|                                                                                         |        |                                     |         |
| Do. to buildings.....                                                                   | 7,500  |                                     |         |
|                                                                                         |        | Balance.....                        | 116,910 |
|                                                                                         |        |                                     |         |
|                                                                                         |        | Interest on capital at 5 per cent.. | 110,185 |
|                                                                                         |        |                                     |         |
|                                                                                         |        | Balance Rupees.....                 | 6,725   |

(Signed) T. T. PEARSON, MAJOR,  
Engineers

**Memorandum on the Survey and Estimate of a line of Rail-  
way, from Madras to Wallajahnuggur.**

The proposed line commences at a point  $\frac{1}{2}$  a mile north west of the Female Asylum, and about 4 miles from the Fort of Madras, by the Poonamallee road. It runs north of the Cooum river for 6 miles; and then crosses it at a bend near Noombul, passes about  $\frac{1}{4}$  of a mile to the north of Poonamallee; and continues to run near, and nearly parallel to, the present high road till it passes the village of Treemoochee. Thence crossing the low swampy ground, through which runs the principal feeder of the Chembrambaukum tank, (the golden channel) it runs by the villages of Tundalum and Namalee, and turning the high ground near Todacaud, takes nearly a westerly direction from thence for the rest of its course. Passing the villages of Poodoopet, Vellatoor and Pullakoor, it crosses the Cortilliaur river at Namalee Coopum. Thence by the villages of Uleyanellloor, Poodoopet, and Ponna.

pentangul, it skirts the north end of the fine tank of Cauvarypauk; and keeping still a westerly course for 4 miles, then curves towards the south west, and terminates near one of the western gates (the Sholingur) of the town of Wallajahunggur. The total length of the above line is 60 miles and 225 yards.

2. The line to Wallajahnuggur, as originally proposed by Captain Worster, differed materially from the above. Starting near the Spur tank, passing under the large Chembrambankum tank, and by Conjeveram, it approached Wallajahnuggur by the southern end of the Cauverypauk tank. One great object held in view, in proposing that line, was the supposed advantage of carrying it to Conjeveram. I do not attach much importance to that consideration. The line itself had the disadvantage of passing over much low ground, and of lying below a great number of tanks. The amount of drainage required would have been large. The extent of embankment would have been consequently large also; giving to the line an unfavorable character, not only with regard to first construction, but also in the subsequent maintenance. The country, in the immediate neighbourhood of Wallajahnuggur upon that line, is not the most favorable for an approach by railway; while the extension of such a line, through and beyond the town, would be attended with still greater disadvantages.

3. The proposed line to Wallajahnuggur is considered experimental, and at the same time as the first link in a general system of railways; and it is in every point of view desirable that it should be made as short and as cheap as possible. There is nothing between Madras and Wallajahnuggur that calls for any deviation from the otherwise cheapest and most direct line. That now proposed is 4 miles shorter than the line by Conjeveram, and for the most part lies over very favorable country.

4. The country, between Madras and Wallajahnuggur, may be described as an extensive plain having a general and slight fall towards the sea : its monotony broken by occasional inequalities of surface, and gentle undulations which determine the direction of the drainage. The lower portions of this plain are occupied by numerous tanks (artificial reservoirs) and the dependant wet cultivation ; while the higher ground is either cultivated in dry grain, covered with low jungle, or altogether waste.

5. The country, traversed by the line now proposed, lies between the rivers Palaur and Cortilliaur; the line itself following the general direction of the water shed. The required drainage is consequently no where very great. For the first 11 miles, the natural drainage of the country runs parallel to the line. For 15 miles it crosses to the south. From thence for 27 miles, till

it turns the Cauvarypauk tank, its general direction is north to the Cortillaur and Cooum rivers.

6. Wallajahnuggur is found to be 553 feet above the level of the terminus at Madras. This gives an average rise of 9 feet per mile. The general slope of the country from the westward towards the coast is not, however, uniform. As a general rule, it seems to be a fall constantly diminishing till it reaches the level of the sea. In the present instance, taking the average line of level throughout, the rise at 20 miles from Madras is found to be 164 feet, or 8½ feet per mile; in the next 20, there is a rise of 114 feet, or 5·7 feet per mile; and in the last 20, 275 feet, or 13·7 per mile.

7. It is proposed that the line should be in the first instance single; and the estimates have been framed accordingly. It is frequently suggested, in similar cases at all events, to make the earth and masonry works for a double line. In some cases, this may be clearly expedient on a comparison of the present amount of outlay required for such a purpose, with the additional amount required to perform the same work at a subsequent period; but the policy of doing so, as a general rule throughout the whole line, is very questionable. The second line of rails is not laid down because we are not certain that they will be required, or that the amount of traffic would pay for them: why then should money be expended upon works for a double line which may after all not be wanted? It is not as if the line first constructed single must be set aside, and considered as labour lost, when the necessity arises for a double line. In most cases, that necessity is met by a process of simple addition. It does not seem to me advisable to make in the present case any preparation for the double line beyond, perhaps, completing the foundations of bridges to that extent. The estimate provides, however, for a sufficient extent of double line at the termini, and at six intermediate stations, viz.: at Tremoochee, Todacaud, Kaunanthongle, Pulloor, Uleyanellor, Ponapentangle. The rails need not, however, be laid down at all these places at first: experience will show the points at which stations are likely to be most required.

8. The total amount of earth work is:

|                      |                  |                        |
|----------------------|------------------|------------------------|
| Amount of earthwork. | Embankment. .... | 10,78,631 cubic yards. |
|                      | Cutting.....     | 3,81,881 „             |

giving an average per mile of 24,342 cubic yards of earthwork. The heaviest portion of the cutting is within 25 miles of Madras, and between Treemoochee and Namalee, the 11th and 19th miles from Madras, where certain low ranges of hills cross the line. Of the total amount of embankment, much also is due

to the necessity of keeping the line in places, where the country is level or the fall slight, somewhat raised, as a security against floods, to which this part of the world is liable in the rainy season.

9. The soil for the most part is very favorable: wherever examinations have been made, it has proved so. In the cuttings near Tundalum, it is likely that Laterite will be met with in some places, but not to any great extent:

elsewhere we meet with clay, loam, and occasionally sand and black soil; near Wallajahnuggur, it becomes gravelly with occasional rock.

10. The earthwork, both cuttings and embankments, are calculated for an average slope of 2 base to 1 perpendicular. The available breadth being 17 feet on embankments and cuttings, 15 feet between the parapets of bridges. In some cases, the cuttings will stand at a less slope, and others, both embankments and cutting may possibly require more.

11. The course of the line, the maximum slope, and the amount of earthwork, have been determined in some measure with reference to each other. To economize the earthwork, and avoid the necessity of high embankments or deep cutting, the line has been curved in some places: in others, a maximum slope of 20 feet in the mile has been admitted for the same purpose; generally speaking, it seems better to save present expenditure by the admission of an indifferent slope, than by a deviation from the proper course of the line. Defective slopes may be remedied hereafter merely by additional work, by raising the embankment or deepening the cuttings. The evil of a bad curve can only be got rid of by the sacrifice of the old and the adoption of a new line in the objectionable parts. The curves in the proposed line are, it will be seen, very favourable: there being but one on so small a radius as one mile.

12. Table A shews the rate of inclination of the several planes into which the proposed line is divided. The maximum slope is one in 256 or 20 feet per mile; admitted for the sake of economy, there is nothing objectionable in these slopes, according to received opinions in the present day. But in every case, the steepest of them is susceptible of improvement, should it be considered advisable, either by curving the line or by some additional cuttings or embanking. The earthwork has been estimated with reference to the average height of embankment, or depth of cutting in each mile, the nature of the soil, and the distance from which it would be carried.

13. Considering the extent of the present project, the unusual magnitude of the embankments, and the desirableness of expediting its completion as much as possible, I have thought it prudent to allow an advance of 30 per cent. on the ordinary charges for this description of work in the public work department. This will include the protection of the slopes with turf or coarse grass.

14. I have, it will be seen, made an allowance for stone facing; this is, however, only intended for the face of the slope of such portions of the embankment as pass within reach of the wash of a full tank.

15. It is of importance that the surface of the embankment below the ballast should be well drained. The usual mode of effecting this, is, by rubble drains carried down the middle, and transverse drains of the same kind at intervals of 20 or 30 feet: probably the same material that is used for ballast would answer this purpose very well.

16. Substantial side drains or gutters will, I think, be found necessary in this country in all deep and extensive cuttings. In such cases, therefore, I have provided for them in the estimate. They may be formed of different materials of rough stone, laterite, or of brick in chunam, according to the locality of the cutting.

17. There are but two bridges of any importance on this line. The one across the Cooum at the 6th mile, and the other the Cortillaur at the 43d mile, from the Madras terminus. For the former, a water way of 300 feet must be allowed; for the latter, 900. I have estimated for these as a series of brick arches.

18. These rivers, like many others in this part of the country, pass through low level plains on shallow sandy beds: with an ordinary fresh, they rise to the level of the top of the banks; while in time of flood, they frequently inundate a portion of the neighbouring plain. The proper bridges, therefore, to carry a railway across such river, would be one with a flat soffit; and, I conceive, that in this instance, it would be advisable to bridge both rivers by means of cast iron girders on brick piers 30 or 35 feet apart.

19. Such a bridge is simple in construction, capable of being very conveniently completed for a double line at two distinct periods: and by carrying the road to such a height only as is absolutely necessary to give the water passage, would save a considerable amount of embankment, and prove, probably, the most economical. Upon the possibility of procuring these girders in India at a moderate cost, or the rate at which they might be imported from England, some further enquiry would be necessary before deciding upon adopting this description of bridge.

20. The smaller bridges and culverts have been calculated, as nearly as possible, from actual observation. It is not, however, easy to determine this amount with precision before hand; the drainage in many parts of the country, over which the line passes, being altogether undefined. In all those portions the fall across the line is very slight, and the direction which the line takes, with reference to the general fall of the country, is such as greatly simplifies the

question of drainage; while it reduces the number of works necessary to give passage to the water across the line. Tunnels, for channels of irrigation, are provided for wherever necessary, but do not form a very heavy item in the estimate.

21. In all cases where the railway would not pass either much above, or much below, the level of the adjacent country, the crossing of the common roads would be provided for by gates to be opened and closed at stated periods by men appointed for the duty. I have introduced in the estimate, however, foot bridges near every village; and would strongly recommend their adoption, as likely to conduce much to the convenience and safety of the inhabitants, among whom carelessness, arising from ignorance, as well as from constitutional indifference, may be expected to give rise to many accidents.

22. The line should be fenced throughout. The estimate provides under this head for a substantial brick wall in every case where the rail passes near a village. For the rest, a hedge will suffice, and can be executed at a very moderate cost.

23. The buildings required at the two termini will consist of offices, waiting rooms, and sheds, godowns, loading and unloading platforms (covered), work shops, engine houses, and cover for waggons and carriages. At each of the intermediate stations, a covered platform for the receipt and discharge of goods, an office for the clerk, and, at one or two of these stations, a bungalow for the accommodation of travellers may be required. The character of the climate, which merely requires that shelter from the sun and rain, should be provided will admit of these buildings being constructed and fitted at a very moderate cost. I have allowed rupees 150,000 for the whole.

24. The line is carried up close to one of the gates at Wallajahnuggur, and terminates there upon an open and elevated spot, which, with a little levelling, will afford good room for the station. At Madras, on the contrary, the terminus, according to the survey now submitted, would be about  $4\frac{1}{2}$  miles (by the present road) from Black Town, and 4 miles from the Fort.

25. The population of Madras is scattered over a space extending nearly 9 miles along the coast with an average breadth of 3 miles. It will, therefore, in all probability be found necessary ultimately to provide, at least, one branch for the accommodation of the public, besides the principal stations, wherever that may be.

26. The accompanying sketch marked A shows two different modes in either or both of which the line might be extended. The one for a distance of

3 miles, 514 yards, running direct to the west esplanade of Black Town, and terminating near the salt depôt; the other 3 miles, 112 yards in length, crossing the Poonamallee road and the Spur tank, and terminating on a very convenient spot of ground, on the bank of the Cooum river, opposite a house belonging to the Nabob, known formerly as Mr. Moorat's house. No survey or estimate has been made of these portions: the sketch alluded to is taken from a published map of Madras.

27. There may be some difference of opinion as to the direction in which the line should be first brought into Madras. If the convenience of the public at large were consulted, the line drawn across the Spur tank to the bank of the Cooum would, perhaps, be the best. For the convenience of the commercial community, there cannot be a doubt that the line to Black Town is preferable. It will be as well to leave the question open for the present. The character of the undertaking is in no degree affected by it, further than if it can be proved to be remunerative without either of these additions, it is more likely to be so with one of them. The cost of these portions would differ from the average cost of the rest of the line, chiefly in the value of the land, and until the direction it should take is determined, I have thought it better to make no survey. The railway might commence operations from the terminus near the Female Asylum; and a short experience would suffice to point out the direction by which it ought to be carried into Madras.

28. It may be observed at the same time, that even supposing one of these extensions (say that to the west esplanade) to be adopted, it is probable that the terminus at that point would consist merely of conveniences for passengers, and for the receipt and delivery of goods. The nature of most of the land in the heart of Madras, the difficulty of procuring it, and the inconvenience arising from too near a proximity to the sea, would lead to the establishment of the principal station, the quarters of the permanent servants, the work shops, carriage sheds, &c. some distance inland, where abundance of ground would be available at a cheap rate, and on a better level.

29. It is proposed to adopt, in the construction of the permanent way, the system in general use in Europe, viz. that of rails fixed in cast iron chairs on transverse sleepers of wood. The gauge of the Bengal railway has,

I believe, been determined at 4 feet 8½ inches; and if such is the case, I conclude there will be no question as to what it shall be in other parts of India. Upon the question of transverse, or longitudinal, bearings, the Engineers in England appear to be divided; though most of the men of note are in favor of the former. It is, however, quite clear, that we must view this question, chiefly, with reference to economical considerations. In some parts of India, it would be found expedient to adopt the longitudinal system, the rather if

experience justified any consequent reduction in the size and cost of the rails, (which I do not, however, observe to follow in England.) In this part of the country the transverse system is the cheapest, and I have, therefore, assumed its adoption.

30. I propose rails of the double headed  shape, 60 lbs. to the yard, upon 3 feet bearings. Rails much heavier than these have been introduced of late years in England; but I conceive that these would be quite sufficient for our purpose: and that it would be imprudent to lay out money on rails unnecessarily heavy and expensive. What is wanted is a rail of sufficient strength to furnish a firm and nearly rigid support to the engines and carriages passing over it. Its size must, therefore, be determined, upon consideration of the weight of the engine; nor can the speed be altogether disregarded, since we cannot calculate upon attaining to perfect rigidity in the rail itself, nor perfect accuracy or steadiness in its joints. The durability of a rail, heavy enough to afford sufficiently stout and rigid path for the engine, need excite no anxiety; and will depend a good deal upon the character of the line in regard to slopes and curves.

31. The attention of railway men in England has been very generally directed to the ruinous weight of many engines brought into use of late years: and examples are recorded of remarkably light engines working with great success. I am not without hopes that we may reap the benefit of these experiments, and be permitted to lay our rails for engines of 9 or 10, instead of 25 and 30, tons weight.

32. It will be observed, that I have estimated the rails at the unusually low price of £9 per ton, inclusive of freight, insurance, and other expenses. I have taken the latest intelligence which I have received from England, to the effect that wrought iron rails are now procurable at the rate of £5.8 per ton. I observe that the Bombay railway have succeeded in getting their rails conveyed from England at 30 shillings per ton. I have, therefore, allowed what I suppose would be the cost at the present time. These data are of course easy of correction, should any change in the market rates occur in the mean time.

33. I have some difficulty in fixing the probable cost of the engines and carriages, from the very conflicting nature of the information conveyed to me in various reports published in England. The engines, must of course, come from England complete. The wheels and axles and springs of the waggons and carriages must come from thence also; but the bodies might with advantage be constructed here, where we have in the teak, perhaps, one of the

best description of woods in the world, for the purpose: one which has been lately applied in England to the same use.

34. A few observations on the mode of carrying out a work of this nature will not be out of place here. The undertaking may be considered as divided into two portions. 1st, The earthworks and bridges, and all that constitute the basis of the railway, and the necessary buildings for stations, &c. 2d, The permanent way and the rolling stock. In the management of the 1st, the chief desideratum is local knowledge and experience in the conduct of public works in this country. Of the earthwork, the embankments constitute the most important portion. The native labourers are familiar with this description of work; but the scale on which it would be executed here, and the use to which they are to be turned, would be novel to them; and would call for more care and better arrangements in their execution than are usual in similar works in this country.

35. The object will be to execute these works as substantially, cheaply, and expeditiously as possible; and the officer in charge of it will have, therefore, to consider, 1st, the season of the year at which labour is cheapest, dependant on the agricultural seasons; 2d, the advantage in all cases of constructing embankments with the smallest possible amount of moisture; 3d, the increased cost of cutting, arising from drought in the case of some soils, in this country.

36. It will probably be found both practicable and expedient, to execute different portions of the work at different periods of the year, forming the embankments in such a manner, and at such intervals, as shall best conduce to their strength and consolidation.

37. The protection of the slopes, either by a revetment of turf or by planting coarse grass, is a process well understood, and practised here both in the road and in the tank department. Applying every known means to reduce the amount of labour in carrying the soil, it will be for the executive officer to determine the points at which the conveyance of earth from the cuttings must cease, and the embankment be completed from side pits. The latter mode of proceeding in this country, where land is always cheap and in some places valueless, will be generally the most economical. The distance of these pits from the foot of an embankment will vary with their depth, the former bearing to the latter a ratio of not less than four to one. In like manner, the catch drains should be thrown well back from the edge of cuttings not less than twice the depth of the cutting.

38. Of the masonry works, the bridges and drains, little need be said.

Masonry. In the two cases above mentioned, should it be considered expedient to adopt the cast iron girder sys-

tem, the requisite number of girders should be obtained on contract, if possible, in this country. They should be one and all carefully tested before being received for use. The other works will consist of simple brick arches, the drains and culverts having brick or stone floors. Near the western terminus, it will be found practicable to procure stones at a moderate cost; and stone slabs may be substituted for arches in the smaller drains.

39. The second portion of the work consists of the permanent way and rolling stock. The rails are laid in cast iron chairs fixed on to sleepers of wood. Different descriptions of timber may be used in different portions of the line, according to the price at which it can be put down. Near

Madras, teak wood will, probably, be found the cheapest. Near Arcot, the various kinds of what are commonly called jungle woods, from the Salem and North Arcot districts, may be brought into use, and will be found perfectly suited to the purpose. Considering, however, the large supply required, it would be unwise to trust to the local markets to supply it at any thing like reasonable rates; and it would be an important part of the executive officer's duty to make arrangements, as quickly as possible, for a supply, expressly for this work; and I doubt not, that with good arrangement, the necessary amount of timber may be supplied, at a cost much below the present market rate: that rate being in this country seldom a just criterion of the terms upon which it is possible to obtain any article.

40. The whole of this wood should be carefully subjected to such preservative process, as may be considered best calculated to secure it against the attacks of white ants. The whole to be subjected to some preservative process. I have no satisfactory information on this point, but have referred to England for the means of ascertaining the process best suited to our purpose. My impression is, that the use of Marjary's patent, (the application of sulphate of copper) is likely to be attended with great advantage in this country. I have allowed 1 rupee per cubic foot to include the cost of this process.

41. Materials for ballasting of various description, as disintegrated laterite, gravel, or sand, will be found on or near different parts of the line.

42. On the subject of rails, chairs, locomotive engines, &c., we naturally look to Europe for guidance, and to the information we can gather from the published results of their experience in that part of the world. The best we can do is to adopt now, in the commencement of our undertaking, what they have arrived at after 20 years practice, cautiously modifying their system only when local peculiarities render it obviously necessary.

43. It will be time enough for us to propose experiments, or suggest im-

provements, when personal-local experience shall have qualified us to judge of their necessity. Hitherto, constant change and gradual progress is observable in every thing connected with the management of railways in England.

44. While, therefore, proposing in this instance that description of permanent way, which I gather from the latest published reports to be the best suited to our wants here, I would suggest the submission of the question at the last moment to the decision of competent professional authority at home, with especial reference to the following points :—

1st. The form and weight of rails.

2d. The mode of fixing.

3d. The length of bearing.

4th. The description and weight of engine.

45. Considering what conflicting opinions have been entertained by experienced men upon some of these points, care should be taken to refer the questions to men whose position admits of their seeing above and beyond all mere party opinions, or professional prejudices; and placing before them the most important features in the circumstances under which railways will be introduced here.

1st. The great extent of the British Indian Empire.

2d. The number of miles of railway (equal to the whole yet laid down in England) required to complete even the bare skeleton of a system of railways for that empire.

3d. The limited resources with which we have to undertake this great work.

4th. The scantiness and poverty of the population.

5th. The light traffic expected, and the moderate speed contemplated.

6th. The characteristics of this particular line.

7th. The cost of stock and materials of construction, and sources from which the same are to be supplied.

46. With regard to the latter point, I should be glad to think that the railways might be constructed and furnished in all, or nearly all, points from the resources of the country. At the present time, however, this cannot be looked for. It will be found necessary, I fear, at first, to procure from England many things that this country might, and at some future day will, supply. In the first instance, the engines and the chief component parts of the carriages and waggons, the rails, and even the chairs, must be supplied, I apprehend, from England.

47. In like manner, should cast iron girders for bridges be wanted, I have no reason to believe they could be furnished from any establishments in this country, at so low a rate as we might get them from England: at the same time it is to be hoped, and may be expected, that our railways will minister

to the interest of the manufacturer of India, as well as to the trader and agriculturist; and, I should not hesitate, as far as I could do it without prejudice to the railway itself, to recommend a system of construction adapted to the nature and extent of our local resources.

48. The completion of the railway would occupy from 2½ to 3 years. The executive officer placed in charge would need to be possessed not only of local experience, but of abundance of health and energy. Selected for the conduct of a novel and important work, involving a large expenditure of money, he should be left, as free as possible, to choose his own agents, and to adopt his own measures for the prosecution of the work. Large contracts are not to be expected or wished for here. At the same time, he should be left at liberty to enter into minor contracts, wherever it might appear to him feasible and expedient.

49. Strongly advocating, in this and all similar cases, considerable freedom of action to the responsible executive officer, I consider it quite as necessary that there should be supervision, and that the actual expenditure of money, and the nature and extent of work done from time to time, should be carefully observed and made the subject of periodical report by such board or officer as the Government might think proper to appoint. All unnecessary interference on their parts in detail, should be carefully avoided.

50. In the event of this or other works of the same nature being carried out by Government, I would strongly recommend, in consideration of the large

amount of money that will be expended on materials and stock from England, that the superintendent of the work should be placed in communication

with some active and experienced officer connected with the Government, but residing in England, who might conduct the negotiations with the manufacturers. Interested in the success of the undertaking as a public work, and knowing the country, such a one would be well qualified to understand the views, and carry out the wishes of his correspondents; while he might be expected to sit loose to all private and party interests in England; and to regulate his proceedings with a single eye to the interest of the Government whose servant he is.

51. There could be no difficulty in finding an officer willing and perfectly qualified for the performance of this duty, either among the many on leave in Europe, or perhaps better still, among those who have been compelled by ill health to retire from the service early in life.

52. In estimating the working expenses on the proposed railway, I have been guided by many of the latest reports on Working expenses. this subject from England, as well as by a consideration of the value of the several descriptions of labour in this country.

Having assumed, for the sake of rendering the estimate complete, a minimum amount of passenger traffic, I have calculated on 6° trains running over the 60 miles per diem, and have allowed 8 annas per mile as the entire locomotive expenses for each train, the average weight being from 80 to 90 tons for the goods, from 20 to 30 for the passenger trains, exclusive of engine and tender. The management and police are calculated with reference to the price of labour here, and to other local circumstances; while the maintenance of way is drawn from examples in Europe, modified according to the circumstances of this particular case. The total estimated expenses have been compared, both in the aggregate cost per unit of work and the relation which the several parts of the expense bear to each other, with examples offered on established lines in Europe, and appear to be fair and consistent. The estimated charge for police and management is relatively high; but this is to be expected while the assumed traffic is small, and the amount of work done relatively low. In calculating the income, the amount of goods traffic has been taken at 50,000 tons, the troops at 12,500, and the mail at 12,000, for reasons given in my report of 5th March last. I have, as before observed, introduced for the sake of method an assumed number of passengers augmenting the estimate of expenses proportionately; but I have, in all these cases, attempted to confine the estimated traffic to what may be supposed to be now existing. The total amount of passenger, or on which I have calculated, is 50 per diem of all classes, each way, between Madras and Arcot.

(Signed) T. T. PEARS, MAJOR,  
Engineers.

MADRAS, July 4th, 1851.

A

| No.<br>of<br>Planes. | Length<br>of<br>Yards. | Rate of inclination. |            | REMARKS. |
|----------------------|------------------------|----------------------|------------|----------|
|                      |                        | Rise.                | Fall.      |          |
|                      |                        | Level                | .....      |          |
| 1                    | 400                    | 1 in 738             | .....      |          |
| 2                    | 800                    | 1 in 1,384           | .....      |          |
| 3                    | 1,200                  | 1 in 508             | .....      |          |
| 4                    | 1,322                  | 1 in 2,118           | .....      |          |
| 5                    | 2,737½                 | 1 in 802             | .....      |          |
| 6                    | 2,673                  | 1 in 2,050           | .....      |          |
| 7                    | 820                    | 1 in 418             | .....      |          |
| 8                    | 800                    | Level                | .....      |          |
| 9                    | 248½                   | 1 in 658             | .....      |          |
| 10                   | 529½                   | 1 in 700             | .....      |          |
| 11                   | 1,683                  | 1 in 644             | .....      |          |
| 12                   | 1,409½                 | 1 in 757             | .....      |          |
| 13                   | 1,369                  | 1 in 85½             | .....      |          |
| 14                   | 1,398                  | 1 in 1,172           | .....      |          |
| 15                   | 1,075                  | 1 in 481             | .....      |          |
| 16                   | 1,487½                 | .....                | 1 in 1,422 |          |
| 17                   | 1,200                  | 1 in 449             | .....      |          |
| 18                   | 968                    | 1 in 300             | .....      |          |
| 19                   | 2,181½                 | 1 in 502             | .....      |          |
| 20                   | 666½                   | .....                | 1 in 302   |          |
| 21                   | 1,770                  | 1 in 315             | .....      |          |
| 22                   | 3,485½                 | 1 in 287             | .....      |          |
| 23                   | 3,497½                 | 1 in 592             | .....      |          |
| 24                   | 1,531                  | .....                | 1 in 518   |          |
| 25                   | 416½                   | 1 in 368             | .....      |          |
| 26                   | 632½                   | .....                | 1 in 419   |          |
| 27                   | 908½                   | 1 in 311             | .....      |          |
| 28                   | 1,903½                 | Level                | .....      |          |
| 29                   | 570                    | 1 in 344             | .....      |          |
| 30                   | 1,690                  | 1 in 305             | .....      |          |
| 31                   | 910                    | 1 in 256             | .....      |          |
| 32                   | 2,009½                 | 1 in 310             | .....      |          |
| 33                   | 1,931                  | .....                | 1 in 323   |          |
| 34                   | 2,110½                 | .....                | 1 in 401   |          |
| 35                   | 823                    | 1 in 260             | .....      |          |
| 36                   | 1,302                  | 1 in 913             | .....      |          |
| 37                   | 332                    | .....                | 1 in 1,685 |          |
| 38                   | 609½                   | .....                | 1 in 365   |          |
| 39                   | 2,071                  | .....                | 1 in 1,306 |          |
| 40                   | 1,907½                 | Level                | .....      |          |
| 41                   | 246½                   | 1 in 296             | .....      |          |
| 42                   | 2,453                  | 1 in 591             | .....      |          |
| 43                   | 940                    | .....                | 1 in 2,666 |          |
| 44                   | 1,200                  | 1 in 661             | .....      |          |
| 45                   | 1,406                  | 1 in 509             | .....      |          |
| 46                   | 1,902½                 | 1 in 804             | .....      |          |
| 47                   | 2,870                  | 1 in 577             | .....      |          |
| 48                   | 1,499½                 | 1 in 691             | .....      |          |
| 49                   | 742                    | 1 in 1,467           | .....      |          |
| 50                   | 1,081½                 | 1 in 845             | .....      |          |
| 51                   | 910                    | 1 in 326             | .....      |          |
| 52                   | 831                    | 1 in 363             | .....      |          |
| 53                   | 721                    | 1 in 1,000           | .....      |          |
| 54                   | 910                    |                      |            |          |

| No. of Planes | Length of Yards. | Rate of inclination. |          | REMARKS. |
|---------------|------------------|----------------------|----------|----------|
|               |                  | Rise.                | Fall.    |          |
| 55            | 1,200            | 1 in 458             |          |          |
| 56            | 564              | 1 in 2,115           |          |          |
| 57            | 600              | Level                |          |          |
| 58            | 1,982½           | 1 in 4,465           |          |          |
| 59            | 970½             | 1 in 275             |          |          |
| 60            | 600              | 1 in 800             |          |          |
| 61            | 1,000            |                      |          |          |
| 62            | 3,437½           | 1 in 307             | 1 in 983 |          |
| 63            | 1,414½           | 1 in 381             |          |          |
| 64            | 2,619½           | 1 in 295             |          |          |
| 65            | 2,278            | 1 in 302             |          |          |
| 66            | 1,367½           | 1 in 373             |          |          |
| 67            | 1,377½           | 1 in 298             |          |          |
| 68            | 800              | 1 in 333             |          |          |
| 69            | 1,681½           | 1 in 1,801           |          |          |
| 70            | 935              | 1 in 339             |          |          |
| 71            | 1,773            | 1 in 300             |          |          |
| 72            | 2,447½           | 1 in 272             |          |          |
| 73            | 1,824            | 1 in 344             |          |          |
| 74            | 1,750½           | 1 in 294             |          |          |
| 75            | 700              | 1 in 325             |          |          |
| 76            | 1,158½           | 1 in 339             |          |          |
| 77            | 250½             | Level                |          |          |

(Signed) T. T. PEARS, MAJOR,  
Engineers.

**B**  
Estimate of the probable cost of Earthwork, Drains, Bridges, &c., on a proposed line of Railway between Madras and Wallajahnugur.

| No. of Miles. |           | Embankment.            |                |                        |                       |                | Cutting.   |                |                        |                      |                | Stone facing. |                |              |                | Side drains, Laterite, rough stone or brick in chunam. |         | Drains, Bridges, vide Statement. |         | Foot Bridges. |         | Level Crossings. |         | Total.  |         | REMARKS. |        |        |        |       |
|---------------|-----------|------------------------|----------------|------------------------|-----------------------|----------------|------------|----------------|------------------------|----------------------|----------------|---------------|----------------|--------------|----------------|--------------------------------------------------------|---------|----------------------------------|---------|---------------|---------|------------------|---------|---------|---------|----------|--------|--------|--------|-------|
| Miles.        | Furlongs. | Soil.                  | Length, Yards. | Cubic contents, Yards. | Average height, feet. | Rate per Yard. | Amount.    | Length, Yards. | Cubic contents, Yards. | Average depth, feet. | Rate per Yard. | Amount.       | Length, Yards. | Cubic Yards. | Rate per Yard. | Amount.                                                | Length. | Amount.                          | Number. | Amount.       | Number. | Amount.          | Number. | Amount. | Rupees. |          | A. P.  |        |        |       |
| 1             | 0         | Alluvial Light.        | 1,760          | 6,500                  | 1.25                  | 0 0 10         | 338 8 8    | 0              | 0                      | 0                    | 0 0 0          | 0 0 0         | 0              | 0            | 0 0 0          | 0 0 0                                                  | 0       | 0                                | 0       | 2             | 840     | 0                | 0       | 1,000   | 0       | 0        | 2,178  | 8 8    |        |       |
| 2             | 0         |                        | 1,760          | 800                    | 1.5                   | 0 0 10         | 41 10 8    | 0              | 0                      | 0                    | 0 0 0          | 0 0 0         | 0              | 0            | 0 0 0          | 0 0 0                                                  | 0       | 0                                | 0       | 4             | 470     | 0                | 0       | 1,000   | 0       | 0        | 1,661  | 10 8   |        |       |
| 3             | 0         |                        | 1,760          | 12,470                 | 2.75                  | 0 1 0          | 779 6 0    | 0              | 0                      | 0                    | 0 0 0          | 0 0 0         | 0              | 0            | 0 0 0          | 0 0 0                                                  | 0       | 0                                | 0       | 4             | 620     | 0                | 0       | 1,000   | 0       | 0        | 2,399  | 6 0    |        |       |
| 4             | 0         |                        | 1,760          | 9,183                  | 2.0                   | 0 0 11         | 526 1 9    | 0              | 0                      | 0                    | 0 0 0          | 0 0 0         | 0              | 0            | 0 0 0          | 0 0 0                                                  | 0       | 0                                | 0       | 4             | 470     | 0                | 0       | 1,000   | 0       | 0        | 2,146  | 1 9    |        |       |
| 5             | 0         | Light Sandy.           | 1,760          | 9,460                  | 2.2                   | 0 0 11         | 541 15 8   | 0              | 0                      | 0                    | 0 0 0          | 0 0 0         | 0              | 0            | 0 0 0          | 0 0 0                                                  | 0       | 0                                | 0       | 4             | 470     | 0                | 0       | 1,000   | 0       | 0        | 2,161  | 15 8   |        |       |
| 6             | 0         |                        | 1,760          | 9,680                  | 2.3                   | 0 0 11         | 554 9 4    | 0              | 0                      | 0                    | 0 0 0          | 0 0 0         | 0              | 0            | 0 0 0          | 0 0 0                                                  | 0       | 0                                | 0       | 2             | 340     | 0                | 0       | 1,000   | 0       | 0        | 2,044  | 9 4    |        |       |
| 7             | 0         |                        | 1,760          | 8,310                  | 2.0                   | 0 0 11         | 476 1 6    | 0              | 0                      | 0                    | 0 0 0          | 0 0 0         | 0              | 0            | 0 0 0          | 0 0 0                                                  | 0       | 0                                | 0       | 3             | 12,230  | 0                | 0       | 1,000   | 0       | 0        | 13,856 | 1 6    |        |       |
| 8             | 0         |                        | 1,760          | 6,750                  | 1.6                   | 0 0 10         | 351 9 0    | 0              | 0                      | 0                    | 0 0 0          | 0 0 0         | 0              | 0            | 0 0 0          | 0 0 0                                                  | 0       | 0                                | 0       | 4             | 460     | 0                | 0       | 1,000   | 0       | 0        | 1,961  | 9 0    |        |       |
| 9             | 0         | Clayey.                | 1,760          | 12,840                 | 2.8                   | 0 1 0          | 802 8 0    | 0              | 0                      | 0                    | 0 0 0          | 0 0 0         | 0              | 0            | 0 0 0          | 0 0 0                                                  | 0       | 0                                | 0       | 2             | 230     | 0                | 0       | 1,000   | 0       | 0        | 2,182  | 8 0    |        |       |
| 10            | 0         |                        | 1,760          | 4,650                  | 1.2                   | 0 0 10         | 242 3 0    | 0              | 0                      | 0                    | 0 0 0          | 0 0 0         | 0              | 0            | 0 0 0          | 0 0 0                                                  | 0       | 0                                | 0       | 3             | 485     | 0                | 0       | 1,000   | 0       | 0        | 1,877  | 3 0    |        |       |
| 11            | 0         |                        | 1,760          | 4,920                  | 1.7                   | 0 0 11         | 396 7 4    | 0              | 0                      | 0                    | 0 0 0          | 0 0 0         | 0              | 0            | 0 0 0          | 0 0 0                                                  | 0       | 0                                | 0       | 3             | 340     | 0                | 0       | 1,000   | 0       | 0        | 1,886  | 7 4    |        |       |
| 12            | 0         |                        | 0              | 0                      | 0                     | 0 0 0          | 0 0 0      | 0              | 0                      | 0                    | 0 0 0          | 0 0 0         | 0              | 0            | 0 0 0          | 0 0 0                                                  | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 1,000   | 0       | 0        | 1,166  | 7 0    |        |       |
| 13            | 0         | Red Soil and Laterite. | 1,540          | 7,190                  | 1.75                  | 0 0 11         | 441 14 10  | 0              | 0                      | 0                    | 0 0 0          | 0 0 0         | 0              | 0            | 0 0 0          | 0 0 0                                                  | 0       | 0                                | 0       | 1             | 6,000   | 0                | 0       | 1,000   | 0       | 0        | 6,441  | 14 10  |        |       |
| 14            | 0         |                        | 1,760          | 72,470                 | 10.0                  | 0 1 6          | 6,791 1 0  | 0              | 0                      | 0                    | 0 0 0          | 0 0 0         | 0              | 0            | 0 0 0          | 0 0 0                                                  | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 7,944  | 1 0    |        |       |
| 15            | 0         |                        | 450            | 8,110                  | 5.5                   | 0 1 4          | 675 13 4   | 0              | 1,310                  | 65,280               | 11.75          | 0 2 4         | 9,520 0 0      | 0            | 0              | 0 0 0                                                  | 0 0 0   | 2,620                            | 2,620   | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0      | 12,140 | 0 0    |       |
| 16            | 0         |                        | 0              | 0                      | 0                     | 0 0 0          | 0 0 0      | 0              | 1,020                  | 69,490               | 13.75          | 0 2 4         | 10,133 15 4    | 0            | 0              | 0 0 0                                                  | 0 0 0   | 2,040                            | 2,040   | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0      | 0      | 675    | 13 4  |
| 17            | 0         | Red Soil.              | 1,740          | 17,616                 | 7.0                   | 0 1 4          | 1,468 0 0  | 0              | 0                      | 0                    | 0 0 0          | 0 0 0         | 0              | 0            | 0 0 0          | 0 0 0                                                  | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0      | 1,468  | 0 0    |       |
| 18            | 0         |                        | 1,760          | 1,03,210               | 12.5                  | 0 1 8          | 10,751 0 8 | 0              | 0                      | 0                    | 0 0 0          | 0 0 0         | 0              | 0            | 0 0 0          | 0 0 0                                                  | 0       | 0                                | 0       | 2             | 4,600   | 0                | 0       | 0       | 0       | 0        | 0      | 0      | 15,801 | 0 8   |
| 19            | 0         |                        | 1,539          | 11,880                 | 3.0                   | 0 1 0          | 742 8 0    | 0              | 221                    | 100                  | 0              | 0 1 0         | 6 4 0          | 0            | 0              | 0 0 0                                                  | 0 0 0   | 0                                | 0       | 0             | 1       | 170              | 0       | 0       | 1,000   | 0        | 0      | 1,326  | 4 0    |       |
| 20            | 0         |                        | 0              | 0                      | 0                     | 0 0 0          | 0 0 0      | 0              | 740                    | 3,575                | 2.5            | 0 0 11        | 204 13 1       | 0            | 0              | 0 0 0                                                  | 0 0 0   | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0      | 0      | 742    | 8 0   |
| 21            | 0         | Clay.                  | 1,020          | 7,490                  | 2.75                  | 0 1 0          | 468 2 0    | 0              | 0                      | 0                    | 0 0 0          | 0 0 0         | 0              | 0            | 0 0 0          | 0 0 0                                                  | 0       | 0                                | 0       | 1             | 275     | 0                | 0       | 0       | 0       | 0        | 0      | 468    | 2 0    |       |
| 22            | 0         |                        | 727            | 8,030                  | 3.75                  | 0 1 0          | 501 14 0   | 0              | 1,033                  | 10,850               | 3.75           | 0 1 0         | 678 2 0        | 0            | 0              | 0 0 0                                                  | 0 0 0   | 0                                | 0       | 0             | 0       | 0                | 0       | 1,000   | 0       | 0        | 1,678  | 2 0    |        |       |
| 23            | 0         |                        | 0              | 0                      | 0                     | 0 0 0          | 0 0 0      | 0              | 0                      | 0                    | 0 0 0          | 0 0 0         | 0              | 0            | 0 0 0          | 0 0 0                                                  | 0       | 0                                | 0       | 2             | 715     | 0                | 0       | 0       | 0       | 0        | 0      | 0      | 1,216  | 14 0  |
| 24            | 0         |                        | 0              | 0                      | 0                     | 0 0 0          | 0 0 0      | 0              | 1,320                  | 25,030               | 5.75           | 0 1 1         | 1,694 11 10    | 0            | 0              | 0 0 0                                                  | 0 0 0   | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0      | 0      | 1,694  | 11 10 |
| 25            | 0         | Clay or Gravel.        | 440            | 3,270                  | 2.75                  | 0 1 0          | 204 6 0    | 0              | 0                      | 0                    | 0 0 0          | 0 0 0         | 0              | 0            | 0 0 0          | 0 0 0                                                  | 0       | 0                                | 0       | 2             | 1,090   | 0                | 0       | 0       | 0       | 0        | 0      | 0      | 1,294  | 6 0   |
| 26            | 0         |                        | 0              | 0                      | 0                     | 0 0 0          | 0 0 0      | 0              | 690                    | 13,200               | 5.75           | 0 1 4         | 1,100 0 0      | 0            | 0              | 0 0 0                                                  | 0 0 0   | 0                                | 0       | 0             | 0       | 0                | 0       | 1,000   | 0       | 0        | 0      | 0      | 2,250  | 0 0   |
| 27            | 0         |                        | 1,070          | 17,200                 | 5.25                  | 0 1 4          | 1,433 5 4  | 0              | 0                      | 0                    | 0 0 0          | 0 0 0         | 0              | 0            | 0 0 0          | 0 0 0                                                  | 0       | 0                                | 0       | 3             | 660     | 0                | 0       | 0       | 0       | 0        | 0      | 0      | 2,093  | 5 4   |
| 28            | 0         |                        | 0              | 0                      | 0                     | 0 0 0          | 0 0 0      | 0              | 667                    | 7,110                | 3.75           | 0 1 0         | 444 6 0        | 0            | 0              | 0 0 0                                                  | 0 0 0   | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0      | 0      | 444    | 6 0   |
| 29            | 0         | Clay or Gravel.        | 1,093          | 24,770                 | 6.5                   | 0 1 2          | 1,806 2 4  | 0              | 0                      | 0                    | 0 0 0          | 0 0 0         | 0              | 0            | 0 0 0          | 0 0 0                                                  | 0       | 0                                | 0       | 3             | 345     | 0                | 0       | 0       | 0       | 0        | 0      | 0      | 2,151  | 2 4   |
| 30            | 0         |                        | 0              | 0                      | 0                     | 0 0 0          | 0 0 0      | 0              | 504                    | 5,860                | 4.25           | 0 1 4         | 488 5 4        | 0            | 0              | 0 0 0                                                  | 0 0 0   | 0                                | 0       | 0             | 0       | 0                | 0       | 1,000   | 0       | 0        | 0      | 0      | 1,638  | 5 4   |
| 31            | 0         |                        | 1,196          | 14,440                 | 4.0                   | 0 1 4          | 1,203 5 4  | 0              | 0                      | 0                    | 0 0 0          | 0 0 0         | 0              | 0            | 0 0 0          | 0 0 0                                                  | 0       | 0                                | 0       | 3             | 455     | 0                | 0       | 0       | 0       | 0        | 0      | 0      | 1,658  | 5 4   |
| 32            | 0         |                        | 0              | 0                      | 0                     | 0 0 0          | 0 0 0      | 0              | 500                    | 7,420                | 4.25           | 0 1 4         | 618 5 4        | 0            | 0              | 0 0 0                                                  | 0 0 0   | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0      | 0      | 618    | 5 4   |
| 33            | 0         | Rock in some places.   | 1,260          | 19,060                 | 5.0                   | 0 1 4          | 1,588 5 4  | 0              | 0                      | 0                    | 0 0 0          | 0 0 0         | 0              | 0            | 0 0 0          | 0 0 0                                                  | 0       | 0                                | 0       | 1             | 390     | 0                | 0       | 0       | 0       | 0        | 0      | 0      | 1,978  | 5 4   |
| 34            | 0         |                        | 0              | 0                      | 0                     | 0 0 0          | 0 0 0      | 0              | 660                    | 15,440               | 6.75           | 0 1 2         | 1,125 13 4     | 0            | 0              | 0 0 0                                                  | 0 0 0   | 0                                | 0       | 0             | 0       | 0                | 0       | 1,000   | 0       | 0        | 0      | 0      | 2,275  | 13 4  |
| 35            | 0         |                        | 850            | 1,800                  | 0.75                  | 0 0 8          | 75 0 0     | 0              | 1,074                  | 16,000               | 5.0            | 0 1 1         | 1,083 5 4      | 0            | 0              | 0 0 0                                                  | 0 0 0   | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0      | 0      | 75     | 0 0   |
| 36            | 0         |                        | 0              | 0                      | 0                     | 0 0 0          | 0 0 0      | 0              | 0                      | 0                    | 0 0 0          | 0 0 0         | 0              | 0            | 0 0 0          | 0 0 0                                                  | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0      | 0      | 1,083  | 5 4   |
| 37            | 0         | Clay.                  | 686            | 8,500                  | 4.25                  | 0 1 0          | 531 4 0    | 0              | 0                      | 0                    | 0 0 0          | 0 0 0         | 0              | 0            | 0 0 0          | 0 0 0                                                  | 0       | 0                                | 0       | 1             | 290     | 0                | 0       | 0       | 0       | 0        | 0      | 0      | 821    | 4 0   |
| 38            | 0         |                        | 0              | 0                      | 0                     | 0 0 0          | 0 0 0      | 0              | 1,135                  | 29,680               | 7.25           | 0 1 4         | 2,473 5 4      | 0            | 0              | 0 0 0                                                  | 0 0 0   | 2,270                            | 2,270   | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0      | 0      | 4,743  | 5 4   |
| 39            | 0         |                        | 625            | 7,370                  | 4.0                   | 0 1 0          | 460 10 0   | 0              | 0                      | 0                    | 0 0 0          | 0 0 0         | 0              | 0            | 0 0 0          | 0 0 0                                                  | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0      | 0      | 1,260  | 10 0  |
| 40            | 0         |                        | 0              | 0                      | 0                     | 0 0 0          | 0 0 0      | 0              | 448                    | 3,780                | 3.0            | 0 1 0         | 236 4 0        | 0            | 0              | 0 0 0                                                  | 0 0 0   | 0                                | 0       | 0             | 0       | 0                | 0       | 1,000   | 0       | 0        | 0      | 0      | 1,386  | 4 0   |
| 41            | 0         | Clay with Laterite.    | 1,312          | 21,840                 | 5.5                   | 0 1 4          | 1,820 0 0  | 0              | 0                      | 0                    | 0 0 0          | 0 0 0         | 0              | 0            | 0 0 0          | 0 0 0                                                  | 0       | 0                                | 0       | 3             | 870     | 0                | 0       | 0       | 0       | 0        | 0      | 0      | 2,690  | 0 0   |
| 42            | 0         |                        | 0              | 0                      | 0                     | 0 0 0          | 0 0 0      | 0              | 811                    | 3,170                | 1.7            | 0 1 0         | 198 2 0        | 0            | 0              | 0 0 0                                                  | 0 0 0   | 0                                | 0       | 0             | 0       | 0                | 0       | 1,000   | 0       | 0        | 0      | 0      | 1,348  | 2 0   |
| 43            | 0         |                        | 949            | 5,920                  | 2.5                   | 0 1 2          | 431 10 8   | 0              | 0                      | 0                    | 0 0 0          | 0 0 0         | 0              | 0            | 0 0 0          | 0 0 0                                                  | 0       | 0                                | 0       | 1             | 225     | 0                | 0       | 0       | 0       | 0        | 0      | 0      | 656    | 10 8  |
| 44            | 0         |                        | 0              | 0                      | 0                     | 0 0 0          | 0 0 0      | 0              | 844                    | 4,540                | 2.2            | 0 1 0         | 283 12 0       | 0            | 0              | 0 0 0                                                  | 0 0 0   | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0      | 0      | 283    | 12 0  |
| 45            | 0         | Clay & Gravel.         | 916            | 14,530                 | 5.25                  | 0 1 4          | 1,210 13 4 | 0              | 0                      | 0                    | 0 0 0          | 0 0 0         | 0              | 0            | 0 0 0          | 0 0 0                                                  | 0       | 0                                | 0       | 2             | 530     | 0                | 0       | 0       | 0       | 0        | 0      | 0      | 1,740  | 13 4  |
| 46            | 0         |                        | 0              | 0                      | 0                     | 0 0 0          | 0 0 0      | 0              | 340                    | 550                  | 0.75           | 0 1 0         | 34 6 0         | 0            | 0              | 0 0 0                                                  | 0 0 0   | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0      | 0      | 34     |       |

**Estimate of the probable cost of Earthwork Drains, Bridges, &c.—continued.**

| No. of Miles. |           | Embankment.                                |               |                        |                       |                |         | Cutting.      |                        |                      |                |          | Stone facing. |              |                |         | Side drains, Late-rite rough stone or Brick in Chunnam. |         | Drains, Bridges, vide Statement. |         | Foot Bridges. |         | Level Crossings. |         | Total.  |         | REMARKS. |         |       |
|---------------|-----------|--------------------------------------------|---------------|------------------------|-----------------------|----------------|---------|---------------|------------------------|----------------------|----------------|----------|---------------|--------------|----------------|---------|---------------------------------------------------------|---------|----------------------------------|---------|---------------|---------|------------------|---------|---------|---------|----------|---------|-------|
| Miles.        | Furlongs. | Soil.                                      | Length Yards. | Cubic contents, Yards. | Average height, feet. | Rate per Yard. | Amount. | Length Yards. | Cubic contents, Yards. | Average depth, feet. | Rate per Yard. | Amount.  | Length Yards. | Cubic Yards. | Rate per Yard. | Amount. | Length.                                                 | Amount. | Number.                          | Amount. | Number.       | Amount. | Number.          | Amount. | Number. | Amount. |          | Rupees. | A. P. |
| 34            | 0         | Clay and Light Alluvial Soil. Sandy.       | 1,760         | 4,320                  | 0.75                  | 0              | 0       | 180           | 0                      | 0                    | 0              | 0        | 0             | 0            | 0              | 0       | 0                                                       | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 330      | 0       | 0     |
| 35            | 0         |                                            | 1,760         | 12,830                 | 2.75                  | 0              | 1       | 801           | 14                     | 0                    | 0              | 0        | 0             | 0            | 0              | 0       | 0                                                       | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 1,162    | 8       | 0     |
| 36            | 0         |                                            | 0             | 0                      | 0                     | 0              | 0       | 0             | 0                      | 0                    | 0              | 0        | 0             | 0            | 0              | 0       | 0                                                       | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0       | 0     |
| 37            | 0         |                                            | 1,470         | 6,220                  | 1.75                  | 0              | 0       | 10            | 323                    | 15                   | 4              | 0        | 0             | 0            | 0              | 0       | 0                                                       | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 2,556    | 14      | 0     |
| 38            | 0         | Clay and Sandy.                            | 0             | 0                      | 0                     | 0              | 0       | 0             | 0                      | 0                    | 0              | 0        | 0             | 0            | 0              | 0       | 0                                                       | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0       | 0     |
| 39            | 0         |                                            | 1,320         | 9,790                  | 2.75                  | 0              | 1       | 0             | 611                    | 14                   | 0              | 0        | 0             | 0            | 0              | 0       | 0                                                       | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 908      | 15      | 4     |
| 40            | 0         |                                            | 0             | 0                      | 0                     | 0              | 0       | 0             | 0                      | 0                    | 0              | 0        | 0             | 0            | 0              | 0       | 0                                                       | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0       | 0     |
| 41            | 0         |                                            | 1,450         | 5,920                  | 1.75                  | 0              | 0       | 10            | 308                    | 5                    | 4              | 0        | 0             | 0            | 0              | 0       | 0                                                       | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 4       | 2     |
| 42            | 0         | Clay and Sand.                             | 0             | 0                      | 0                     | 0              | 0       | 0             | 0                      | 0                    | 0              | 0        | 0             | 0            | 0              | 0       | 0                                                       | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0       | 0     |
| 43            | 0         |                                            | 1,486         | 4,250                  | 1.25                  | 0              | 0       | 10            | 221                    | 5                    | 8              | 0        | 0             | 0            | 0              | 0       | 0                                                       | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0       | 0     |
| 44            | 0         |                                            | 1,760         | 10,560                 | 2.25                  | 0              | 0       | 10            | 550                    | 0                    | 0              | 0        | 0             | 0            | 0              | 0       | 0                                                       | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0       | 0     |
| 45            | 0         |                                            | 1,760         | 10,230                 | 2.25                  | 0              | 0       | 10            | 532                    | 13                   | 0              | 0        | 0             | 0            | 0              | 0       | 0                                                       | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0       | 0     |
| 46            | 0         | Soft Clay and Stone.                       | 0             | 0                      | 0                     | 0              | 0       | 0             | 0                      | 0                    | 0              | 0        | 0             | 0            | 0              | 0       | 0                                                       | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0       | 0     |
| 47            | 0         |                                            | 1,140         | 7,270                  | 2.5                   | 0              | 1       | 0             | 454                    | 6                    | 0              | 0        | 0             | 0            | 0              | 0       | 0                                                       | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0       | 0     |
| 48            | 0         |                                            | 1,560         | 6,970                  | 1.75                  | 0              | 0       | 10            | 363                    | 0                    | 4              | 0        | 0             | 0            | 0              | 0       | 0                                                       | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0       | 0     |
| 49            | 0         |                                            | 1,760         | 14,750                 | 3.0                   | 0              | 1       | 0             | 921                    | 14                   | 0              | 0        | 0             | 0            | 0              | 0       | 0                                                       | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0       | 0     |
| 50            | 0         | Hard Clay, Rocky in some places.           | 587           | 7,330                  | 4.5                   | 0              | 1       | 4             | 610                    | 13                   | 4              | 0        | 0             | 0            | 0              | 0       | 0                                                       | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0       | 0     |
| 51            | 0         |                                            | 0             | 0                      | 0                     | 0              | 0       | 0             | 0                      | 0                    | 0              | 0        | 0             | 0            | 0              | 0       | 0                                                       | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0       | 0     |
| 52            | 0         |                                            | 1,615         | 62,700                 | 7.75                  | 0              | 1       | 2             | 4,571                  | 14                   | 0              | 0        | 0             | 0            | 0              | 0       | 0                                                       | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0       | 0     |
| 53            | 0         |                                            | 1,260         | 11,680                 | 3.25                  | 0              | 1       | 4             | 973                    | 5                    | 4              | 0        | 0             | 0            | 0              | 0       | 0                                                       | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0       | 0     |
| 54            | 0         | Ditto with Gravel.                         | 0             | 0                      | 0                     | 0              | 0       | 0             | 0                      | 0                    | 0              | 0        | 0             | 0            | 0              | 0       | 0                                                       | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0       | 0     |
| 55            | 0         |                                            | 1,030         | 4,400                  | 1.75                  | 0              | 1       | 0             | 275                    | 0                    | 0              | 0        | 0             | 0            | 0              | 0       | 0                                                       | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0       | 0     |
| 56            | 0         |                                            | 1,760         | 43,760                 | 7.0                   | 0              | 1       | 8             | 4,558                  | 5                    | 4              | 0        | 0             | 0            | 0              | 0       | 0                                                       | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0       | 0     |
| 57            | 0         |                                            | 0             | 0                      | 0                     | 0              | 0       | 0             | 0                      | 0                    | 0              | 0        | 0             | 0            | 0              | 0       | 0                                                       | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0       | 0     |
| 58            | 0         | No rock found.                             | 64            | 130                    | 0.7                   | 0              | 0       | 8             | 5                      | 6                    | 8              | 0        | 0             | 0            | 0              | 0       | 0                                                       | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0       | 0     |
| 59            | 0         |                                            | 1,760         | 20,260                 | 4.0                   | 0              | 1       | 4             | 1,688                  | 5                    | 4              | 0        | 0             | 0            | 0              | 0       | 0                                                       | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0       | 0     |
| 60            | 0         |                                            | 1,314         | 13,940                 | 4.5                   | 0              | 1       | 4             | 1,161                  | 10                   | 8              | 0        | 0             | 0            | 0              | 0       | 0                                                       | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0       | 0     |
| 61            | 0         |                                            | 0             | 0                      | 0                     | 0              | 0       | 0             | 0                      | 0                    | 0              | 0        | 0             | 0            | 0              | 0       | 0                                                       | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0       | 0     |
| 62            | 0         | Clay and Gravel.                           | 780           | 10,590                 | 4.5                   | 0              | 1       | 4             | 882                    | 8                    | 0              | 0        | 0             | 0            | 0              | 0       | 0                                                       | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0       | 0     |
| 63            | 0         |                                            | 1,760         | 24,310                 | 4.5                   | 0              | 1       | 4             | 2,025                  | 13                   | 4              | 0        | 0             | 0            | 0              | 0       | 0                                                       | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0       | 0     |
| 64            | 0         |                                            | 1,760         | 82,150                 | 10.75                 | 0              | 2       | 0             | 10,268                 | 12                   | 0              | 0        | 0             | 0            | 0              | 0       | 0                                                       | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0       | 0     |
| 65            | 0         |                                            | 1,760         | 52,410                 | 8.0                   | 0              | 2       | 0             | 6,551                  | 4                    | 0              | 0        | 0             | 0            | 0              | 0       | 0                                                       | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0       | 0     |
| 66            | 0         | Hard soil with Gravel, and rocky in parts. | 0             | 0                      | 0                     | 0              | 0       | 0             | 0                      | 0                    | 0              | 0        | 0             | 0            | 0              | 0       | 0                                                       | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0       | 0     |
| 67            | 0         |                                            | 450           | 662                    | 0.5                   | 0              | 0       | 8             | 10                     | 5                    | 6              | 0        | 0             | 0            | 0              | 0       | 0                                                       | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0       | 0     |
| 68            | 0         |                                            | 1,760         | 71,570                 | 9.75                  | 0              | 2       | 0             | 8,946                  | 4                    | 0              | 0        | 0             | 0            | 0              | 0       | 0                                                       | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0       | 0     |
| 69            | 0         |                                            | 0             | 0                      | 0                     | 0              | 0       | 0             | 0                      | 0                    | 0              | 0        | 0             | 0            | 0              | 0       | 0                                                       | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0       | 0     |
| 70            | 0         |                                            | 1,120         | 17,810                 | 5.0                   | 0              | 1       | 4             | 1,484                  | 2                    | 8              | 0        | 0             | 0            | 0              | 0       | 0                                                       | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0       | 0     |
| 71            | 0         |                                            | 0             | 0                      | 0                     | 0              | 0       | 0             | 0                      | 0                    | 0              | 0        | 0             | 0            | 0              | 0       | 0                                                       | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0       | 0     |
| 72            | 0         |                                            | 0             | 0                      | 0                     | 0              | 0       | 0             | 0                      | 0                    | 0              | 0        | 0             | 0            | 0              | 0       | 0                                                       | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0       | 0     |
| 73            | 0         |                                            | 1,582         | 75,870                 | 11.0                  | 0              | 2       | 0             | 9,483                  | 12                   | 0              | 0        | 0             | 0            | 0              | 0       | 0                                                       | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0       | 0     |
| 74            | 0         | Total..                                    | 0             | 0                      | 0                     | 0              | 0       | 0             | 0                      | 0                    | 0              | 0        | 0             | 0            | 0              | 0       | 0                                                       | 0       | 0                                | 0       | 0             | 0       | 0                | 0       | 0       | 0       | 0        | 0       | 0     |
| 75            | 0         |                                            | 81,116        | 1,078,631              | .....                 | .....          | .....   | 99,290        | 1                      | 3                    | 24,259         | 3,81,881 | .....         | .....        | .....          | .....   | .....                                                   | .....   | .....                            | .....   | .....         | .....   | .....            | .....   | .....   | .....   | .....    | .....   | ..... |
| 76            | 0         |                                            |               |                        |                       |                |         |               |                        |                      |                |          |               |              |                |         |                                                         |         |                                  |         |               |         |                  |         |         |         |          |         |       |
| 77            | 0         |                                            |               |                        |                       |                |         |               |                        |                      |                |          |               |              |                |         |                                                         |         |                                  |         |               |         |                  |         |         |         |          |         |       |
| 78            | 0         |                                            |               |                        |                       |                |         |               |                        |                      |                |          |               |              |                |         |                                                         |         |                                  |         |               |         |                  |         |         |         |          |         |       |
| 79            | 0         |                                            |               |                        |                       |                |         |               |                        |                      |                |          |               |              |                |         |                                                         |         |                                  |         |               |         |                  |         |         |         |          |         |       |
| 80            | 0         |                                            |               |                        |                       |                |         |               |                        |                      |                |          |               |              |                |         |                                                         |         |                                  |         |               |         |                  |         |         |         |          |         |       |
| 81            | 0         |                                            |               |                        |                       |                |         |               |                        |                      |                |          |               |              |                |         |                                                         |         |                                  |         |               |         |                  |         |         |         |          |         |       |
| 82            | 0         |                                            |               |                        |                       |                |         |               |                        |                      |                |          |               |              |                |         |                                                         |         |                                  |         |               |         |                  |         |         |         |          |         |       |
| 83            | 0         |                                            |               |                        |                       |                |         |               |                        |                      |                |          |               |              |                |         |                                                         |         |                                  |         |               |         |                  |         |         |         |          |         |       |
| 84            | 0         |                                            |               |                        |                       |                |         |               |                        |                      |                |          |               |              |                |         |                                                         |         |                                  |         |               |         |                  |         |         |         |          |         |       |
| 85            | 0         |                                            |               |                        |                       |                |         |               |                        |                      |                |          |               |              |                |         |                                                         |         |                                  |         |               |         |                  |         |         |         |          |         |       |
| 86            | 0         |                                            |               |                        |                       |                |         |               |                        |                      |                |          |               |              |                |         |                                                         |         |                                  |         |               |         |                  |         |         |         |          |         |       |
| 87            | 0         |                                            |               |                        |                       |                |         |               |                        |                      |                |          |               |              |                |         |                                                         |         |                                  |         |               |         |                  |         |         |         |          |         |       |
| 88            | 0         |                                            |               |                        |                       |                |         |               |                        |                      |                |          |               |              |                |         |                                                         |         |                                  |         |               |         |                  |         |         |         |          |         |       |
| 89            | 0         |                                            |               |                        |                       |                |         |               |                        |                      |                |          |               |              |                |         |                                                         |         |                                  |         |               |         |                  |         |         |         |          |         |       |
| 90            | 0         |                                            |               |                        |                       |                |         |               |                        |                      |                |          |               |              |                |         |                                                         |         |                                  |         |               |         |                  |         |         |         |          |         |       |
| 91            | 0         |                                            |               |                        |                       |                |         |               |                        |                      |                |          |               |              |                |         |                                                         |         |                                  |         |               |         |                  |         |         |         |          |         |       |
| 92            | 0         |                                            |               |                        |                       |                |         |               |                        |                      |                |          |               |              |                |         |                                                         |         |                                  |         |               |         |                  |         |         |         |          |         |       |
| 93            | 0         |                                            |               |                        |                       |                |         |               |                        |                      |                |          |               |              |                |         |                                                         |         |                                  |         |               |         |                  |         |         |         |          |         |       |
| 94            | 0         |                                            |               |                        |                       |                |         |               |                        |                      |                |          |               |              |                |         |                                                         |         |                                  |         |               |         |                  |         |         |         |          |         |       |
| 95            | 0         |                                            |               |                        |                       |                |         |               |                        |                      |                |          |               |              |                |         |                                                         |         |                                  |         |               |         |                  |         |         |         |          |         |       |
| 96            | 0         |                                            |               |                        |                       |                |         |               |                        |                      |                |          |               |              |                |         |                                                         |         |                                  |         |               |         |                  |         |         |         |          |         |       |
| 97            | 0         |                                            |               |                        |                       |                |         |               |                        |                      |                |          |               |              |                |         |                                                         |         |                                  |         |               |         |                  |         |         |         |          |         |       |
| 98            | 0         |                                            |               |                        |                       |                |         |               |                        |                      |                |          |               |              |                |         |                                                         |         |                                  |         |               |         |                  |         |         |         |          |         |       |
| 99            | 0         |                                            |               |                        |                       |                |         |               |                        |                      |                |          |               |              |                |         |                                                         |         |                                  |         |               |         |                  |         |         |         |          |         |       |
| 100           | 0         |                                            |               |                        |                       |                |         |               |                        |                      |                |          |               |              |                |         |                                                         |         |                                  |         |               |         |                  |         |         |         |          |         |       |
| 101           | 0         |                                            |               |                        |                       |                |         |               |                        |                      |                |          |               |              |                |         |                                                         |         |                                  |         |               |         |                  |         |         |         |          |         |       |
| 102           | 0         |                                            |               |                        |                       |                |         |               |                        |                      |                |          |               |              |                |         |                                                         |         |                                  |         |               |         |                  |         |         |         |          |         |       |
| 103           | 0         |                                            |               |                        |                       |                |         |               |                        |                      |                |          |               |              |                |         |                                                         |         |                                  |         |               |         |                  |         |         |         |          |         |       |
| 104           | 0         |                                            |               |                        |                       |                |         |               |                        |                      |                |          |               |              |                |         |                                                         |         |                                  |         |               |         |                  |         |         |         |          |         |       |
| 105           | 0         |                                            |               |                        |                       |                |         |               |                        |                      |                |          |               |              |                |         |                                                         |         |                                  |         |               |         |                  |         |         |         |          |         |       |
| 106           | 0         |                                            |               |                        |                       |                |         |               |                        |                      |                |          |               |              |                |         |                                                         |         |                                  |         |               |         |                  |         |         |         |          |         |       |
| 107           | 0         |                                            |               |                        |                       |                |         |               |                        |                      |                |          |               |              |                |         |                                                         |         |                                  |         |               |         |                  |         |         |         |          |         |       |

Grand Total Rupees.. 2,88,216 10 10

(Signed) T. T. PEARS, MAJOR,  
Engineers.

**Estimate of Bridges and Drains required on the proposed Railway between Madras and Wallajahnuag**

| No. | Mile. | Nature of Work.              | No. of Vents.     | Space. | Height of Piers. | Probable cost of each. | Estimate cost for e Mile. |
|-----|-------|------------------------------|-------------------|--------|------------------|------------------------|---------------------------|
| 1   | 1     | Culvert . . . . .            | 1                 | 4      | 1                | 120 0 0                | 840                       |
| 2   | "     | Bridge . . . . .             | 1                 | 18     | 4                | 720 0 0                |                           |
| 3   | 2     | } Irrigation Channel. {      | 1                 | 3      | 1                | 115 0 0                |                           |
| 4   | "     |                              | 1                 | 3      | 1                | 115 0 0                |                           |
| 5   | "     |                              | 1                 | 4      | 1                | 120 0 0                |                           |
| 6   | "     | Culvert . . . . .            | 1                 | 4      | 1                | 120 0 0                | 470                       |
| 7   | 3     | Bridge . . . . .             | 3                 | 5      | 1                | 275 0 0                |                           |
| 8   | "     | } Irrigation Channel. {      | 1                 | 3      | 1                | 115 0 0                |                           |
| 9   | "     |                              | 1                 | 3      | 1                | 115 0 0                |                           |
| 10  | "     |                              | 1                 | 4      | 1                | 120 0 0                |                           |
| 11  | 4     | Culvert . . . . .            | 1                 | 4      | 1                | 120 0 0                | 470                       |
| 12  | "     | } Irrigation Channel. {      | 1                 | 3      | 1                | 115 0 0                |                           |
| 13  | "     |                              | 1                 | 3      | 1                | 115 0 0                |                           |
| 14  | "     |                              | 1                 | 4      | 1                | 120 0 0                |                           |
| 15  | 5     | Culvert . . . . .            | 1                 | 3      | 1                | 115 0 0                | 470                       |
| 16  | "     | } Irrigation Channel. {      | 1                 | 3      | 1                | 115 0 0                |                           |
| 17  | "     |                              | 1                 | 4      | 1                | 120 0 0                |                           |
| 18  | "     |                              | Culvert . . . . . | 1      | 3                | 1                      | 115 0 0                   |
| 19  | 6     | } Irrigation Channel. {      | 1                 | 5      | 4                | 225 0 0                | 340                       |
| 20  | "     |                              | 10                | 30     | 5                | 12,000 0 0             |                           |
| 21  | 7     |                              | Bridge . . . . .  | 1      | 3                | 1                      |                           |
| 22  | "     | } Irrigation Channel. {      | 1                 | 3      | 1                | 115 0 0                | 12,230                    |
| 23  | "     |                              | 1                 | 3      | 1                | 115 0 0                |                           |
| 24  | 8     |                              | 1                 | 3      | 1                | 115 0 0                |                           |
| 25  | "     | } Irrigation Channel. {      | 1                 | 3      | 1                | 115 0 0                | 460                       |
| 26  | "     |                              | 1                 | 3      | 1                | 115 0 0                |                           |
| 27  | "     |                              | 1                 | 3      | 1                | 115 0 0                |                           |
| 28  | 9     | } Irrigation Channel. {      | 1                 | 3      | 1                | 115 0 0                | 230                       |
| 29  | "     |                              | 1                 | 5      | 0                | 120 0 0                |                           |
| 30  | 10    |                              | Culvert . . . . . | 1      | 5                | 3                      |                           |
| 31  | "     | } Irrigation Channel. {      | 1                 | 3      | 3                | 155 0 0                | 48                        |
| 32  | "     |                              | 1                 | 3      | 0                | 110 0 0                |                           |
| 33  | 11    |                              | 1                 | 3      | 0                | 110 0 0                |                           |
| 34  | "     | Culvert . . . . .            | 1                 | 5      | 0                | 120 0 0                | 34                        |
| 35  | "     | Bridge . . . . .             | 5                 | 20     | 5                | 6,000 0 0              | 6,000                     |
| 36  | 13    | Viaduct . . . . .            | 1                 | 15     | 5                | 600 0 0                | 4,600                     |
| 37  | 16    | Bridge . . . . .             | 3                 | 20     | 5                | 4,000 0 0              |                           |
| 38  | "     | Channel . . . . .            | 2                 | 3      | 1                | 170 0 0                |                           |
| 39  | 17    | } Bridge . . . . . {         | 1                 | 10     | 2                | 275 0 0                | 7                         |
| 40  | 18    |                              | 1                 | 15     | 4                | 600 0 0                |                           |
| 41  | 19    |                              | 1                 | 3      | 1                | 115 0 0                |                           |
| 42  | "     | Irrigation Channel . . . . . | 1                 | 17     | 9                | 800 0 0                | 1,000                     |
| 43  | 20    | Road Bridge . . . . .        | 1                 | 10     | 3                | 290 0 0                |                           |
| 44  | "     | } Bridge . . . . . {         | 1                 | 12     | 2                | 320 0 0                |                           |
| 45  | 21    |                              | 1                 | 6      | 2                | 225 0 0                |                           |
| 46  | "     |                              | 1                 | 6      | 2                | 225 0 0                |                           |

## Estimate of Bridges and Drains, &amp;c.--continued.

| No. | Mile. | Nature of Work.     | No. of Vents. | Space. | Height of Piers. | Probable cost of each. | Estimated cost for each Mile. | REMARKS. |
|-----|-------|---------------------|---------------|--------|------------------|------------------------|-------------------------------|----------|
| 47  | 21    | Irrigation Channel. | 1             | 3      | 1                | 115 0 0                | 660 0 0                       |          |
| 48  | 22    |                     | 1             | 3      | 1                | 115 0 0                |                               |          |
| 49  | "     |                     | 1             | 3      | 1                | 115 0 0                |                               |          |
| 50  | "     |                     | 1             | 3      | 1                | 115 0 0                | 345 0 0                       |          |
| 51  | 23    |                     | 1             | 3      | 1                | 115 0 0                |                               |          |
| 52  | "     | Bridge.....         | 1             | 3      | 1                | 115 0 0                |                               |          |
| 53  | "     |                     | 1             | 6      | 2                | 225 0 0                | 455 0 0                       |          |
| 54  | 24    |                     | 1             | 12     | 4                | 390 0 0                | 390 0 0                       |          |
| 55  | 26    |                     | 1             | 10     | 3                | 290 0 0                | 290 0 0                       |          |
| 56  | 27    |                     | 1             | 17     | 9                | 800 0 0                | 800 0 0                       |          |
| 57  | 28    | Road Bridge ..      | 1             | 10     | 3                | 290 0 0                |                               |          |
| 58  | "     |                     | 1             | 10     | 3                | 290 0 0                |                               |          |
| 59  | "     |                     | 1             | 10     | 3                | 290 0 0                | 870 0 0                       |          |
| 60  | 29    |                     | 1             | 6      | 2                | 225 0 0                | 225 0 0                       |          |
| 61  | 30    |                     | 1             | 6      | 3                | 225 0 0                |                               |          |
| 62  | "     | Bridge.....         | 1             | 8      | 3                | 275 0 0                | 530 0 0                       |          |
| 63  | 31    |                     | 1             | 12     | 3                | 355 0 0                | 355 0 0                       |          |
| 64  | 32    |                     | 1             | 6      | 2                | 225 0 0                |                               |          |
| 65  | "     |                     | 3             | 6      | 2                | 375 0 0                | 600 0 0                       |          |
| 66  | 33    |                     | 1             | 3      | 1                | 115 0 0                |                               |          |
| 67  | "     | Irrigation Channel. | 1             | 3      | 1                | 115 0 0                | 230 0 0                       |          |
| 68  | 33    | Bridge.....         | 3             | 6      | 2                | 375 0 0                |                               |          |
| 69  | "     |                     | 1             | 3      | 1                | 115 0 0                |                               |          |
| 70  | "     |                     | 1             | 3      | 1                | 115 0 0                | 605 0 0                       |          |
| 71  | 36    |                     | 1             | 3      | 1                | 115 0 0                |                               |          |
| 72  | "     |                     | 1             | 4      | 6                | 235 0 0                |                               |          |
| 73  | "     | Bridge.....         | 1             | 4      | 6                | 235 0 0                | 585 0 0                       |          |
| 74  | 37    |                     | 5             | 5      | 12               | 460 0 0                |                               |          |
| 75  | "     |                     | 1             | 4      | 6                | 235 0 0                | 625 0 0                       |          |
| 76  | 38    |                     | 2             | 10     | 24               | 470 0 0                | 470 0 0                       |          |
| 77  | 39    |                     | 1             | 4      | 2                | 140 0 0                |                               |          |
| 78  | "     | Irrigation Channel. | 1             | 4      | 2                | 140 0 0                |                               |          |
| 79  | "     |                     | 1             | 4      | 2                | 140 0 0                |                               |          |
| 80  | "     |                     | 2             | 3      | 0                | 170 0 0                | 500 0 0                       |          |
| 81  | 40    |                     | 1             | 4      | 2                | 140 0 0                |                               |          |
| 82  | "     |                     | 1             | 10     | 2                | 260 0 0                | 420 0 0                       |          |
| 83  | 41    | Irrigation Channel. | 1             | 4      | 2                | 140 0 0                |                               |          |
| 84  | "     |                     | 1             | 4      | 2                | 140 0 0                |                               |          |
| 85  | "     |                     | 1             | 4      | 2                | 140 0 0                |                               |          |
| 86  | "     |                     | 1             | 6      | 3                | 255 0 0                | 675 0 0                       |          |
| 87  | 43    |                     | 1             | 4      | 2                | 140 0 0                |                               |          |
| 88  | "     | Bridge.....         | 26            | 30     | 6                | 40,000 0 0             |                               |          |
| 89  | "     |                     | 1             | 5      | 7                | 300 0 0                | 40,440 0 0                    |          |
| 90  | 44    |                     | 1             | 3      | 14               | 130 0 0                |                               |          |
| 91  | "     |                     | 1             | 3      | 14               | 130 0 0                |                               |          |
| 92  | "     |                     | 1             | 3      | 14               | 130 0 0                |                               |          |
| 93  | "     | Bridge.....         | 3             | 12     | 3                | 800 0 0                | 1,190 0 0                     |          |
| 94  | 45    |                     | 1             | 10     | 2                | 275 0 0                |                               |          |
| 95  | "     |                     | 1             | 4      | 2                | 140 0 0                |                               |          |
| 96  | "     |                     | 1             | 4      | 2                | 140 0 0                | 555 0 0                       |          |
| 97  | 46    |                     | 2             | 15     | 3                | 800 0 0                | 800 0 0                       |          |
| 98  | 47    | Irrigation Channel. | 1             | 4      | 2                | 140 0 0                |                               |          |
| 99  | "     |                     | 1             | 4      | 2                | 140 0 0                | 280 0 0                       |          |

## Estimate of Bridges and Drains, &amp;c.--continued.

| No.            | Mile. | Nature of Work.   | No. of Vents.     | Space. | Height of Piers. | Probable cost of each. |        | Estimated cost for each Mile. |       | REMARKS. |  |
|----------------|-------|-------------------|-------------------|--------|------------------|------------------------|--------|-------------------------------|-------|----------|--|
| 100            | 49    | Road Bridge ..... | 1                 | 15     | 5                | 600                    | 0 0    |                               |       |          |  |
| 101            | "     | Bridge.....       | 1                 | 20     | 4                | 850                    | 0 0    | 1,450                         | 0 0   |          |  |
| 102            | 50    | Tunnel.....       | 1                 | 3      | 0                | 110                    | 0 0    | 110                           | 0 0   |          |  |
| 103            | 51    |                   | 1                 | 3      | 0                | 110                    | 0 0    | 110                           | 0 0   |          |  |
| 104            | 52    |                   | 1                 | 6      | 2                | 225                    | 0 0    |                               |       |          |  |
| 105            | "     |                   | 1                 | 6      | 2                | 225                    | 0 0    | 450                           | 0 0   |          |  |
| 106            | 53    |                   | 1                 | 4      | 2                | 140                    | 0 0    |                               |       |          |  |
| 107            | "     | Channel.....      | 1                 | 6      | 2                | 225                    | 0 0    | 365                           | 0 0   |          |  |
| 108            | 54    |                   | 1                 | 4      | 2                | 140                    | 0 0    |                               |       |          |  |
| 109            | "     |                   | 1                 | 8      | 4                | 290                    | 0 0    | 430                           | 0 0   |          |  |
| 110            | 55    |                   | Road Bridge ..... | 1      | 15               | 5                      | 600    | 0 0                           |       |          |  |
| 111            | "     |                   | Bridge.....       | 3      | 18               | 5                      | 2,500  | 0 0                           | 3,100 | 0 0      |  |
| 112            | 56    | Road Bridge ..... | 1                 | 15     | 5                | 600                    | 0 0    |                               |       |          |  |
| 113            | "     | Bridge.....       | 1                 | 15     | 5                | 600                    | 0 0    | 1,200                         | 0 0   |          |  |
| 114            | 58    | Road Bridge ..... | 1                 | 15     | 5                | 600                    | 0 0    |                               |       |          |  |
| 115            | "     | Bridge.....       | 2                 | 6      | 3                | 450                    | 0 0    |                               |       |          |  |
| 116            | "     |                   | 1                 | 25     | 3                | 1,200                  | 0 0    | 2,250                         | 0 0   |          |  |
| 117            | 60    |                   | 2                 | 18     | 6                | 1,750                  | 0 0    | 1,750                         | 0 0   |          |  |
| Total Rupees.. |       |                   |                   |        |                  |                        | 94,075 | 0 0                           |       |          |  |

(Signed) T. T. PEARSON, Major,  
Engineers.

**D**

*Estimate of the probable cost of laying the Permanent way for a single line of Railway from Madras to Wallajahnuggur, 61½ miles, including sidings.*

**PER MILE.**

|                                                                           |                                  |
|---------------------------------------------------------------------------|----------------------------------|
| Rails (60 lbs. to the yard). Wrought iron rails 943 tons at £9..8,487 0 0 |                                  |
| 1,761 Sleepers, each 8 × 10 × 5 = 5283 cubic feet, at Rs. 1..5,283 0 0    |                                  |
| Chairs, 706 Joint.....                                                    | } = 25 tons, at £7.....1,750 0 0 |
| „ 2,816 intermediate.....                                                 |                                  |
| Ballast, 2,200 cubic yards, at Rs. 1.....                                 | 2,200 0 0                        |
| 3,522 Keys, at 1 anna each.....                                           | 221 0 0                          |
| 7,750 Spikes, or trenails, at 1 anna.....                                 | 487 0 0                          |
| Laying rails.....                                                         | 400 0 0                          |
| Sundries.....                                                             | 172 0 0                          |
| Total for one mile, Rs. .                                                 | 19,000 0 0                       |
| „ for 61½ miles „                                                         | 11,68,500 0 0                    |

(Signed) T. T. PEARS, MAJOR,  
Engineers.

**E**

*Estimate of the probable cost of Engine and Carriages required to stock a single line of Railway between Madras and Wallajahnuggur.*

|                                               |              |
|-----------------------------------------------|--------------|
| 3 Engines with Tenders, at Rupees 18,000..... | 144,000 0 0  |
| 20 Carriages..... at „ 2,500.....             | 50,000 0 0   |
| 150 Waggon..... at „ 500.....                 | 75,000 0 0   |
| Total Rupees..                                | 2,69,000 0 0 |

(Signed) T. T. PEARS, MAJOR,  
Engineers.

**EXTRACTS FROM THE MINUTES OF CONSULTATION.**

PUBLIC DEPARTMENT.

No. 766.

*Dated 16th August, 1851.*

1. On comparing Major Pears' estimate with the contract for the construction of the railway from Bombay to Tannah, there appears such a wide difference in some respects, that Government deem it necessary that the foregoing report from Bombay should be immediately forwarded to Major Pears, in order that he may analyze it and compare the details with his own calculations.

2. Major Pears' attention is particularly directed to the difference in the expense of constructing the road way, and preparing it for the rails being laid down, including ballasting.

(A true Extract.)

(Signed) H. C. MONTGOMERY,  
Chief Secretary.

FROM J. D. BOURDILLON, Esq.

Collector of North Arcot.

TO SIR H. C. MONTGOMERY, BART.

Chief Secretary to Government,

Fort St. George.

SIR,

1. I have the honor to acknowledge your letter of the 26th May, enclosing an extract from the Minutes of Consultation of Government of the same date, having reference to the proposed rail-road from Madras to the westward; and calling for my opinion on the question, where, supposing it to be determined to carry the rail-road beyond Wallajahnuggur but short of the ghauts, the terminus ought to be fixed.

2. The proposed railway has been called experimental; but I think the term is inapplicable and likely to mislead. The experiment has already been tried and succeeded, I will not say in England and other wealthy European countries, for the cases are not parallel, but in countries of less wealth and population to the square mile than this part of India, such as the western parts of the United States and Cuba. There seems indeed no room for doubt either that railways, cheaply constructed and worked at moderate speed, will

yield a profit here also, or that they will prove the same rapid means of improvement here that they have been elsewhere.

3. It appears certain, indeed, that railways must ultimately become the means of communication on all the main lines; and this being the case, I should prefer to begin at once with one complete line to the centre of the Peninsula, as for instance to Bellary or Bangalore. Because an incomplete line certainly works at a disadvantage; the inconvenience of the transfer of goods and passengers from railway to road, or vice versa, counterbalancing much of the benefits of the railway, especially where these benefits have yet to make themselves practically known. But if this complete line is not to be undertaken at first, the next best thing is to carry the rail so far, at least, as to ensure to it a decided advantage over the common roads, even in the eyes of those as yet ignorant of its value; and the present railway being restricted to this side of the ghauts, I think it should certainly go as near to them as possible.

4. Again, as to the direction by which the line should leave Madras, this has not been determined; but there seem to be abundant reasons for adopting that by Sholinghur. Captain Best's remarks in speaking of that line appear conclusive on this point. In respect both of cheapness of construction and stability, it is vastly superior to the lower road; and it has the further advantage of being precisely that line from which branches can best be taken towards Bangalore, Bellary and Cuddapah on the one hand, and Vaniembaddy, Salem and Coimbatore on the other.

5. Government appear to have fully admitted the validity of the reasons urged by Major Pears for carrying the railway beyond Wallajahpettah, and to have resolved to place the terminus on the further side of the Poonnay and Palar rivers. Practically the choice appears to lie between Vellore, Gooriatum, Vaniembaddy, and Moogly or Vencatagherry.

6. Vellore is a large and populous town, and though not a place of much manufacture or trade, its own wants and the travelling occasions of its population and their connections, make it a place of importance with reference to the railway. Being so extensive a place too, it could at once, and without inconvenience, furnish the accommodation which will be needed wherever the terminus is placed. It is also very little out of the direct line of a branch from the Sholinghur and Poonnay line towards Vaniembaddy and Salem. The objection to it is, that it would scarcely take the railway far enough to the westward, either to ensure a monopoly of the traffic, or materially to assist intercourse. Both the rivers, Poonnay and Palar, having been crossed, no great work will remain between Vellore and Vaniembaddy, and the line will be very easily made. I think, therefore, that if the railway is brought to Vellore, it ought to be continued to Vaniembaddy.

7. Gooriatum lies nearer the ghauts than Vellore, and it also is large enough to meet the wants of a terminus. It is in the direct road to the Naickanairy pass, and is also geographically about midway between Moogly and Vaniembaddy. But this place is open to very serious objections as a terminus.

8. In the first place, there is not at present any traffic whatever by this route; for the Naickanairy pass is in such a state as to be impassable by carts, except by unloading them wholly or in part, taking out the bullocks, and employing coolies, both for the cart and the load: it is very rarely, therefore, that a bandy passes up or down. A railway to Gooriatum would, consequently, be useless till access should be opened to it, either by this pass or by a road from Moogly, or by one from Amboor on the high western road.

NOTE. — Gooriatum is not a place of trade; it manufactures piece goods to some little extent.

9. As to the first, the repair of the Naickanairy pass has been more than once proposed; but the line is so bad, and it would cost so much to make a tolerable road, that the idea appears to have been abandoned. And even supposing this objection of expense to be overcome, and a road made up the pass, the country above, as well as the pass itself, is feverish; there is only a very small village (Naickanairy) at the top of the pass; the road from that point to the Mysore frontier (13 Miles) once made by the Pioneers but left without bridges, is utterly gone to ruin; and even beyond that, within the Mysore frontier, the road though not so entirely neglected, has been to a great extent given up, in favor of that to Palmanair and Moogly on one side, and that to Vaniembaddy on the other.

Again, as to making this station of use to the Ceded Districts, a road from Gooriatum to Moogly would run along the foot of the ghauts over a very broken country; it would consequently be difficult and expensive to construct, and it would also make an acute angle with the railway from Poonnay to Gooriatum.

Lastly, as to a road to be opened from Gooriatum to Amboor, a country road exists already and might be improved; but after all, even with such improved road, it would hardly be more easy (as there are two rivers to cross) to get from Amboor to Gooriatum, than from Amboor to Vellore.

10. Again, I cannot contemplate the probability of the railway being continued up the Naickanairy pass; and its continuation from Gooriatum must, therefore, be by a branch to Moogly on the one hand, and to Amboor and Vaniembaddy on the other. To the former place, a line would be very expensive; and to both places, a route from Madras by Gooriatum would be circuitous, and would so involve needless outlay. Even supposing the railway to be taken up the Naickanairy pass, the communication with the Ceded Dis-

tricts could scarcely be benefitted; for a line from Naickanair to Palmanair would be so expensive that it may be called impracticable, lying as it would, across the deep ravines and broken ground at the edge of the ghauts. For the foregoing reasons, I consider Gooriatum to be unsuitable for a terminus.

11. Vaniembaddy offers many advantages. Though not large in population it is a place of active trade, and Amboor, ten miles on this side of it, and through which the railway would pass, is still more so. It is situated on the high western road, and so is already the channel of a great amount of traffic, viz., almost the whole of that from Bangalore and the Mysore country, and the Salem and Coimbatore Collectorates, with Madras and the central parts of the Carnatic; and the increase and development of this traffic would be a more simple and natural process than the diversion of it into a new channel. Still it is open to the objection taken by government that a large part of this traffic, viz., that of Bangalore and Mysore, has been drawn to it by the accidental circumstance, that the more direct and better route by the Palmanair or Moogly pass has not been opened; and to the still more important objection that a railway to this point would do very little to aid the traffic of the Ceded Districts with Madras.

12. Major Pears avows his conviction that the most important line, as respects the interests of both the country and the Government, is that from Madras to or towards Bellary, touching North Arcot, Mysore and Cuddapah, and having in view ultimate connection with the Bombay railways. But he rejects that line in favor of that to Vaniembaddy, because the former, "though indisputably the first in importance to this Presidency," does not promise such immediate profitable return.

13. I cannot concur with Major Pears in his opinion on this question. It is justly observed by the Government, that the direct line for all the traffic between Madras and the Carnatic on the one hand, and Bangalore and almost the whole of Mysore on the other, is the Moogly pass and Chittoor. When the roads, now in progress between Arcot and the Mysore frontier by Palmanair, are completed, a great part of this traffic will, in no long time, be diverted to this route; and with a railway terminus at Moogly, this change would be more certain and more rapid. Then there is the traffic of the Ceded Districts, which is far from inconsiderable now, and which would be certain to expand with improved communications, and there is the sugar of Palmanair, Vencatagherricottah and Congoondy, which, even now, comes down the Moogly pass.

14. Some traffic tables prepared for the Moogly pass for the four months,

NOTE.—Tables taken at Poonnay in the same months give a daily average 36½ tons, or 13,300 yearly. A part of this came from Cuddapah by the Daumel Chittoor Pass.

November 1850 to February 1851, show an average of 24 tons daily, or 8,760 annually; but the greater part of the sugar passes down earlier in the season. I think 10,000 tons may be safely taken as the traffic of that pass for a year; and if we assume only 30,000 tons as that of the high western road west of Vaniembaddy, and Major Pears' statements warrant the assumption, and the suppose three-fourths of that quantity to belong to Bangalore and Mysore, the total to come to Moogly will be 32,000 tons annually, and knowing the wretched state of the roads on this side of Chittoor up to the present time, which makes it matter of surprise to me that cart traffic has been maintained on them

at all, I cannot doubt that a great increase on this quantity would follow the formation of a rail-road.

15. Looking at these considerations, I cannot think it expedient to give up Moogly in favour of Vaniembaddy, but at the same time, neither would I abandon Vellore and Vaniembaddy; and the plan which I would beg to propose is as follows. The railway to proceed from Madras to Sholinghur, or rather somewhat to the south of Sholinghur, where the ground is most favorable, to cross the Poonnay river about Mailpaudy or Poonnay, as a more particular survey may show to be best: at the first convenient spot after crossing the river, the railway to divide, one branch going to Moogly, and the other to Vellore, and either to have its terminus there, or to go on to Vaniembaddy, the latter I should consider preferable, for the reason given above when speaking of Vellore.

16. By this means, the whole of the traffic between Madras and this part of the Coast on the one hand, and the Ceded Districts, the Mysore country, the Salem and Coimbatore districts, the Neilgherry Hills and the Western Coast on the other, would be secured to the railway. In other words, supposing the traffic of the northern and western parts of North Arcot, the Ceded Districts, Mysore, the Neilgherries, and the Western Coast, to be secured by a line to Moogly, then that of the southern parts of North Arcot, Salem, and Coimbatore, will be gained in addition, by the few miles of railway from Mailpaudy to Vellore, or Vaniembaddy,

NOTE.—Taking Major Pears' calculation of the Vaniembaddy traffic, 50,000 tons to 130 miles would give 307 tons to a mile annually. But adding only 15,000 tons to the aggregate tonnage for the Moogly line (and I feel sure that it would soon greatly exceed that) we have 65,000 tons for 115 + 55. 170 miles, or 390 tons to the mile, for the whole distance.

as the case may be. Thus bringing 30 per cent. more carriage on the main line

between Madras and Mailpaddy, than could be obtained by adopting either of the above specified branch lines to the abandonment of the other.

17. As regards the Moogly branch, it will of course, be necessary to fix the terminus at such a spot as shall be convenient for the ascent of the ghauts, when the prolongation of the line shall hereafter be resolved on. From my slight acquaintance with the locality, I believe that a favorable place for ascending by an incline will be found immediately contiguous to the present Moogly pass; and that a convenient line for ascending with locomotives might probably be traced within a short distance. But though the precise spot for the terminal station cannot at present be exactly defined, this need not prevent the general and conditional adoption of the Moogly line: much remains to be done on all parts of the line before the work can be commenced; and while the surveys and estimates are advancing on the eastern parts, a few weeks accurate examination will be sufficient to fix on the best point and the best mode of ascending the ghauts; and it can then be finally settled, whether the station shall be at Moogly itself, or half a mile or a mile to the north or south of it, or whether it would be better to stop the railway for the present at Vencatagherry, five miles on this side of Moogly.

18. Though not within the limits of the question proposed to me by Government, I beg permission to add a remark on the proposed rate of charge for goods. Major Pears lays down one anna a ton a mile as the maximum, and frames his calculations of the returns on that basis. I think the rate too high. The ordinary cart rate at the present time is stated by Major Pears, after much careful enquiry, at 1 anna and 10 pie per ton per mile, for conveyance towards the coast, and he thinks that competition might possibly bring it still lower. Carts returning into the interior will take loads for half hire, rather than go empty, and Major Pears assumes 1 anna 6 pie, therefore, as the average rate. But supposing the railway to secure the conveyance of goods towards Madras, there would be no return carts: in comparing the present rates, therefore, with the future railway rates, the full cart hire must be taken.

19. But even taking that, I think that a charge of one anna by the rail, though with the great collateral advantages of quickness and security, would be too high either at once to draw all the traffic to the railway, or to give much relief to the trade of the country. I think the rate should not exceed half an anna a mile per ton; but even at this reduced rate, I feel no apprehension as to the aggregate annual receipts falling short, after a very few years. For Major Pears in his estimate has taken credit for nothing on account of passengers, (troops excepted) but has only thrown them in as a make-weight. But I cannot avoid thinking that in this country, as in England and elsewhere, the passenger traffic will give much larger returns than that of goods; and I think one great advantage of a railway (as Major Pears remarks) will be to open the in-

terior to the merchants of this Presidency, and one district to the people of another: thus extending the wants of all beyond their own locality, and promoting industry and the beneficial interchange of its products.

I have the honor to be,

Sir,

Your most obedient Servant,

(Signed) J. D. BOURDILLON,

Collector of North Arcot.

MADRAS, 4th July, 1851.

SUPERINTENDENT OF ROADS OFFICE;  
CAMP CONAIRY COOPUM, 5th July, 1851.

No. 153—1851.

FROM CAPTAIN S. BEST,

*Superintendent of Roads.*

TO SIR H. C. MONTGOMERY, BART.

*Chief Secretary to Government,*

*Fort St. George.*

SIR,

1. In submitting the following remarks in accordance with the desire of the Right Honorable the Governor in Council as expressed in Minutes of Consultation, No. 465\* I

\* 26th May, 1851.

have the honor to state that, although I have not failed to give my best attention to the important subject on which my opinion was called for, the information that I possess as to many of the circumstances on which the correct solution of the problem rests, is so extremely meagre, that I cannot but be sensible how far the conclusions I have arrived at may, or rather must, be from correctness: and, that I might myself change my view of the matter very much, if better means of examination enabled me to obtain a clear insight of it. Such as these remarks are, I have endeavoured to explain the grounds of my opinions, so that where they are found in error, or the deductions incorrectly made, the invalidity of the conclusions may be evident.

2. It is impossible to study the map of Southern India with any degree of attention, without being struck by the remarkably unfavourable position of its metropolis. Great as is the amount of capital invested in this ill-chosen spot, it is probable that the place on the coast to the southward, where a tolerable pier shall be first erected, may draw away much of its trade. It is, too, possible, that for a sum not greater than that which a railway to Vellore is estimated at, the entrance to the Coleroon might be kept clear, and Devi-

cotta made a port fit for the reception of a fleet of large ships, and possessing the advantages of a river capable of conveying produce from 150 miles inland, at almost all seasons of the year; and the neighbourhood of by far the richest and most populous of our districts.

3. If a straight line be drawn through Mysore, and Chittledroog, passing a little west of Bellary and east of Chintroypatam, the east coast will be from twice to three-times as distant as the west. Thus, from Seringapatam, Cannanore is 3 times as near as Madras: from Chintroypatam, Mangalore is twice as near: from Chittledroog, Coompta and Meerjan are nearly twice as near as any place on the east coast; and from Bellary itself, very much nearer than any so situated. If another line be drawn through Alamparva and Bangalore, all places to the southward are nearer to Cuddalore or Porto Novo than they are to Madras. Allowing the existence of a rail-road from Vaniembaddy 125 miles long to be equivalent to a reduction of distance to the extent of one third or 40 miles, it would still be better for all places south of a line drawn through Alamparva and Trinomallee, to send goods to Cuddalore for shipment, than to Madras; even though Madras were not so remarkable, as it is, for suffering from gales more frequently than any port to the south of it, and so destitute of shelter, for the protection, and of suitable conveniences for the repair of even a dhony.

4. The chief scope of the Madras export trade is thus limited within a space which may be described as bounded by the coast, the northern Pennairoo, which passes by Nellore, and the southern Pennaur, which disembogues near Cuddalore. The sources of both these rivers are found in the neighbourhood of Nundidroog.

5. With regard to the internal trade from the south, for the advantage which the town of Vaniembaddy has been proposed as a terminus, it is to be remarked that high mountains, which themselves occupy considerable space and which are skirted by wide tracts of jungle, intervene between the Salem and the Arcot and Trichinopoly districts. Through these, the Chungamah and Ahtoor passes afford the only direct communication. A line through Salem and Dindigul divides the southern districts equally, and shews which places are nearer to Pomany and the west coast, and which nearer to Negapatam and the east coast.

6. Another line, drawn from Dindigul towards Gooriatum, shews that places to the west of it may follow the road by Salem and Vaniembaddy towards Madras, but that it will be shorter from Dindigul itself and from all places east to go by the southern trunk road through Tooldoor and Tindivanam, or by Tiagurh and Trinomallee. If traffic by the latter route made use at all of a rail-road between Madras and Vaniembaddy, it would fall into its line at Vellore, or further still to the eastward.

7. The chief reason why a few carts from Dindigul and Trichinopoly now go to Madras, via Salem and Vaniembaddy, is because the southern trunk roads are as yet incomplete, and the cotton soil between Ootatoor and Asinoor is barely passable in wet weather, while the Salem road, which goes over favorable ground, is comparatively good; but the southern trunk roads will be finished in a year or two. Dindigul is 260 miles from Madras by way of Trichinopoly and No. 8 road: but 310½ miles by way of Salem, Vaniembaddy and No. 1 road. By Trichinopoly and Vellore to Madras the distance is 309 miles, but the road from Trichinopoly to Vellore from Tooldoor northwards is an unmade track, and it can hardly be expected that the advantages of going by railway 85 miles will be such as to induce the owners of goods to send them 49 miles out of the way and, for 120 miles, over a bad road instead of a better one. Hence, I conclude that there will not be any commensurate benefit derived by carrying on the rail to Vaniembaddy, and that no great portion of the trade of the south will make use of a railway, unless it meet it more directly than a Vellore and Vaniembaddy one would do.

8. The terminus and direction of the rail-road should be such as to save transport as much as possible, but they should also be selected mainly with reference to the facility of construction, not only to the foot of the ghauts, but up the ghauts, and beyond them. I am not sufficiently acquainted either with the nature and extent of the traffic between Madras and places westward, or the form of the ghauts themselves, or that of the Mysore and Cuddapah countries, to speak with confidence on these subjects. The old passes into the Carnatic were probably selected as offering the fewest obstacles, when it was not common to make large outlay for the improvement of communications. It is, therefore, not impossible, that a better line for a ghaut than any now followed may be discovered: but, from what I have seen of these mountain acclivities, I think it is not likely that a pass, such as locomotive engines can ascend or descend with safety, will be practicable without inordinate expense. The train would run of itself down a slope of 24 feet in a mile or 1 in 220, and as the height of the ghauts above the plains below is from 500 to 800 feet, the length of the road up would be 20 miles at least. Of the existing passes, the easiest by far is that of Shoolagherry, or the road to Bangalore by Kistnagherry and Oossoor. This may be improved, and would probably be the easiest known line to carry the rail-road on. The Peddanaickdroog or Naikenairy pass from Gooriatum is a great deal too steep for wheel carriage, though carts, helped up by coolies and double teams, do still use it. Of the Synegoontla ghauts, I have seen but part. It is, I believe, somewhat better than the Naikenairy. The Moogly ghaut ascends 579 feet from its base in a length of 27,603 feet, including descents of 97 feet in a length of 5,961. Thus, its average acclivity is 1 in 32, but in one part, 978 feet long, 1 in 12½.

It is a bad ghaut; and, without entirely re-making parts of it, not capable of much improvement. The Damulcheroo ghaut is naturally more favorable. It ascends about 500 feet in about 25,000, and at an expense of Rupees 12,000 it may be made so that the greatest steepness may fall short of 1 in 20.

9. The country above the Damulcheroo pass is more rugged and uneven than it is further to the south; but, every where west of the foot of the ghauts, if deep cuttings become necessary, there must be much blasting of granite rock, which shews itself in numerous large patches and boulders on the surface. Where the granite is hidden, the soil is usually hard and gravelly and of little depth.

10. With regard to Vellore and Gooriatum, I am of opinion that neither place is well situated with reference to any future prolongation of the line; Vellore being, properly speaking, on the south west rather than on the west line, and Gooriatum facing a part of the ghauts which I expect will be found the least favorable for ascent, whether by rail or otherwise.

11. With regard to the road from Trivalum towards Chittoor, it should be observed that the ground over which it passes between Trivalum and the point of junction, near Punnautoor, with the Vellore and Chittoor roads, is uneven; and that a railway could not be made without great deviations from the line of the road now under construction. Still less favorable would be the line onwards to Chittoor, which passes over three short ghauts at a slope of 1 in 20, and is, in many other parts, much too steep for a rail-road. A road direct to Moogly was once surveyed, by Captain Lawford, and again by the late Captain Vardon, but much of the country is covered with rocks and rocky hills that would impede the construction of a railway, or render it expensive and difficult.

12. The chief weight of the trade to Madras is, I believe, produced north east of Palmanair, Penconda and Bellary, and, considering which are the producing tracts and the way in which they are distributed, it seems that the rail-road should have its terminus near to Poinay, whence one branch might proceed in the direction of the Moogly pass and Bangalore, and another up the right bank of the Poinay river, to meet the Bellary traffic by Damulcheroo, or any other pass that may be found in that neighbourhood. The latter branch need not cross the Poinay river unless within 6 miles of the ghaut. The former might cross it where it is between 70 yards and 80 yards in width. At Trivalum it is 492 yards wide. The Palaur would not need a bridge, were either Gooriatum, Moogly or Damulcheroo the terminus. Preference cannot fairly be given to Vellore as a terminus, because that if the railway go there, the Palaur will be bridged. The construction of a bridge across the Palaur near Wallajahnuggur or Arcot is very desirable in itself, and a bridge may be built which would carry over common carts, as well as

railway vans and waggons. The railway should stand or fall on its own merits, and not on the ground of being provided with a bridge from which ordinary traffic would be excluded.

13. \*A line has been surveyed and marked out by the Road Department, which, although not intended for a rail-road and in parts much too steep for one, traverses country generally favorable, and such that a rail-road might perhaps be made within a short distance. As the precise lines of rail-road are not ascertained, I shall assume that the present trunk road (No. 1) to Vellore and the road to Gooriatum may be compared with the proposed (No. 11) trunk road to Damulcheroo and (No. 10) to Moogly, instead of two lines of rail to the same place.

14. On these two lines, the distances from Madras are nearly as follows:

|                       | Miles. |                      | Miles. |
|-----------------------|--------|----------------------|--------|
| To Wallajahnuggur.... | 64     | To Cavetrajpett..... | 60     |
| To Gooriatum... ..    | 104    | To Moogly .... ..    | 104    |
| To Trivalum ..... ..  | 76     | To Damulcheroo....   | 107    |
| To Moogly direct....  | 110    | To Chittoor ... ..   | 85     |

Thus, the distances being nearly equal, comparison may be made of Cavetrajpett (near Poinay) as a terminus with Wallajahnuggur, and of Gooriatum with Moogly and with Damulcheroo.

15. In respect of the local traffic of the country in the immediate neighbourhood of these lines, the Wallajahnuggur and Gooriatum line has, I consider, the advantage. It would pass nearer to the lands irrigated by the Palaur and the tanks which receive water from that river; and, not only is the country near it more fertile, but the towns and villages along it are of somewhat more consideration. Streepermatoor, Conjeveram, Wallajahnuggur, Arcot, Vellore, Gooriatum, and Amboor, are the chief places near the one line. Trivalloor and Tripassoor, Sholingapooram and Chittoor, are adjacent to the other.

16. But, for the conveyance of goods from places at a greater distance, and therefore, as regards the continuation of the railway, the advantages preponderate on the side of the more northern line. The range of hills, which divides Cuddapah and Kurnool from Nellore and Gunttoor, has so few passes, and those so difficult, that the trade of those districts with Madras is forced to go rather westward, and most of it must come by the Naggry or the Damulcheroo pass, or by a yet more circuitous route, descending the ghauts still further west and south.

17. A railway, passing near the line marked out for No. 11 road, would serve, without lengthening the present distance, to convey goods for 25 miles or more, after they had descended the Naggry pass. Rating 3 miles of rail

as equal to 2 of common road, it would virtually bring Madras 8 miles nearer to Naggry. The other line would probably be 7 or 8 miles to the south and would, therefore, in no way assist this portion of the traffic.

18. In like manner, Cavetrajpett is on the nearest road by which goods can reach Madras from any country north of the Presidency and west of the Tripetty hills, and those which encumber the eastern portion of the Cuddapah district. The railway, going by this line, would save (at one third the real distance,) about 22 miles of transit: whereas Wallajahnuggur is 11 miles out of the way to the south as regards all places east of  $78^{\circ} 45'$  and north of  $13^{\circ} 10'$  and is (in direct distance) farther off than Cavetrajpett from all places north of a line passing through Calicut and Gooriatum.

19. So also, supposing the railway to be carried further westward, a terminus at Damulcheroo would be 16 miles nearer than one at Moogly, and 32 miles nearer than one at Gooriatum to all places east of  $79^{\circ}$  longitude and north of  $13^{\circ} 30'$  while it would be the nearest to all places north of a line passing through Chittoor and Balsamoodrum, Moogly being nearer than Gooriatum to all places north of a line passing by Vellore and Sircy.

I have, &c.

(Signed) SAMUEL BEST,

*Superintendent of Roads.*

FROM MAJOR F. C. COTTON,  
*Engineers.*

TO SIR H. C. MONTGOMERY, BART.  
*Chief Secretary to Government.*

SIR,

1. Agreeably to the instructions conveyed in your letter of 26th May 1851, I have the honor to forward to you my opinion upon the right direction and terminus for a rail-road, supposing it to be carried further to the westward than Wallajahnuggur.

2. Before I could give an opinion on this point, it was necessary for me to determine how far the rail-road would repay its cost of working, with the interest on the money spent in its construction, supposing the money to be borrowed at 5 per cent. Not having Captain Collyer's estimate in detail, I cannot express an opinion upon that, but I do not hesitate to trust it, and Major Pears' able and very complete report furnishes me with all else that is required.

3. From a close examination of these papers, I feel convinced that a single line of railway such as is projected, carried to Vaniembaddy or any

point at the entrance of the Amboor valley would repay immediately more than 5 per cent interest on the outlay. This conclusion I have arrived at, by allowing a lower rate for goods than Major Pears (8 pice per ton per mile;) but, taking into account, as a certainty if that rate is established, a great increase in the traffic on the line, from the reduced cost of carriage, I don't doubt that from the distant stations, the additional security, with the reduction from the present cost (one anna and 8 pice) to one anna a ton per mile, will increase the traffic considerably; but I feel equally sure, from the low value of much of the produce of the country that enters the Madras market, that the railway will, by its effect on trade, work to greater profit, if the rate is as low as I have reckoned it. That it might be brought down still lower, I consider possible, but I have taken 8 pice as a rate that may be fairly trusted, and ensure the railway being remunerative, provided that no canal or cheaper means of transit is opened parallel to it. In the present state of India, cheap carriage of goods is what is wanted, and that, in many positions, would be better effected by a canal than rail-road; but in this case, a rail-road being determined on, it is only left to work it as cheaply as is consistent with security, which has evidently been Major Pears' intention in all that he proposes. I have reckoned also, as a certainty, a profit of considerable amount from passengers, which I do not hesitate to do, taking the lowest rate of 2 pice per mile, as that will bring rail-road travelling within the means of men earning 4 annas a day; and I am borne out by the fact, that great use is made by travellers of Cochrane's canal, on which the boats cannot move faster than a man can walk, and the fare paid is  $3\frac{1}{2}$  pice per mile or  $3\frac{1}{2}$ . Such a rail-road as is proposed, worked at the rate that I allow, will pay a high interest upon every mile, if it extends far enough into the country. I think, with Major Pears, that it will pay 5 per cent if only taken to Wallajahnuggur, and that it will pay far better in a rapidly increasing progression, the further it extends, provided it is passing through a country that can bring its produce to the road on either side; the influence of the road, both north and south, extending further every mile it runs. The greatest profit upon the outlay in this particular case, would, it appears, be derived by extending the road to Vaniembaddy, as, up to that point, the combined traffic from Salem, and the Baramahal, with the south of the Mysore, supplies the goods we reckon on, but beyond that the quantity will lessen.

4. Had the returns of the railway not promised so well, I would have recommended that it should terminate at the entrance of the Amboor valley, from which point the southern produce is cut off by a long range of hills, following the course the road will take; but as, mile by mile, it will pay well eastward of Amboor, it will do no less up to the point at which the line from Kistnahgerry joins it. I think, therefore, that there cannot be a question as to the advisability of its being taken so far, should that line be determined on in

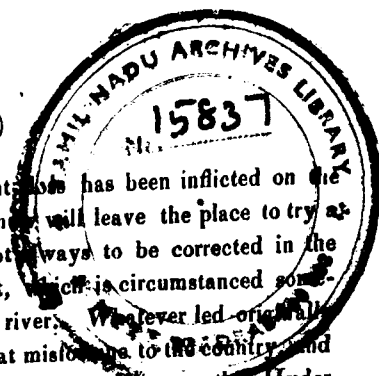
preference to all others. But, as Major Pears has shewn, (Para 57) there is a line of infinitely more importance, and one which seems to offer no engineering difficulties, which should, in my opinion, either be opened first or simultaneously. The line I allude to, would be a continuation of the Wallajahnuggur road, running towards Bellary. No one can look at a map without seeing how much wider a field is to be benefitted in that direction, even if the returns of trade did not shew, as they do, most important traffic in that country now. From these returns, I see the value of goods is far greater from Cuddapah and Bellary than from Coimbatore and Salem, the respective amounts being as follows:—

|                 |                  |
|-----------------|------------------|
| Cuddapah.....   | 25,46,357        |
| Bellary.....    | 2,83,676         |
|                 | <u>28,30,033</u> |
| Coimbatore..... | 2,91,538         |
| Salem.....      | 8,33,056         |
|                 | <u>11,24,574</u> |

and although the principal item in the Cuddapah list is Indigo, which, from its great value, will be benefitted less by cheap transit than the produce generally, it will, on the other hand, be that which profits most by security and speed. These returns were made in 1842, when there was no tolerable road in this direction, none by which the cheaper goods could travel to the coast without their value being expended upon carriage, which doubtless may account for the more valuable commodity taking so prominent a place in the account.

5. And when it is remembered, that this line leads from the most important cotton fields in this part of India, and that the country is still without a road direct to any part upon the eastern coast, that alone might turn the scale in favor of this line; for it is evident, every facility must now be given for bringing the cotton of this country to a shipping port, and where there are no roads,—roads of some kind must be opened.

6. The Vaniembaddy railway, it is possible, might, in some degree, affect the Bellary cotton, but if it did so, it might be to its eventual loss, as has actually been the case upon the western coast; where, for economy, the cheapest pass was opened to the port, and the result is now, a needless charge upon the Coompta cotton, that we see no present hope of lessening. Here, during the Affghan war, when money could not be found for public works, a bullock road was opened at a trifling cost, to give the cotton an outlet to the sea, as it was thought better then to have a road of some kind, than to leave the country closed. Coompta rose into importance with unprecedented rapidity, and now that the carriage road by Devamunny has been opened to the Tuddry river, the mouth of which is only 12 miles north of Coompta, with facilities for trade, such as are not to be found between the ports of Goa



and Cochin, it is evident that a permanent loss has been inflicted on the trade that cannot be corrected; for no one now will leave the place to try a new location. And that such an error is not always to be corrected in the course of years, we have the case of Calicut, which is circumstanced somewhat similarly with reference to the Beypoor river. Whatever led originally to its present position being chosen, was a great mistake to the country, and so clearly was it seen, in former times, that such had been the case, that Hyder made an effort to correct it by obliging all the leading merchants of the town to change their place of residence; but, although the Beypoor river affords a sheltered harbour for the coasting craft,—timber is to be had for ship-building, and vessels of 800 tons can there be launched and floated out to sea: in short, that there is, only 8 miles distant from Calicut, a noble site for a commercial town to rise upon,—no sooner was the restraint removed than the inhabitants returned to where they first located, preferring their former homes to all that Beypoor offered; and, while Calicut is every day increasing, Beypoor remains almost as much deserted as it was in Hyder's days.

7. If the rail-road now projected, was for some years the only one, it would undoubtedly give a wrong direction to the trade, and might well cause such a loss as I have mentioned on the western coast. That the south western line is inferior, and “in the system of rail-roads” alluded to by the Court of Directors, a very secondary or small branch line, there cannot be a doubt. Beyond Vaniembaddy, it will influence beneficially the Baramhal and southern talooks of Mysore, and be of use to Salem and the country round it; but, the roads of Coimbatore having been improved, and a line opened to the

western coast, the cotton and other produce of that district no longer come down to Madras (vide appendix P) nor would it do so by a rail-road. While

the south of Salem has cheap carriage to the sea upon the Cauvery river, the eastern talooks are cut off by a range of hills, so that they cannot use the rails; and, as for the trade between Madras and Dindigul and Trichinopoly, that, no doubt, will find its way over the Cauvery and Coleroon bridges to the trunk road now in progress, even supposing that the southern coast canal, so long projected, is not carried out, to give it a cheaper carriage in its right direction than the rail-road could afford, after it was reached by many miles detour.

8. That the south western branch line will pay immediately, is, I think, established, and it is clear that the line taken to the north west will pay much more, eventually; the selection of the former having been made, in some degree, under the impression that the latter will not be so remunerative at once. This, in my opinion, is not right, with such a trade as that of the cotton of Bellary wanting a road to market. I believe that the rail would be no sooner laid down, than it would be used to a more profitable amount than the south wes-

tern line will ever pay. The effect of the wretched pass leading to Coompta (already quoted) was magical *the first season* it was opened, though the distance the cotton had to travel to reach the sea was much greater than it will be here. The best carriage offered was a brinjaree bullock, which, by the report of the Bombay Chamber of Commerce, so injured the material as to bring it into the market below the produce of all other districts; whereas a railway here would give the most perfect safety,—a quicker and a cheaper carriage; under which circumstances the effect, we may safely say, would be no less immediate on the line I now propose than it was upon the Coompta road, i. e., the first season it was opened.

9. The first rail-road then, should, in my opinion, on all accounts be laid down in the direction of Bellary; but, as the south-western line will pay as a speculation, and at the same time benefit the country, it would, of course, be most advisable that it should be laid down also; and then the eastern portion between Madras and that point, at which the two branch off, will have the full advantage of them both, and yield much more than any thing that has been calculated upon either line.

10. There seems to me no question to be answered by a trial in a case like this. If we can shew that a rail-road will only cost a certain sum, and that, in working it to the profit of its owners, we can reduce the cost of carriage below any means that are to be brought against it, and at the same time give advantages with which no other mode of transit can compare, we have done all that is necessary, and a rail-road is no more experimental here than if it ran between two points in England. In this particular country, the estimate for such a work can be made with an accuracy such as could not possibly be obtained in any part of England, the engineering difficulties here being at their minimum. We may safely say, that we know what the work will cost in its construction, the locomotive charges are of the simplest calculation. We have returns to shew what the traffic will produce at once; and, when we see that railways benefit a trade in rightly wrought commodities, such as those of England, we cannot fear its having less effect upon our raw materials, the price of which upon the coast depends so much upon the cost of carriage.

11. What I would then venture to suggest is, that steps are forthwith taken to estimate the north west line, as far, at least, as to the summit of the ghauts.

I have the honor to be,

Sir,

Your most obedient Servant,

(Signed) F. C. COTTON,

Civil Engineer.

MADRAS, 12th July, 1851.

FROM MAJOR T. T. PEARS, C. E.

Engineers.

TO THE CHIEF SECRETARY TO GOVERNMENT,

Fort, St. George.

SIR,

I have the honor to acknowledge the receipt of an extract from Minutes of Consultation, No. 583, in the public department, dated the 25th June 1851, communicating correspondence noted in the margin, and directing me to give my attention specially to the views of the Honorable Court, and report my opinion on the proper direction of a railway, the object of which would be to facilitate communication for political purposes.

Letter, No. 306, from Secretary to Government of India, 22d May, 1851.

Extract from a dispatch from the Honorable Court of Directors, in the Financial Department, No. 17 of 1851, dated 12th March.

Do. do. do. No. 16, of 1850.

2. In my report of the 5th March last (para. 8), I referred to the instructions of the Honorable Court on this subject; and the sketch which accompanied that report, and to which I referred in the 9th para. of the same, was prepared for the purpose of shewing the general direction of the lines, which would be considered the first in importance, within the limits of this Presidency, in a political as well as in a commercial point of view. I shall now, in obedience to the order under acknowledgment, submit for the consideration of Government my views upon the importance of the several lines, as facilitating communication for political purposes.

3. Considering the circumstances under which we are placed in India, the points between which it would appear desirable to establish the best possible communication for political purposes, would be

1st. The seats of Government of the several Presidencies.

2d. The Capitals of the several Presidencies (thus united) and the most convenient port for communication with Europe.

3d. The seat of Government at each Presidency, and the chief Military station or stations under its authority.

4th. (If not provided for among the above) the principal ports on each side of the peninsula.

And lastly, it would be desirable so to connect the railways throughout the Empire, as to place the resources of all, within the reach of any one Presidency when required for Military operations, either within its limits, or upon its frontier: the whole scheme being completed by frontier or coast lines.

4. In projecting a system of railways upon the above principles for political purposes, we should find, in the Madras Presidency, a line of railway running up the coast to Calcutta, and another down by Trichinopoly to the

Travancore frontier; a third across the Peninsula either to Cochin or Mangalore; a fourth from Madras to Bombay; and a fifth from the neighbourhood of Trichinopoly, by Bangalore and the Ceded Districts, through the Hyderabad country and Berar, completing the communication between this Presidency and the North West Provinces.

5. Each of these lines would possess a degree of importance proportioned to the probability of its being called into exercise for political purposes: its value would also depend, relatively, upon the nature of the means of communication which in each case already exist, and which the railway would supersede.

6. But, in a work of such magnitude before us, we should, in determining the line or lines to be first undertaken, have not only to consider their relative political importance, but also to observe how far in each case, the social and commercial were likely to accord with the political value of the line; and thus, in fact, to commence operations with that wherein we found these several ends answered in the highest degree.

7. In a military view, the system of railways would not be complete without the coast lines, among which, one, at least, derives additional importance as connecting Madras and Calcutta; but, in considering the expediency of constructing such lines, we should find that, as commercial speculations, they were most unpromising: and that their value for political ends was only likely to be felt upon remote and improbable contingencies: while, for those purposes, communication by sea offered present advantages which were wanting on other projected lines of, at least, equal political importance.

8. Contenting ourselves, therefore, for the present, with communication by sea along our coasts, even between the seats of Government of Madras and Bengal, we have to select for our first work one of the remaining lines above described.

9. A line from Madras to Bombay, would pass near the important Military post of Bellary, which appears, at the same time, a good point of departure for a great trunk line connecting the Madras railways with those of central India.

10. This, however, would be a great and expensive undertaking, very important no doubt in its effects, but not likely to pay for some time. As far as Bellary, it would be of great value to this Presidency for commercial, as well as political, purposes; but, (having always before us the prospect of ultimate completion of the whole net work of railways) it may be questioned whether the communication with Bombay should not be first completed by combining the operations of a line across the peninsula here with those of steam packets on the other side.

11. A railway thus thrown across the peninsula from Madras, either to

Cochin or Mangalore, would be a great commercial, as well as political work. It might be made use of (during the greater part of the year at all events) to expedite the conveyance of intelligence from Europe to Madras, and the eastward; and would be a very great advance upon our present means of communication with Bombay—the direct line to which place might come hereafter.

12. It appeared to me, from the above considerations, that the best line (in every sense) for us to begin with, would be that now proposed experimentally westward from Madras. For the first 60 miles at least, it would answer many of the most important political ends, while it would be, as a whole, the most desirable for commercial purposes.

13. Under favorable circumstances, the first line projected would be, perhaps, one starting from Madras, with a northerly tendency, through Cuddapah to Bellary and Bombay; but circumstances are very unfavorable for such a line. The Cuddapah district offers many serious impediments which, it is neither necessary nor desirable that we should encounter in the first stage of our proceedings; whereas, the line running nearly west from Madras appears to be the most favorable that could be chosen for an advance towards communication with the other coast, with Bangalore, Bellary, and Bombay.

14. Having a line thus laid to Bellary, there could be no doubt of the proper mode of making the communication between this Presidency and Central India: nor could a more convenient point of departure, for a line in that direction, be found than Bellary itself. For political purposes, it may be of more importance to establish communication between some central points in each Presidency than between the seats of Government themselves.

15. Considering, however, as I do, that the line to Bellary is, upon the whole, the most important to this Presidency, I would wish to be understood as not intending that the communication with that place should be at once made direct, on the contrary, I conceive, that, as a general rule, the direct lines should be left to the last; and that, consulting the local as well as the general interests of the country, the communication between two distant points should, in the first instance, be effected by means of such intermediate links, as should form the most valuable chain of communication in its several parts, as well as in its whole length.

16. We should, in fact, do deliberately here, what successive Railway Companies (influenced by local rather than by general or national interests) accomplished in England, viz., complete the communication from one end of the land to the other, by means of several independent lines. By this means, we have not only the desired communication from end to end, but we get possession of the best local traffic, and supply the most pressing local demands for transport. Direct lines will come in their turn; when those first made will take

their proper places as valuable, though it may then be subordinate, members of the entire system.

17. The views which I entertained in recommending the construction of

Report, March 5th, 1851.

NOTE.—It will be evident that Vaniembaddy has not been selected from any importance attached to the place itself, but from its position.

a line to Vaniembaddy for commercial reasons were as follows. I considered that such a line would be, in every point of view, the best for an experiment; considering it merely as the first of a series of railways to be carried across the country, it would be the best to begin with; as falling in at once with the course of a great portion of the existing traffic,

and leading in a direction which would also render it of great value as a political instrument. Considered not only as the first but as the last (and if "experimental" we must, however, unwillingly admit this hypothesis), then it must be confessed, that no other line of equal length would offer so great promise, either of benefit to the country, or advantage to its own proprietors.

18. There is no expensive or difficult ghaut to ascend, and the line promises to be throughout of cheap and easy construction. Completed and brought into operation as far as Vaniembaddy, a line might be carried on to Bangalore (after careful examination of the ghauts) either by a branch from the neighbourhood of Sholinghur by Palmansair, or by one taken from Palli-condah by Gooriatum to a pass near Sautghur, or even by an extension from Vaniembaddy itself. A line then carried from Bangalore to Bellary would complete the connection between the latter place and Madras.

19. Having accomplished thus much, the question would arise, whether we should proceed to extend the line from Bellary to Bombay, send a line down to the opposite coast (Mangalore) from Bangalore, or one from Vaniembaddy to Calicut or Cochin. I am disposed to think, the latter would be the wisest course: we should be in a much better position for determining the question then, than we are now.

20. I have taken for granted that the railways first constructed will be those most wanted, viz., across the country, from the coast to the various points in the interior; and that, for some years to come, the communication must be completed along the coast by sea. The navigation of these coasts is attended with many great advantages. It is true, that there is a great want of places of security for shipping, and that at certain seasons of the year the coasts are not to be approached without risk; but these seasons are limited, on the western coast, to three, and on this, to two months of the year: while in the latter case, there are, in fact, very few days in the year whereon communication with the shore is actually impracticable. The very marked character of the seasons contributes greatly to the safety of the navigation in these seas. But while the character of the climate and regularity of the seasons

thus favor the coast navigation, the communication between the two coasts is maintained under very different circumstances, and with greater difficulty: and, although the works carried on for some years in the Paumbum channel have tended much to the removal of these difficulties, enough remain to render a railway across the peninsula a very desirable work in every point of view.

21. Whether the port of Cochin\* would be found, or could be made, a

place of safe resort for packets during the monsoon, as well as during the remaining nine months of the year, is a question of some interest in connection

with the present subject: but it is one upon which, I am not now in a position to offer an opinion. It appears, however, certain, that the introduction of railways in this part of India, will, at all events, render Madras a very important point of departure to China, and, indeed, to all the colonies eastward of the Cape. This importance would be, of course, greatly enhanced by any arrangement of the railways that should facilitate the conveyance of intelligence to and across the peninsula of India, by the shortest possible line between Aden and Madras.

22. It will be seen, that I consider Bellary to be a point well worthy of first attention in laying out railways in this Presidency. In the heart of the peninsula, and on the direct line from Madras to Bombay, a fortress, and an important Military position, the chief town of an extensive and fertile district, with a population at the present time of 40,000 souls, there is no place under this Presidency which stands more in need of improved communication with the coast; while there is none that in position and character (whether we view this as a commercial or a political question) offers so eligible a site for one of the principal stations of Southern India.

23. The climate of any particular district will not, perhaps, weigh much one way or the other, in determining the exact course of any of our lines of a railway. If any attention were shown to this consideration, preference would doubtless be given, ceteris paribus, to the less healthy parts of the country, to those localities where, in the present state of affairs, risk from fevers or other diseases, tends to increase the difficulty of carrying on the traffic of the country.

24. The climate of Bellary and of the Ceded Districts is not, as far as I am aware, generally unfavorable to health. That part of the country is, however, I believe, peculiarly subject to severe visitations from Cholera. The conveyance of troops and travellers through the country at such seasons will be one, and not the least, of the benefits conferred upon us by the railways. In substituting movement by rail for the long and tiresome marches, it appears likely, that one cause of this terrible disease will be actually got rid of: while, by offering the means of conveyance to troops and travellers,

through, or from, a station actually infected, the interests of Government and the cause of humanity will be alike served, many lives may be saved, and much done to mitigate the paralysing effect on the commerce of the country, too often resulting from the spread of this pestilence. These remarks apply with equal force to the line now proposed to Vaniembaddy; a march up the Amboor valley being, at all times, attended with peculiar danger from disease.

I have the honor to be,

Sir,

Your most obedient Servant,

(Signed) T. T. PEARS, MAJOR,

Engineers.

MADRAS, 12th July, 1851.

#### EXTRACT FROM THE MINUTES OF CONSULTATION.

PUBLIC DEPARTMENT,

No. 812.

Dated 29th August, 1851.

Para. 1. In their order of 16th Instant, No. 766, the Government directed Major Pears to compare the estimates submitted with his \*report with the contract for the

\* 4th July, 1851.

railway from Bombay to Tannah. The further consideration of this part of the subject will be deferred till Major Pears' reply is received.

2. The Government now proceed to the question of the line which a railway running out of Madras westward should take, and the terminus to which it should be carried.

3. In considering this question, Government have to give heed particularly to the object of facilitating communication for political purposes, besides the objects of promoting commercial and social intercourse.

4. The line to Wallajahnuggur, already surveyed by Major Pears, will not answer on this view of the question. It is probably the best line that could be taken if no ulterior object beyond what was proposed to Major Pears were contemplated; but it is clearly not the best line to serve as a basis for a system of railways, for the purposes of commercial, social and political intercourse and communication, and unless as a mere experimental line, it ought not to be chosen.

5. Mr. Bourdillon recommends that a single line of railway should be carried due west from Madras, to a point some miles beyond Sholunghur, whence one branch should be directed to the bottom of the Moogly pass, and so on to Palmanair, the Ceded Districts, &c., whilst another branch should tend to the south-west and approach the northern bank of the Palar river, opposite to the town of Vellore.

6. Mr. Bourdillon seems to think that Gooriatum, which was one of the places suggested as a terminus in advance of Vellore, is not suited to that purpose, on account of the natural difficulties of the face of the country in its vicinity, and the impossibility of ascending the Naikanary ghaut, which would render a great detour necessary without any corresponding advantage.

7. The line No. 2, marked red in the map submitted by Major Pears, which for 65 miles would serve in common for Bellary and Bangalore by Palmanair in one direction, and for Vellore, Salem, &c., in another, appears to be decidedly the one to be preferred for all the objects contemplated. For the political object, and equally for the commercial one, a line to serve in common for Bangalore and Bellary, as far as it can be carried, is of the next importance. Considering the difficulty and expense of carrying a railway up the ghauts, the Government, in Extract Minutes of Consultation, dated 26th May 1851, called for the opinions of the Officers, whose reports are above recorded, as to the point short of them at which the terminus should be fixed. Major Pears has indicated Vencatagherry, 5 or 6 miles from the bottom of the Moogly pass, leading to Palmanair. Mr. Bourdillon suggests that it should be fixed there, or at Mooglee itself, or within a mile of it, according to the determination that may be come to as to the best mode of ascending the ghauts.

8. The Right Honorable the Governor in Council resolves that Major

Resolution. Pears be directed immediately to survey the line

No. 2, marked red on his map as far as Menil or Mailpady, or some other place on the right bank of the river Ponay, convenient for the divergence of the lines to Vellore and towards the ghauts respectively, and to follow this up as speedily as possible by a survey of the line from that point towards the ghauts, the whole range of which he should reconnoitre and carefully examine with the object of deciding which of the passes is likely to be most easily surmounted in attaining the upper country. This survey as far as Menil, Major Pears calculates he could perform in two months.

9. The delay which must necessarily occur in coming to a final decision is to be regretted; but it is of infinite importance that the project of a line of railway adapted to ascend eventually the ghauts should receive the fullest consideration, and the Governor in Council believes that the greatly desired object

of railway communication in this Presidency will be best promoted by the further investigation now proposed.

10. The reports and surveys now received from Major Pears, with the letters from Mr. Bourdillon, Major Cotton, and Captain Best, will be communicated to the Honorable the Court of Directors without delay, in continuation of the despatch from this Government of the 7th June last, No. 16, with an intimation that every possible expedition will be used in preparing and forwarding the remainder; and copies of Major Pears' reports with the proceedings of this Government thereon, and the papers connected therewith, will be forwarded to the Madras Railway Committee for their information.

FROM MAJOR T. T. PEARS, C. B.

*Engineers.*

TO THE CHIEF SECRETARY TO GOVERNMENT,

*Fort St. George.*

SIR,

1. I have the honor to acknowledge the receipt of an extract from Minutes of Consultation in the public department, dated 16th August 1851, forwarding certain papers connected with the Bombay railway, pointing out the wide difference which appears in some respects between the contract for constructing that railway, and the estimates framed by me for similar work here; and directing me to analyze the former, and compare its details with my own calculation.

2. Although the information contained in these papers from Bombay is by no means as complete as could be wished, there will, I think, be found in them, and some of those transmitted to me with your letter, No. 98, of the 29th January last, ample explanation of the difference which appears between the expense of the work in course of execution in Bombay, and that provided for in my estimates.

3. My attention has been specially directed to the expense of constructing the road, and preparing it for the rails, and I shall, therefore, consider first the following points:—

1st. The earthwork.

2d. The works of masonry.

3d. The ballasting and laying the rails; and I shall subsequently notice such other points as appear to merit observation.

4. 1st. The earthwork.—The total length of the proposed railway to Wallajahnuggur is 60 miles and 225 yards.

The total amount of earthwork is 1,460,512 cubic yards.

The total estimated cost of the earthwork is Rupees 138,671.

The average amount of earthwork per mile is 24,291 cubic yards.

The average cost of this per mile is Rupees 2,300.

5. The total length of the Bombay line is 20 miles and 660 yards.

The total amount of earthwork is not given.

The total cost of earthwork is English money £16,393-8-7, or Rupees 163,934.

The average cost of earthwork per mile is consequently Rupees 8,045.

6. There are certain deductions, however, to be made from this amount, before we can institute a just comparison between the earthwork on the Bombay line and that estimated for by me here. In the first place, the contractor's tenders include superintendence, which may be divided into two parts: and for our present purpose distinguished as "executive superintendence" and "controlling superintendence". The latter being, in a great measure, the value of the contractor's own time, talents, and labour, is generally viewed as "profits" and will be considered hereafter.

7. The cost of the "executive superintendence" need not differ from at which it would amount to under our own management. I shall deduct, erefore, from his tender for earthwork the same relative amount on this count that I have separately allowed in my estimate.

8. The total sum, at which I have calculated the superintendence, is Rupees 144,000, deducting 44,000 from this for the "controlling superintendence" we get 1,00,000 Rupees upon an expenditure (exclusive of the cost of rails and chairs, &c.,) of 15 lacs rupees, or about 7 per cent.

I will allow, therefore, that of the 8,045 Rupees obtained above, a sum is to be deducted for superintendence equal to 7 per cent of the remainder. This reduces the amount to 7,500 nearly.

9. Then again, the Bombay is a double line; and before a fair comparison can be made, we must deduct one-third of the above, my estimate having been made for a single line.

The cost thus becomes 7,500—2,500=Rupees 5,000 per mile.

10. Thus, the cost of the earthwork for a single line near Madras is estimated at Rupees 2,300 per mile, that in Bombay at Rupees 5,000: rather more than double, exclusive of superintendence.

|                             |       |
|-----------------------------|-------|
| Cost of earthwork per mile. |       |
| Madras.....                 | 2,300 |
| Bombay.....                 | 5,000 |

11. The relative cost of earthwork on two different lines of railway will depend mainly upon the following points:—

1st.—The nature of the country, and general section along the line, affecting the actual quantity of earthwork.  
 Cost of earthwork dependent on the nature of the country, &c.  
 2ndly.—The quality of the soil, the distance the earth has to be carried, ("length of lead" as it is technically called, depending in a measure on the section also and on the value of adjacent land) and the price of labour—all of which affect the cost of the earthwork.

12. Of the first of these, "the actual amount of earthwork," the papers from Bombay give us very little information. There are no plans or sections.

No. 41, June 17th, 1851. The letter from the Superintending Engineer to the Deputy Secretary to Government informs us, that there are no engineering difficulties that the line of country throughout is very favorable, while Mr. Clark's report\* speaks of the earthwork as being of a very trifling description.

\* 26th August, 1846.

13. It is incidentally mentioned in one of the contractor's estimates, (schedule No. 3) that the average height of embankment is 4 feet; but that of cutting is not given. I find, however, from a letter from the Superintending Engineer to the Secretary to Government, dated the 2d October 1850, that the cuttings are neither numerous nor large; that there are no embankments of any magnitude, or importance, except that at the Sion marsh.

14. While, therefore, we have not the means of knowing what the actual amount of earthwork is, we have every reason to conclude that it is small—a conclusion which derives confirmation from a reference to the schedule containing a list of prices at which the tender was computed, where we find the average price of earthwork deposited in embankments to be,  $8\frac{1}{2}$  pence per cubic yard.

15. If we take this as the average cost, and calculate the whole of the earthwork (cutting and embankment) as if the former went to spoil, it will give for £16,393 a total of 476,900 cubic yards, which for a double way of

27 feet with a slope of  $1\frac{1}{2}$  to 1, would give a section of 120 feet, and consequently an average depth of earthwork of 3.7 feet. If, on the other hand, we suppose that the cuttings exactly balanced and supplied the embankments, we get double the quantity of earthwork, a section of 240 feet, and an average depth of 6.5 feet, we may assume something between these two, say  $4\frac{1}{2}$  feet.

Superintending Engineer's letter, 2d October, 1851.

16. The average depth of earthwork throughout the proposed line to Wallajahnuggur is  $4\frac{1}{2}$  feet. The excess of expenditure on the Bombay line does not appear to be attributable, therefore, to the amount of earthwork.

17. We have next to consider, the quality of the soil, the length of lead, and the price of labour, all of which affect the cost.

18. The quality of the soil throughout the line is not mentioned, but we find from the Superintending Engineer's letter above quoted, that the soil in the important cuttings near the Sion embankment is generally easy of excavation; nor can I find any objection made to the soil elsewhere.

19. The length of lead is not given either. In Mr. Clarke's report on the line from Bombay to Koobee,\* the average lead is given at  $\frac{1}{4}$  of a mile. In the immediate neighbourhood of Bombay, however, it is likely to be more than this. It is stated in the "general conditions of contract" para 20, that the land provided by the Company is considered sufficient to supply, either from the excavations or side ditches, all the soil requisite for the embankments and road approaches. It is probable, however, that this item of expense will be heavier in Bombay than upon the line estimated by me; that the value of land there would render it cheaper to lead the soil a considerable distance from the cuttings to form embankments, than to take up land on the sides of the line to furnish the requisite spoil banks for the one, and material for the other; and that the cost of the earthwork in embankments would be enhanced thereby.

\* 26th August, 1846.

Length of lead.

20. My estimates were framed upon the supposition that the whole of the embankments would be constructed of material taken from side pits, and the whole of the cuttings carried to spoil: and I looked to such portion of the embankment, as it might be found cheaper to construct from the cuttings, as so much clear gain on the estimate.

21. I can only conclude, with reference to this point, that it is probable the value of land in the neighbourhood of the Bombay line would increase to a certain extent the distance to which, in many cases, the earth has to be carried, and would thus contribute to raise the cost of earthwork.

Value of land in Bombay would affect the cost of earthwork.

22. We now come to consider the value of labour, upon which we have more precise information, sufficient of itself not only to explain the difference between the cost of the works, but to excite feelings of surprise, that that difference should have been no greater than it is.

23. The list of prices which accompanies the tender is entitled "sche-

Contractor's schedule of prices. "dule referred to containing a list of prices at which the foregoing tender has been actually computed, and by which all extra works are to be valued", and in the latter view it is recognized by the authorities in para 11 of the general conditions of contract.

24. As the clearest mode of shewing the relative cost of labour in Bombay, I have collected information from various sources on the cost of similar work in other places, and have consulted such works as I had by me on the cost of the same in England, and I shall give a few leading points in detail, presuming that the contractor's prices are all given in English money, although required by the conditions of contract (para. 18) to make his tenders in Rupees, and that I have turned them into our currency at the rate of 2 shillings to the Rupee.

25. Earthwork.—The Bombay contract gives the average cost of earthwork deposited in embankments,  
 Earthwork in Bombay 5½ Annas per cubic yard (average.) At 5½ Annas per cubic yard.  
 The average cost of earthwork in my estimate is 1½ Annas per yard.

An accepted tender for work performed at Madras under the Military Board, furnished me from that office, shews as the cost of such work here, 60 cubic yards for Rupees 3-8-0, or something less than 1 Anna per yard. This in Madras itself.

The rates at which works in the vicinity of Madras are executed (as given in the data of the Civil Engineer in the 4th Division) shew that with a lead of 50 yards and a depth of 4 feet, cutting earthwork in common alluvial soil is performed for 1 Anna the yard.

The data furnished me by Captain Best, the Superintendent of Roads, for work of this nature in this part of India gives 1 Anna per cubic yard for excavating foundation. I have also had an opportunity of seeing a letter from Captain Berthon, the Superintendent of Roads in Bombay, by which it appears that the price of earthwork in his Department there is from 8 Annas to a Rupee and a quarter for 100 cubic feet, according to the nature of the soil, and the distance to be carried, i. e. from 2 Annas to 5 Annas the cubic yard, according to those circumstances.

26. In England, where, notwithstanding the large amount of work that one man will perform, ordinary manual labour is certainly dearer than it is here, earthwork has gene-

rally been taken at from 6 to 8 Annas the yard; but I find, from Whishaw's popular account of some of the railways, that on the "Midland Counties," with an average lead of 2½ miles, it was about 9 Annas (the rate in Bombay would be 2½ Annas;) on the Newcastle and Carlisle, with "some heavy works," the average cost was 4½ Annas the yard.

On the "Newcastle and Northshields," with "considerable difficulties," the earthwork cost 6 Annas the cubic yard.

On the Slamannar railway, the chief cutting was 2 miles in length and from 16 to 40 feet deep, principally of hard blue clay, when the lead was only a quarter of a mile: the cost per yard was 5½ (in Bombay it is 6½;) when, on the other hand, it was carried to spoil it was 4½ Annas. On the "North Union" railway, the earthwork was performed with an average lead of 1½ mile, at an average cost of 6½ Annas the yard. On the Bombay, it would have been 16 Annas.

27. It must be remembered too, that much of the earthwork on English lines is in deep cuttings, and lofty embankments; whereas in Bombay, the average height of the latter is 4 feet, and the cuttings we may assume to be about the same.

28. From the above we may feel certain that the cost for earthwork in Bombay is very great, much higher than in other parts of India; and is, of itself, more than sufficient to account for the difference in the cost of earthwork there and here.

29. In the Schedule of prices above referred to, the rate of wages upon which the tender has been actually computed is given; and, we find that in all cases they are much higher than is usual in India, and in some, as much as 3 or 4 times as high. The following Table shews the rate of wages as given by the contractor, and by certain other authorities in India. I must observe, however, that I have allowed in my calculation for a certain advance on the rate of wages given here, as a result to be expected from an unusual demand, and I doubt not but in Bombay a similar provision has been made.

Wages.

STATEMENT shewing the rates of wages according to the undermentioned authorities.

authorities.

| NAMES.                                     | Chief Engineer, Madras. |       | Civil Engineer, 4th Division. |       | Superintendent of Roads, Madras. |       | Superintendent of Roads, Bombay. |       | Bombay Contractor. |           | REMARKS. |                                                                                                                        |    |    |   |
|--------------------------------------------|-------------------------|-------|-------------------------------|-------|----------------------------------|-------|----------------------------------|-------|--------------------|-----------|----------|------------------------------------------------------------------------------------------------------------------------|----|----|---|
|                                            | Rs.                     | A. P. | Rs.                           | A. P. | Rs.                              | A. P. | Rs.                              | A. P. | Rs.                | A. P.     |          |                                                                                                                        |    |    |   |
| Excavators (Coolies or Wodders) per diem } | 0                       | 3     | 0                             | 2     | 6                                | 0     | 2                                | 3     | 0                  | 2         | 3        | <div style="font-size: 3em; vertical-align: middle; padding: 0 10px;">{</div> Tank diggers work in Madras by contract. |    |    |   |
| Bricklayers.....                           | 0                       | 6     | 6                             | 0     | 4                                | 6     | 0                                | 5     | 6                  | not given | 0        |                                                                                                                        | 10 | 8  |   |
| Masons.....                                | 0                       | 0     | 0                             | 0     | 0                                | 0     | 0                                | 0     | 0                  | 0         | 0        |                                                                                                                        | 16 | 0  |   |
| Carpenters.....                            | 0                       | 6     | 9                             | 0     | 5                                | 0     | 0                                | 5     | 10                 | 0         | 0        |                                                                                                                        | 0  | 20 | 0 |
| Smiths.....                                | 0                       | 8     | 9                             | 0     | 0                                | 0     | 0                                | 0     | 0                  | 0         | 0        |                                                                                                                        | 0  | 24 | 0 |
| Labourers (Coolies)....                    | 0                       | 3     | 0                             | 0     | 2                                | 6     | 0                                | 5     | 0                  | 0         | 0        |                                                                                                                        | 0  | 28 | 0 |
| Cart and two Bullocks.                     | 0                       | 10    | 0                             | A     | 0                                | 0     | 0                                | 7     | 0                  | 0         | 2        | 3                                                                                                                      | 0  | 8  | 0 |
|                                            |                         |       |                               |       |                                  |       |                                  |       |                    |           |          |                                                                                                                        |    |    |   |
| At 1 Anna per mile.                        |                         |       |                               |       |                                  |       |                                  |       |                    |           |          |                                                                                                                        |    |    |   |
| 30 From the                                |                         |       |                               |       |                                  |       |                                  |       |                    |           |          |                                                                                                                        |    |    |   |

30. From the above, I conclude that the higher cost of earthwork on the Bombay line may be attributed in a measure to the distance the soil has to be carried, but much more to the remarkably high wages recognized in that place.

31. I now come to consider the masonry works, and shall on this subject be enabled to be very brief.

32. The total charge for bridges and drains in my estimate, on a line of 60 miles and 225 yards, is Rupees 94,075, or about 1,568 Rupees per mile. The charge in the Bombay contract is Rupees 54,598 on a line of 20 miles and 30 chains, or 2,700 Rupees per mile.

33. We have to make deductions in this case as in that of the earth-work, viz.

|                                          |     |
|------------------------------------------|-----|
| For superintendence.....                 | 150 |
| For the extra work in a double line..... | 650 |
|                                          | 800 |

We have thus as the cost of masonry work on a single line in Bombay 2,700—800=1,900 per mile, the rate in my estimate being Rs 1,568. The bridges, &c., on the Bombay line are all small works, the largest being estimated at 4,695 Rupees.

They are described by Mr. Clark as consisting of seven road bridges and a few small culverts: whereas, on the proposed line to Wallajahnuggur, there is one 40,000 and one of 12,000 Rupees. 117 works in all.

The price charged for brick in chunam by the contractor would, however, enable us to provide twice the amount of masonry they could execute for any given sum in Bombay.

34. The following table shews the cost of this description of work, as charged by the contractor, and as given to me by other authorities.

STATEMENT shewing the average price of brick work in Bombay, and that given by other authorities in India.

| Nature of Work.                          | Chief Engineer, Madras. |          | Civil Engineer 4th Division. |       | Capt. Best, Superintendent of Roads. |       | Madras Contractor from Military Board. |       | Superintendent of Roads, Bombay. |       | Bombay Contractor. |       |
|------------------------------------------|-------------------------|----------|------------------------------|-------|--------------------------------------|-------|----------------------------------------|-------|----------------------------------|-------|--------------------|-------|
|                                          | Rs.                     | A. P.    | Rs.                          | A. P. | Rs.                                  | A. P. | Rs.                                    | A. P. | Rs.                              | A. P. | Rs.                | A. P. |
| Brick in chunam, per cubic yard.....     | 3                       | 0 4 1/2  | 2                            | 14 0  | 2                                    | 8 0   | 2                                      | 13 0  | 4                                | 8 0   | 6                  | 8 0   |
| Arch-work in chunam, per cubic yard..... | 4                       | 11 4 1/2 | 3                            | 11 0  | 2                                    | 12 0  | 5                                      | 1 0   | 0                                | 0 0   | 8                  | 0 0   |

I find from Colonel Grant's pamphlet "Bombay Cotton and India Railways," page 136, brick and chunam estimated at 18 Rupees for 100 cubic feet, about Rs. 4-14-0 per cubic yard.

35. The excess in the cost of masonry per mile [with reference to the apparently smaller amount of work done] is not more than is due to the difference in the cost of that description of work, as given in the preceding table. In calling for an increased number of small drains and occupation bridges, the circumstance of locality might be expected to be against the Bombay line; while, however, the rate at which brick work is charged there, is double what we can perform it for here, the sum allowed per mile in my estimate is nearly equal to that allowed in Bombay. As far as we can judge herefore, from such analogies, the allowance made by me for drainage is ample.

36. The next items to be considered are "ballasting" and "laying the rails," &c.

In the Schedule No. 7 of the Bombay contract, ballast is rated (14 pence) 9½ Annas the cubic yard. Of the total amount, however, of 197,248 yards, 97,245 are supposed to be procurable from cuttings.

My estimate is considerably above this, being one Rupee the yard, assumed in consideration of the distance, to which, in many cases, the ballast could be carried: and yet, I believe perfectly safe, as I should calculate on the railway itself coming into operation in its conveyance.

37. There is, however, a very great difference on the other hand between my estimate of the cost of laying rails, and that granted to the contractor in Bombay. Calculating

the cost of labour here, I allow 400 Rupees the mile for a single line. The contractor's terms are 3,520 Rupees a mile for a double, or 1,760 Rupees for a single line of railway.

38. We have no precedent for this sort of work in India. Comparing, however, the charges of the contractor in Bombay with those for the same work in England, I find in a report of the "General Works Committee" on the permanent way of the London and Northwest Railway (a very valuable paper), laying rails on a double line is estimated (including spikes and keys) at  $2\frac{1}{2}$  Rupees (5 shillings) the lineal yard.

Charge in England. Deducting the value of spikes and keys, say  $1\frac{1}{2}$  Rupee per yard, the charge for laying will be 1 Rupee the yard for the double line, or 8 Annas for the single; giving 880 Rupees per mile, instead of 1,760, as in Bombay.

39. From several returns laid before the Parliamentary commission in 1846, it appears that a common charge for laying a double line of way is £176, which is at the rate of Rupees 880 for a single line; just half of that allowed in Bombay, but double my estimate.

40. It is possible that the sum I have allowed, viz., 400 Rupees (exclusive of superintendence) may prove barely sufficient; but I still think it is so, because the price of labour of this description in this country is very low. Four Rupees is allowed for laying  $17\frac{1}{2}$  running yards of a single line, and for this sum we could hire expert labourers of their kind to the following extent:—

|                        |   |
|------------------------|---|
| Carpenter Maistry..... | 1 |
| Carpenters.....        | 4 |
| Coolies.....           | 8 |
| Boys.....              | 2 |

They would require instruction at first, but would very soon become expert at that kind of work.

41. In the summary of the Bombay contract, there are three heads of expenditure which require notice, viz.

|                  |              |
|------------------|--------------|
| Crossings.....   | £ 1,021 14 0 |
| Provisions.....  | ,, 9,376 8 0 |
| Maintenance..... | ,, 2,000 0 0 |

42. The particulars of the crossings are given in Schedule No. 6, Contract No. 1. There are 8 crossings rather expensive; but, it is to be presumed, in such a place as Bombay much care will be necessary, and much expense incurred, in providing duly for the safety and accommodation of the public. None of the crossings in my estimate require metalled approaches, and nearly all are on a level. The allowance made, therefore, for the gates was only 150 Rupees, which is the same as is allowed the contractor in Schedule No. 3, for level crossings "without paving or fencing to approaches."

43. The next head to be considered is that entitled "provisions" (Schedule No. 3), one that forms a large item in the contract. This statement, it appears, is framed

to shew the cost at which the contractor will execute such works, if required. It is not a part of the expenditure guaranteed to him. The amount is £9,376-8, or Rupees 93,764, and the works consist (with the exception of a few drains) of 38 level crossings, and of walling and fencing.

44. The crossings at £15 amount to 570, but the walling and other fencing amount, in the aggregate, to the large sum of £8,232-8, or Rupees 82,324, being at the rate of something above 4,000 Rupees the mile, allowing wall at every village the road runs through, or very near, and a hedge elsewhere, my fencing upon 60 miles amounts to Rupees 12,500, or 200 Rupees a mile.

The charge for fencing in Bombay certainly appears very high, but we must make allowance again here for the necessities of a populous neighbourhood, which demand a very complete description of fence, while the high price of labour tends to enhance the cost of it.

45. The last item is "maintenance of way," which is not allowed for at all in my estimate, and which must, therefore, be struck out in making a comparison between the estimated cost of the two works.

46. There remain two points to be separately considered as affecting the contractor's estimate, viz., the "risk" and the "profits." The former is met in my estimate, in a measure, by the allowance for "contingencies;" the latter is, as before observed, the price of the contractor's services.

47. We can easily understand, that in the present case the risk would be highly estimated by a contractor undertaking in England to execute a work in Bombay. Its value will be affected also, in some degree, by the terms imposed upon him by his employers. It is, of course, the interest of the latter to reduce the amount of risk, as much as possible; and to take it upon themselves, in many cases, rather than pay a contractor for bearing it. In the terms of the Bombay contract, there appears to me in some particulars, an unusual accumulation of risk upon the contractor's shoulders, as in para 33 and 45 of that document.

Too much thrown on contractor.

In the former, the contractor is held responsible that the staking and tracing of the railway is correctly laid down; and by the latter, all the risk of errors in the plans and specifications is thrown upon the contractor. This, if not an unusual condition of contract, seems to me a very impolitic one; as we may be quite sure that any contractor will cover by a large margin the possible additional outlay due to such causes.

48. The obvious and just course would be to make the Engineer responsible for the correctness of the plans and specifications, and for the additional work which, in consequence of errors therein, the contractor might be called upon to perform, and to allow the latter a fair price for all extra work so performed.

49. The last element in the contractor's estimate I have to notice is the "profits." It is generally understood, that a contractor's profits in England are considered reasonable at 20 per cent on the amount of contract. We may be certain, however, that the ratio the profits bear to the amount will vary with the magnitude of the work contracted for. A contractor, possessed of energy and experience, found in all the plant and appliances belonging to his profession, will be, in some cases, the cheapest agent for the performance of a work: while the same man, in an undertaking on a smaller scale, would expect so large a proportion of the outlay as would materially affect the value of his services. If we knock off 20 per cent from the Bombay contract, we give for the profits about 1,00,000 rupees; and it is probable that 10,000 pounds might tempt a man of enterprise to leave England for a year or two, but we cannot

Disadvantage of undertaking a small work by contract.

fail to observe at the same time, the great disadvantage under which the Government, or a railway company, labour in undertaking a small work, as a short line of railway, by contract. All the most important elements of expenditure become relatively increased, as the work is reduced in extent and cost; the contractor's profits, the pay of the chief officers, the loss on plant and working stock, are all alike affected by undertaking a work of this nature on a small scale. Either a contractor must make all that it is worth his while to enter upon the work for upon the first small work, or he must get a guarantee of further employment in the event of an extension of the line. In the one case, the cost per mile is greatly increased; in the other, an arrangement is made which precludes future competition, and is, therefore, objectionable.

50. I shall conclude by endeavouring to exhibit in a tabular form the comparison I have drawn between the estimated expenditure on the two works; giving first the actual contract at Bombay; then the same reduced (as I have explained) for purposes of comparison, from the corresponding amounts in my estimate; and lastly, the probable causes of the differences.

51. I am obliged, in making the comparison, to throw the two heads on the Bombay contract of "crossings" and "provisions" (reducing the latter by the deduction of certain drains) into one, and to increase the work of masonry by the cost of drains included in schedule 3 among the "provisions."

COMPARATIVE cost of *Earthwork, &c., on the Bombay and Madras Railway per mile.*

| Contractor's Estimate. | Same reduced for comparison. |    |    | Madras Estimate. |       |    | Difference against. | Probable causes of difference. |
|------------------------|------------------------------|----|----|------------------|-------|----|---------------------|--------------------------------|
|                        | Rs.                          | A. | P. | Rs.              | A.    | P. |                     |                                |
| <i>A</i>               |                              |    |    |                  |       |    |                     |                                |
| Ballast .....          | 5,700                        | 0  | 0  | 2,850            | 0     | 0  | 2,200               | Bombay.                        |
| Laying rails ....      | 3,520                        | 0  | 0  | 1,760            | 0     | 0  | 400                 | Bombay.                        |
| Earthwork, ....        | 8,045                        | 0  | 0  | 5,000            | 0     | 0  | 2,000               | Bombay.                        |
| Culverts .....         | 2,500                        | 0  | 0  | 1,900            | 0     | 0  | 1,568               | Bombay.                        |
| Crossings .....        | 500                          | 0  | 0  | <i>B</i>         | 4,500 | 0  | 300                 | Bombay.                        |
| Provisions .....       | 4,000                        | 0  | 0  |                  |       |    |                     |                                |
| Maintenance....        | 2,000                        | 0  | 0  | 0                | 0     | 0  | 0                   | Not included.                  |

*A* The actual depth of ballast allowed is not shewn, but it appears to be about 2 feet.

*B* Works of a trifling description.

N. B.—The 40,000 rupees allowed in my estimate for foot bridges may be considered as provisional, and is not included in the above: no works of that kind being contemplated on Bombay.

52. The most remarkable difference thus appears in the charge for fencing. Upon the whole, the difference of the estimated cost is not so great as would appear at first sight, certainly not such as one would expect on looking through the contractor's "schedule of prices."

53. The estimates which I have submitted were not framed in minute detail. They were intended to give a just idea of the nature and amount of expenditure to be anticipated in constructing these 60 miles of railway, I

Importance of making the estimates moderate.

have been careful to make my calculations of the amount of work liberally, while in regard to its cost,

I know that work of a similar nature is daily performed in this part of India for less money than that allowed by me. I consider it desirable that the Government should know to the utmost certainty the expense that will be involved in the work contemplated; but I think it quite as important, in the present case, that we should adhere to the rigid principles of economy which have of late years characterized the Public Work Departments in India.

The Government consider the report very satisfactory. It accounts for the disproportionate cost of the Bombay railway, by the comparatively high price of all kinds of labour, skilled and unskilled, which that Government has to bear; and manifests the very great advantage this Presidency possesses in that respect, which will enable it with the same means to do so much more work.

3. The analysis which Major Pears has made of the charges in his estimate relatively with those of Bombay, with allowance for the difference in the cost of labour here, tested, as his rates are, by comparison with those actually allowed by several executive officers at Madras and in the neighbouring districts, gives, in the opinion of Government, a very satisfactory confirmation to his estimate generally. He has doubts, however, whether that part of the estimate, viz., for laying the rail at 400 rupees a mile, is not too low.

4. Resolved, that application be made to the Government of Bombay for the estimates and report indicated in the 55th para. of Major Pears' letter.

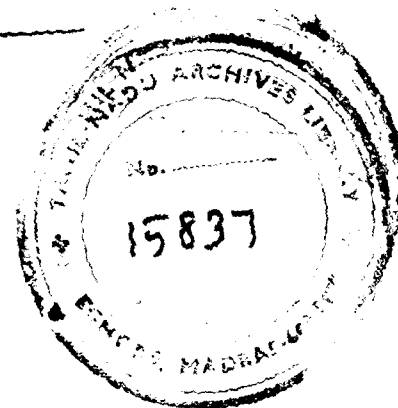
(A true Extract.)

(Signed) H. O. MONTGOMERY,

Chief Secretary.

D415:7.2110/2113

MS2



Total length of Railway ..... 60 Miles & 225 yards  
 Total difference of level between the Termini  
 Number of Planes  $\left\{ \begin{array}{l} \text{Level} \dots\dots\dots 6 \\ \text{Ascending from Mundras} \dots\dots\dots 60 \\ \text{Descending} \dots\dots\dots 11 \end{array} \right\} 77$   
 Maximum rate of inclination ..... 1 in 256  
 Minimum Radius of curvature ..... one Mile  
 Breadth of Road ..... 17 Feet  
 " " Gauge ..... 5 Ft 8½ in.  
 Weight of Rails per yard ..... 60 lbs.  
 Dimension of sleepers ..... 8 Ft x 10 in x 5 in.  
 Bearing ..... 3 Ft  
 Total amount of  $\left\{ \begin{array}{l} \text{Embankment } 10,78,631 \\ \text{Earthwork } \left\{ \begin{array}{l} \text{Cutting} \dots\dots\dots 28,18,81 \end{array} \right\} \end{array} \right\} 11,60,512 \text{ Cubic yards}$   
 Maximum height of embankment ..... 16 Feet  
 " " depth of cutting ..... 18 Feet  
 Average amount of earthwork per mile ..... 24342 Cubic yards  
 Average height (or depth) of earthwork  
 throughout the line ..... 1½ Feet  
 Number of stations with sidings ..... 8  
 Total length of sidings ..... 2400 yards

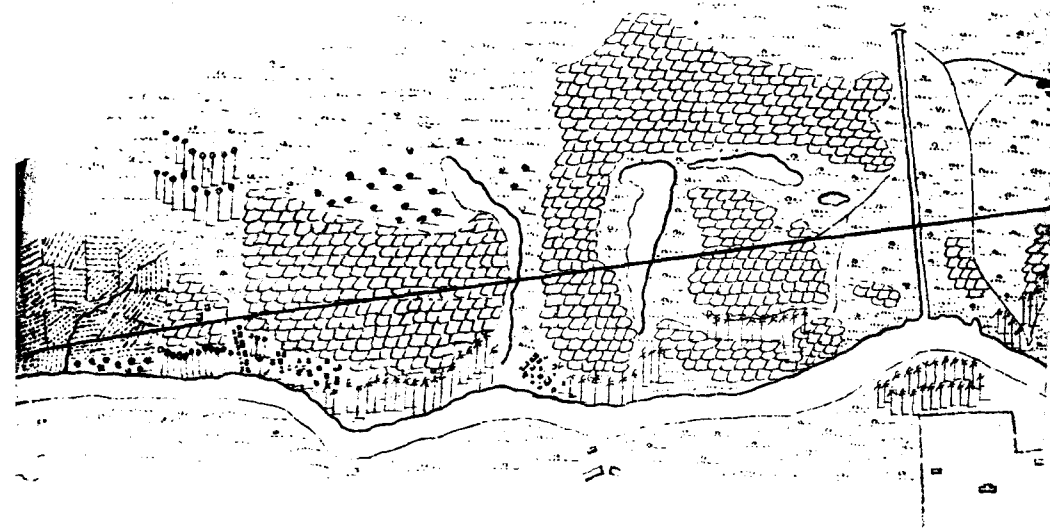
### Estimate of Annual Receipts & Expenses

|          |                      | R.     | as P. |   |        |   |   |
|----------|----------------------|--------|-------|---|--------|---|---|
| Receipts | Goods                | 187500 | .     | . |        |   |   |
|          | Passengers           | 76250  | .     | . |        |   |   |
|          | Troops and Mails     | 24500  | .     | . | 288250 | . | . |
| Expenses | Management & Police  | 53000  |       |   |        |   |   |
|          | Maintenance of way   | 42000  |       |   |        |   |   |
|          | Locomotive expenses  | 56340  |       |   |        |   |   |
|          | Repairs to Carriages | 12500  |       |   |        |   |   |
|          | do to Buildings      | 7500   |       |   | 171340 | . | . |

---

**P L A N**  
*of a portion of*  
**M A D R A S**  
*shewing two different directions in which the Railway*  
*might be extended from the proposed present*  
**TERMINUS.**


---



- A Proposed present Terminus.
- B Eligible situation for a Black Town Terminus.
- C Eligible situation for a more central station.
- D Point of departure from present line.
- B 3 Miles 514 yards.
- C 3 Miles 112 yards.