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Administration Report

ON THE

RAILWAYS IN INDIA,

FOR

1881-82.

BY

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DIRECTOR GENERAL OF RAILWAYS.



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THOS. D. BONA, SUPERINTENDENT.

P R E F A C E.

In this Report, which is the third of its kind, a more methodical arrangement of the different parts has been attempted; and the difficulty of finding any particular information, so frequently experienced in references to the former Administration Reports, is now obviated by the addition of a copious index.

Administration Reports are intended to place on record for future reference the work done during the year under review; and although they are only compiled at the cost of considerable time and labor, they frequently only serve to increase the amount of books lying on the office shelf. But in the Annual Report showing progress on Railways, so many subjects can be reviewed, and so much valuable information can be given, both to the Railway Administrations and to the public, that the Report should form a valuable standard book of reference.

The annual publication in India of a Railway Progress Report must necessarily interfere somewhat with the Annual Report hitherto prepared in the India Office, London, for presentation to the Houses of Parliament; and as the Indian volume is much fuller of detailed information, and moreover contains the actual figures showing traffic results, whereas the India Office Report could only show approximate traffic results—information having to be obtained from India before the Revenue Accounts of many of the larger lines of Railway can be closed—it was considered whether the publication of both should be continued. But as Local Governments cannot submit the Railway Chapter of their Administration Reports much before the 1st of August, the full Railway Report cannot well be got out before the following November or December; this is considered too late for presentation to the Houses of Parliament, and, consequently, it has been decided to prepare in India by the 1st June each year a Preliminary Report, which shall take the place of that hitherto known as Mr. Juland Danver's Report, and which will be afterwards incorporated in the General Annual Report. This arrangement will commence next year; the duty of compiling the Preliminary Report having been placed by the Government of India in the hands of the Director General of Railways.

In the present Report, Chapter I. contains a short general review of the work done during the year, particular references being made to the more salient matters discussed or arranged for during the year.

Chapter II. has been compiled entirely from the Administration Reports submitted to the Government of India by the Local Governments, and contains details showing the working of the traffic on all State lines during the calendar year 1881. It also shows the progress made in the consolidation and maintenance of the several State lines open to traffic, as well as the progress in the construction of small branches and extensions of the main lines.

Chapter III. is compiled from the same sources, and relates in the same manner the progress and advancement made during the year on the Guaranteed and Subsidized Railways.

Chapter IV. records the progress made on lines of Railway under construction and which in themselves are new and separate projects, although after construction they may be allied with some of the existing lines for purposes of economical working.

Chapter V. contains a more or less lengthy record of all the Railway Projects which have been submitted to the Government of India during the last few years. This is an interesting Chapter, as it gives a short outline of all the lines now being pressed upon the Secretary of State by rival promoters and Companies for immediate construction. A few words as to the advancement of the negotiations and of the projects up to date may not be uninteresting, and will be taken in order according to their entry in the table of contents at the head of the Chapter.

As regards the Madras Presidency, it is understood that all the preliminaries for floating the Nilgiri Railway Company are settled, and that work either has, or is to be, started at once. The project for a branch from Shoranur to Cochin has fallen through for the present, as the Secretary of State is not disposed to concede as much as the promoters consider necessary to induce the requisite Capital to be subscribed. The reconnaissance surveys of the country between Vizagapatam and Raipur in the Central Provinces have been submitted to the Government of India, and show that line *via* Jaipur and Raigarh is only feasible at great expense and by using very severe gradients, while a line can be carried round the east and north of the Nawagarh range of hills, with a ruling gradient of about 1 in 100, and not at any inordinate expense. The length of this line is about 370 miles.

The Mysore Durbar has been authorized to put in hand the Railway from Bangalore to Tumkur, and work has commenced. Surveys for protective lines of Railway from Cuddapa to Nellore, and from Adoni to Kurnool and on to Guntoor in the Kistna delta are to be at once undertaken.

In the Bombay Presidency, the Western Deccan Railway surveys are being rapidly pushed on, and the Southern Mahratta Railway Company is most anxious to construct the line as an integral part of its system. On the Marmagao Railway and on the Southern Mahratta system, the work of construction is being pushed forward with vigor. Negotiations for a line of Railway from Bhopal to Jhansi, Gwalior and Cawnpore, under the auspices of the Board of Directors, Great Indian Peninsula Railway Company, are started, and have been favorably received.

The bridge over the Hooghly, to bring the East Indian Railway into Calcutta has been commenced, and the material required from England is under provision. The Bengal Central Railway Company has asked to be allowed to add the line from Ranaghat to Santipur and Bhagwangola to its present venture, and the matter is now before the Secretary of State. Construction work has commenced on the Narainganj-Dacca-Mymensingh line; the line between Daudkandi, Comillah, and Chittagong has been ordered to be located and proper estimates made; and a reconnaissance from near Comillah northwards into Cachar, and possibly into Assam, will be at once undertaken. The reconnaissance made last year across the Garo hills between Mymensingh and Gauhati shows that the difficulties of such a line have been much under-estimated, although the height to be crossed is much lower than at first thought.

The Secretary of State has refused to enter into negotiations with any promoters regarding the through line of railway between Bengal and the Central Provinces

until he has received more detailed information as to the routes, prospects, &c. This information has been given, and orders have issued for the line of railway to be located along the southern route, and proper estimates framed.

In the North-Western Provinces, the Farukhabad-Hathras Extension has been sanctioned by the Secretary of State, and work is about to commence. A permanent survey of the Jhansi-Bargarh line as a famine protection work has been ordered to be put in hand at once; and the reconnaissance surveys between Gwalior and Jhansi and between Cawnpore and Jhansi give very satisfactory results. The Company to make the line of Railway between Bareilly and Ranibagh has just been floated, so work will soon commence; and in anticipation of the result the North-Western Provinces Government has for some time past been actively preparing for its part of the agreement.

The Patna-Bahraich Railway has been sanctioned by the Secretary of State, and construction ordered to be commenced this cold season. The land for it is now under acquisition. A Company, called "the Bengal and North-Western Railway Company," has just been formed to take this line over from Government; and it seems probable that they will be allowed to extend the present sanctioned system by a branch southwards from Gorakhpur to Benares and Ghazipur.

In the Punjab, a revised scheme for a branch Railway from Umballa to near Kalka has lately been submitted, and is under consideration. A reliable estimate of the cost of constructing a branch from Wazirabad to Sialkot is also being prepared, and the survey of the line from Rawalpindi to Murree is almost complete. A local Company is being formed to construct this latter line, if they can obtain certain concessions; the matter is now before the Secretary of State. The construction of the branch from Raiwind to the Sutlej, opposite Ferozepore, has been again revised by the Sind, Punjab and Delhi Railway Company. The line can be made very cheaply, and will utilize a very large quantity of second-hand permanent way material, at present practically useless. It can be opened for traffic within six months, and as it will afford incalculable benefit both to the Sind, Punjab and Delhi and Indus Valley Railways, it is trusted that the Secretary of State will admit its construction as an integral portion of the Sind, Punjab and Delhi Railway system. The Secretary of State has also been asked to sanction the construction of the Hissat-Ferozepore line as a famine protection work.

The high floods down the Indus this year, and the resulting scour through the channel between Sukkur and Rohri, have led to a re-investigation of the best site for a bridge across the Indus at Sukkur; and now, owing to the extreme scour observed this year, it has been deemed preferable to have one large span across the main channel than an ordinary girder bridge of moderate spans situated lower down the river. The span over the Rohri channel will probably be not less than 850 feet.

In the Central Provinces, a survey from the Kutni station, East Indian Railway, to the Rewah Coal-field has just been commenced, and the survey will be continued in a south and easterly direction to Bilaspur, or to some convenient point on the Bengal-Nagpur projected Railway. Application has also been made for concessions to construct a line to join the Wardah Coal Railway with the Nizam's Railway; the matter of railway extension in the Nizam's dominions is at present under discussion in England.

In Chapter VI. will be found the question of locomotive fuel fully discussed. The data have been obtained from the several Railway Administrations, but it may be that in estimating distances, length of sections, and rates for the carriage of Revenue stores, the absolute cost price of fuel on the different sections has not been correctly stated; it is, however, believed that the figures are fairly accurate, and sufficiently so to give a comparative view of the actual cost of fuel throughout the Railways in India. It is trusted also that the information now collected will be of great use to the heads of Railway Administrations, and cause their attention to be more firmly fixed on the necessity of reducing fuel expenses as much as possible.

Chapter VII. contains a short review of Railway Stores, with some remarks on the accumulations by Railways of surplus stores.

Amongst the Appendices, besides the usual statistical tables and the analysis of the results of the working of all the Railways, will be found some most useful information. The Working Agreements between the different Railways for the interchange of traffic and management of joint stations have been as far as possible collected together, and will doubtless be frequently referred to. The contracts with Southern Mahratta Railway Company and with the Assam Light Railways and Trading Company are given *in extenso*. The schedule showing the rates in use on the different Railways for the carriage of Revenue stores is also interesting. These rates are supposed to be fixed at such a figure as will prevent the line carrying the stores at a loss, and still not sufficiently high to bring to the line any appreciable profit. The rates, therefore, should be a reflex of what the Agents, Managers, and Traffic Officers of the different lines believe to be their present limit of profitable carrying rates.

I was desirous of adding a Chapter on the effects of alterations in passenger fares as deduced from the records of the Public Works Department, and also another Chapter on the progress made in the classification of goods, but time has not permitted of these Chapters being written; I hope they will be ready for next year's Report.

I was also in hopes of having this Report ready for submission to Government by the 1st November, but unfortunately there has been considerable delay in the receipts by the Government of India of some of the Local Reports; I trust, however, it will be ready by the 31st December at latest, an advance of fully 4 months in the time of production over last year.

SIMLA,
3th November, 1892. }

F. S. STANTON.

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RAILWAYS IN INDIA.

ADMINISTRATION REPORT,

1881-82.

CHAPTER I.

GENERAL REVIEW.

CONTENTS.—Open mileage, and work done—Financial results—Additions to open mileage—Progress from commencement—Traffic—Wheat Traffic—Persons employed—Native Drivers—Abolition of Pensions—Provident Institution—Government Railway Police—Railway Schools—Railway Act—Accidents—Railway Conference—Messrs. Cook and Son's tourist arrangements—Statistics.

ON the 31st December, 1880, the total length of Railways in India open to traffic was 9,148 $\frac{3}{4}$ miles; on the last day of 1881 the open mileage was 9,879 $\frac{3}{4}$, an aggregate length of 731 miles having been opened during the latter year.

	Dec 1880.	Dec 1881.
State Lines,	2,735 75	3,286 50
Native States,	297 75	446 25
East Indian,	1,504 25	1,506 75
Guaranteed lines, ..	4,581 00	4,590 25
Lines under modified guarantee,	30 00	50 00
Total,	9,148 75	9,879 75

The average length open throughout the twelve months was 9,637 $\frac{1}{2}$ miles,* upon which the traffic work performed was equivalent to 2,626 millions of passengers, and 2,340 millions of tons of goods, carried one mile.

The general financial results of working this traffic were—

Financial Results.	Gross earnings,	.. ..	Rs.
	Working expenses,	.. ..	14,32,80,801
			7,07,12,465
	Net Profits,	.. ..	7,25,18,336

The net profits giving an average return on the capital cost of open line of 5.38 per cent.

The general results of working are given for each line in Appendix FF.

Additions.
were as follows:—

The additions to the open mileage during the year and the date of opening each section

Railway and Section.	Length, Miles.	Date of opening.	Remarks.
<i>Punjab Northern—</i>			
Rawalpindi to Haji Shah (Attock),	58	1st January, 1881,	<i>Haji Shah</i> is a temporary station on the left bank of the Indus, and pending the completion of the railway bridge, passengers will cross by the bridge-of-boats, or when this is removed, owing to the floods of June, July and August, be ferried over. <i>Khusalgarh</i> is the present terminus of the Kohat Branch, on the Indus River, 39 miles from Kohat, which is reached by Tonga dak.
Turnool to Jhand,	64	1st April, ..	
Jhand to Khusalgarh,	8	25th October, ..	

* Exclusive of the Dhurka Tramway.

Railway and Section.	Length, Miles.	Date of opening.	Remarks.
<i>Rajputana-Malwa—</i>			
Sujat Road to Pablanpur, ..	148	1st January, 1881,	The opening to Pablanpur completed through railway communication between Delhi and Bombay. The last link in the line between Ajmere and Khandwa.
Neemuch to Nimbahera, ..	15½	10th March, "	
Nimbahera to Chittore, ..	20	19th " "	
Chittore to Nusseerabad, ..	100	1st December, "	
Kankaroola Siding, ..	1½	15th February, "	
<i>Sindia—</i>			
Dholpur to Htampore, ' ..	8½	15th May, 1881,	Completion of the Chumbul bridge.
<i>Northern Bengal—</i>			
Sara Ghât to Sara, ..	2½	21st June, 1881.	This Tramway is on the 2 feet 6 inch gauge, and intended as a feeder to the Northern Bengal Railway.
Kaunia-Dhurla Tramway, ..	21	18th July, "	
<i>Muttra-Hathras-Achnera—</i>			
Muttra to Achnera, ..	22¾	7th November, 1881,	Until the bridge over the Jumna is built this section practically forms a branch of the Rajputana-Malwa Railway, and is worked as such.
<i>Cannpore-Farukhabad—</i>			
Miran Serai to Farukhabad, ..	36¾	1st February, 1881.	
<i>Nagpur and Chhattisgarh—</i>			
Dowhali Junction to Tirora, ..	13	21st February, 1881.	
Tirora to Gondia, ..	18	18th May, "	
Gondia to Amgaon, ..	14	25th November, "	
Total State, ..	550¾		
<i>Bhavnagar-Gondal—</i>			
Wadhwan to Dhoraji, ..	87½	19th January, 1881,	Completes this railway as at present proposed.
<i>Gaekwar of Baroda's—</i>			
Goa Gate to Baroda and Palace, ..	3	24th January, 1881.	
<i>Mysore—</i>			
Bangalore to Channopatna, ..	35	1st February, 1881.	
Channopatna to Maudya, ..	23	26th March, "	
Total Native State, ..	148½		
<i>East Indian—</i>			
Bhadreswar Branch, ..	2½	..	Branch to the right bank of the Hoogly, 17½ miles above Howrah.
<i>Eastern Bengal—</i>			
Khooshtea loop line, ..	1	..	Converts the Kooshtea branch into a loop line.
<i>South Indian—</i>			
Walajabad to Conjeveram, ..	8½	1st January, 1881,	Completes this railway.
Total Guaranteed, ..	9½		
<i>Darjeeling-Himalayan—</i>			
Kurseong to Sonadah, ..	9½	1st February, 1881.	Completes this mountain railway.
Sonadah to Jore-Bungalow, ..	5½	5th April, "	
Jore-Bungalow to Darjeeling, ..	5	4th July, "	
Total under Modified Guarantee, ..	20		
Total opened in 1881, ..	731		

The progress of Indian Railways from 1853 to the end of 1881 is given year by year for each line in Appendix FF. The following figures show their development during successive periods of five years, except that the last period is three years only.

End of year.	Miles open.	GROSS EARNINGS, RUPEES.		Mean age at end of year.
		Total.	Per mile per week.	
1853,	20·50	89,634	119	0·71
1856,	428·50	33,81,930	198	2·44
1863,	2,478·50	2,20,46,598	174	3·17
1868,	4,006·75	5,67,09,003	274	6·21
1873,	5,691·75	7,22,90,386	250	8·68
1878,	8,204·25	11,11,18,429	274	10·15
1881,	9,858·25	14,32,30,801	285	11·13

The coaching traffic continued to improve; on an average 268,000 passengers travelled over each mile of open line during the year. Of the total number 92 per cent. travelled in the lowest class. Full particulars of the traffic are given in statistical statements in the Appendix, and additional remarks relating to each line will be found in the sequel.

The rise in the price of wheat in Europe, due chiefly to the short supplies from America, caused considerable attention to be paid to this staple, which is becoming the most important commodity of goods traffic.

The opening of through communication between the Punjab and Bombay *via* Rajputana being almost co-eval with the rapid growth of exports in grain from Bombay, caused some alarm to the mercantile community of Calcutta, who feared that their trade would suffer by diversion to another port.

The following is extracted from the report by the Auditor, Great Indian Peninsula Railway Company, for the half-year ending 31st December, 1881 :—

This large increase has not only been very important to the Great Indian Peninsula Railway and the Shipping trade here, but has been generally beneficial to Bombay. The Trade Returns of the Port have incited the attention of the Calcutta Chamber of Commerce, and have stimulated them to endeavour to put the East Indian Railway into greater competition with the Bombay Railways, or as the Chairman puts it—“It is desirable on every ground that there should be a thorough overhauling of the East Indian Goods tariff, at once, with a view to reduce rates on all goods before any further diversion occurs.”

The last report of the Calcutta Chamber of Commerce, from which this is taken, has the following, upon what they call the threatened diversion to Bombay of the trade between Calcutta and the North-West.

“We have been in communication both with the Government of India and the East Indian Railway authorities on the subject, pointing out that a serious loss of traffic to the East Indian line can only be averted by a timely reduction in rates of carriage, and by improved facilities for export at Howrah. The extent to which Bombay is gaining on Calcutta in the matter of exports may be seen from the following figures, giving the relative percentages of cotton, seeds and wheat, shipped from each port for the seven months from 1st April to 31st October during the last three years.

		Per cent		
		1879.	1880	1881.
Cotton,	... } Bengal,	20 30	9 96	7·11
	... } Bombay,	79 70	90 04	92·89
Seeds,	... } Bengal,	78·14	67·04	46·89
	... } Bombay,	21·86	32 98	53·11
Wheat,	... } Bengal,	87·03	54 93	38 12
	... } Bombay,	12·97	45·07	61·88

“It is evident from these figures that a displacement of trade is going on which may have the most important consequences for Calcutta. Without cherishing any jealous feelings regarding the growing

prosperity of Bombay, or grudging to that port the fair share of trade to which her proximity to Europe and natural advantages entitle her, we have cause for alarm in the fact that the progress the Western port is making is largely at our expense. The question, therefore, becomes a very practical one, whether any thing can be done to restore the balance which seems to be so rapidly shifting in favor of Bombay."

I quote this because it will be seen upon reference to para. 41 that more than one-half of our traffic has been in wheat and seed, and because in the grain-producing districts between Bombay and Calcutta the direction of transit is a question of rate.

I may, however, remark that whatever the effect of these representations to the East Indian Company may be, they are fallacious in assuming that any important diversion has been effected by the Great Indian Peninsula Railway. Reference to para. 68 of my previous report, and to para. 57 of this, will show that there has been a decrease in wheat and seed traffic received from the East Indian Railway. The increases have been in our local traffic.

The receipts too by the Bombay, Baroda and Central India Railway of wheat and grain from the Rajputana-Malwa line have only been 1,147,000 maunds for the whole year, and this includes what has originated on the Rajputana-Malwa system.

So that it would appear that the Calcutta community is asking the East Indian Railway to compete for what may be considered legitimately Bombay traffic.

I need hardly point out that a combination of favorable circumstances has caused this large export of wheat, and that for it to be maintained we shall need abundant harvests, low rates of exchange, and active home markets.

The real effect on the Calcutta grain trade by the establishment of the through communication above referred to must have been inappreciable. During the year 1881 only 23,077 tons of grain and seeds were despatched from Agra and Delhi to Bombay: the large increase of business at that port being mainly due to the quantities of wheat, &c., brought in by the Great Indian Peninsula Railway from districts which never supplied the Calcutta market. Of wheat alone this railway carried to Bombay about 500,000 tons in 1881 against 146,600 tons in 1880. The wheat railed to Calcutta amounted to 137,700 tons in 1880 and 304,400 tons in 1881.

A nominal roll of officers forming the Government Administration and of the Heads of Departments, and statements showing the number of employés in each department of the several railways, are given in Appendices A and B. Of the total number, 169,577, employed on the 30th September, 1881, 3,763 were Europeans, 3,771 East Indians, and 162,043

Persons employed. Natives. The casualties to Europeans and East Indians during the preceding twelve months bore the following ratio to the total:—

	Death.	Resignation and Discharge.	Dismissal.	Total.
Percentage of number employed, { Europeans, ..	2·19	15·38	6·33	23·90
{ East Indians, ..	1·01	15·32	7·32	23·65

The number of natives employed as engine drivers increased during the year 1881; the annual reports received by the Native Drivers. Government of India were reviewed in a Resolution which is printed in Appendix CC, together with previous orders on the same subject.

In March 1881 the Government of India intimated to all State Railway officers that their retention in railway employment was dependent on efficiency to be Abolition of Pensions on State Railways. measured by tests similar to those that govern service under Railway Companies working with a view to profit." And in September, in consideration of the advantages accruing to the establishment of the State Railway Provident Institution, it was ruled that no employé brought into the State Railway Department after 1st September, 1881, would be eligible for pension. The Circulars communicating these orders, Nos. XIX. and 18, are printed in the Appendices AA and BB.

The establishment and general features of the State Railway Provident Institution were noticed in the Administration State Railway Provident Institution. Report of last year, pages 10 and 11, and a typographical error which occurred on the latter page may now be corrected.

The bonus or contribution from the revenues of each line is limited to one-half per cent. of the net profits, unless such profits exceed $4\frac{1}{2}$ * per cent. upon the capital cost of the railway, in which event the bonus is equal to one per cent. of the net profits. Numbers III, IV, V and VI of the Fund Rules stand thus:—

III.—With effect from the 1st January, 1880, each Manager shall deduct and withhold the following sums from the salary of every servant employed under him, and deposit them in the Savings Bank on behalf of the said servant, namely:—

- (a). From each rupee of the salary of every married servant, or widower with children dependent on him, not being of purely Asiatic descent, and of any other servant who may in writing so desire, the Manager shall deduct one anna:
- (b). From each rupee of the salary of every other servant the Manager shall deduct half an anna.

IV.—As soon as the Revenue Account of a State Railway for a half-year is made up, one-half per centum of the ascertained net earnings during the half-year shall, subject to the proviso in Rule V, at the discretion of the Government, and till further orders, be provisionally distributed as bonus among the depositors of the railway, in proportion to the compulsory deposits made on their behalf during the said half-year.

V.—If the net earnings of the whole calendar year exceed $4\frac{1}{2}$ per cent. upon the capital cost of the railway, an additional one-half per centum, making, in such case, one per centum of the net earnings for the whole year, shall be provisionally distributed in like manner, and subject to the same conditions. Provided that the bonuses distributed among the depositors of any railway in one year or half-year shall in no case exceed the compulsory deposits on their behalf during the same period.

VI.—If the bonus calculated under Rule IV appears to the Government, in any case, insufficient, the Government of India will deal with the case specially according to its discretion, but subject always to the proviso in Rule V.

The following table shows the number of depositors and the sums at their credit on the 31st March, 1882:—

STATE RAILWAY.	Number of Staff depositing.	NO OF DEPOSITORS.		AMOUNT AT CREDIT ON THE 31st MARCH, 1882			
		Voluntary.	Compulsory	Voluntary.	Compulsory.	Bonus.	Total.
				Rs.	Rs.	Rs.	Rs.
Northern Bengal,	367	53	367	5,460	19,315	4,170	28,945
Tirhoot,	262	50	262	3,912	13,547	4,137	21,596
Patna-Gya,	75	1	75	519	1,228	290	2,037
Muttra-Hathras,	125	3	125	82	2,725	459	3,266
Cawnpore-Farukhabad,	1,727	82	1,692	24,718	65,615	14,073	1,04,406
Rajputana-Malwa,	262	10	262	460	3,082	38	3,580
Bhavnagar-Gondal,	57	3	56	127	2,297	89	2,513
Wardha-Coal,	170	10	170	482	4,930	469	5,881
Nagpur-Chhattisgarh,	324	60	323	7,618	17,864	7,758	33,240
Rangoon and Irrawaddy Valley,	734	17	729	3,054	23,958	3,939	30,951
Punjab Northern,	1,152	130	1,045	23,749	42,388	10,306	76,443
Indus Valley and Kandahar,	167	29	163	2,245	6,434	1,616	10,295
Nizam's,							
Total,	5,422	448	5,269	72,426	2,03,333	47,344	3,23,153

The system of Government Police on the East Indian Railway was the outcome of the report of a Committee assembled in 1872. That Committee recommended that Government should fix what force it required

for "strictly State duties" such as law and order; that the Railway Company should fix what force it required for watch and ward and other duties in which Government may be considered to have no administrative interest; and further that the whole force, whether required for watch and ward or for law and order, was to be retained as one organized body under one system of supervision. This

* The last Administration Report gave 4 per cent.

scheme was in the main carried out; the force—called the Government Railway Police—is entirely under the control of the Assistant Inspector General of Railway Police as regards all matters of discipline, but the Agent of the Railway has a potential voice as to the allocation and employment of the force.

The East Indian Railway Company has several times pressed for the re-organization of this force, their principal objections being—

- (1). The very heavy expense which as regards watch and ward alone might be materially reduced—
 - (a), by employment of night watchmen who need not be Policemen;
 - (b), by placing these men under control of the railway staff, and thereby dispensing with an expensive supervising staff; and
 - (c), by employing these men at odd times in various duties where now the Company has to employ extra men.
- (2). The antagonism said to exist between the Police and Railway subordinates, and which it is asserted interferes with the working of the line.
- (3). The unnecessarily large number of men employed for law and order, having regard to the peaceful character of the travelling public, and to the impossibility of utilizing these men between times.

The Railway Company put forward three alternative schemes for the re-organization of the force, and for making it more into a private railway police under the supervision of its own officers; and referred the whole matter to its Board of Directors. The Board, however, was unwilling to act in such a matter without in some measure knowing the wishes of Government; and as the Governments of Bengal and the North-West Provinces agreed that the existing police arrangements might possibly be open to some of the objections urged against them, the matter was referred to a General Committee, composed partly of officers of

Home Department Resolution Nos. 190-3, dated 9th July, 1881.

general administrative experience and partly of officers who have special knowledge of railway management.

The Committee met in Calcutta on the 5th December, 1881, but soon found that a question of such considerable importance could not be satisfactorily disposed of by a mere summary enquiry into the working of the police on the East Indian Railway alone, it being essential that evidence should be collected as to the working of the police systems on the Eastern Bengal, Northern Bengal, Great Indian Peninsula, Oudh and Rohilkhand, Sind, Punjab and Delhi, Rajputana and Madras Railways. For this purpose a Sub-Committee, consisting

Home Department Resolution Nos. 1-20 to 25 of 30th January, 1882.

of the President and two Members, were nominated by the Government of India to collect the required information. This Sub-

Committee did not complete its labours until the end of March 1882, and the Committee did not submit its report until the middle of June 1882. It is now under consideration by the Government of India.

The question of providing the means of education for the children of European and Eurasian railway employés received considerable attention during the

Railway Schools.
year.

Soon after the East Indian Railway became the property of the State, proposals were made by the Company to utilize

East Indian Railway Schools.

the balances standing at the credit of the

Savings Bank Fund and of the Fine Fund in the establishment of a hill school for the children of the Company's employés. The question as to the particular manner in which these moneys should be devoted to educational purposes was discussed at great length. In P. W. Department letter No. 488 R. E., dated 30th June, 1880, it was stated—

"It appears to the Government of India that, in forming an industrial school, it would be prudent not to allow it to be the sole outcome of the munificent grant about to be made * * * but to combine the industrial establishment with a preparatory school for children of both sexes under the age of ten or twelve, at which they could be boarded with special care for domestic arrangements, and from which, at a proper age, the boys could be transferred to the industrial training school and the girls to a private or special school for children of the same age and sex."

It was calculated that the funds available for this purpose would accumulate to about 3½ lakhs of rupees by the end of 1881, and the Secretary of State expressed his approval of this sum being spent in providing a school on the hills for such children of the Company's servants as were eligible and could be accommodated. The following extract from letter No. 87, dated 8th July, 1881, from the Board of Directors to their Agent at Calcutta, gives a general outline of the scheme proposed:—

2 *Site and necessary buildings.*—The Board have carefully examined the several reports sent home at various times as to the locality, possessing in itself the greatest advantages, in regard to the establishment of a Hill School,—especially the Minutes of the School Committee held at Howrah on the 29th August, 1879,—and they entirely concur with those of their Officers who have given so much of their time and experienced ability to the question,—that the "New Brewery Estate" at Mussoorie, of 40 acres, already possessing a building upon which a moderate expenditure only, in the first instance, is necessary, should, if obtainable on fair terms, at once be acquired for the purpose.

The Board therefore desire that, upon receipt of this letter, you will again institute inquiries among the Subordinate European Members of the staff, as to the numbers—boys and girls—(in November 1879 you gave the number of boys as 120) who may be expected to join the school upon the completion of the necessary arrangements, and, upon receipt of the replies, you will, with all despatch, get out, for submission to the Board, an estimate including, *inter alia*,—

- (1). The price at which the "New Brewery Estate" may now be acquired.
- (2). The cost of putting the existing buildings in efficient repair, including an extension thereof if necessary, furniture, educational accessories, &c, as well as the erection of a lodge for a Superintendent and his wife
- (3). The erection of a building or buildings in the nature of a sanatorium for the use of such of the Company's servants as might require temporary change of life from the Plains, or for the use generally of parents visiting their children at the school.

3. *Scheme of education.*—The views of the Board on this subject are fully set out in their letters to the Secretary of State, dated the 7th November, 1879, and 1st April, 1881.

They desire chiefly to educate the children of their servants, and to provide them with employment, suitable to their station of life in the country, to assist their servants in the circumstances in which they are placed, so far as they can, with propriety, do so, not in the eleemosynary sense of relieving parents from any part of their moral or social duties, but in providing them with access to education and moral training suitable for their children in a climate less inimical and trying than the neighbourhood of the hot and crowded stations on the Plains, they do not propose, but would rather deprecate, any expectation being held out, that the education to be thus given to the children of the subordinate servants of the Company should be directed to higher objects than will be required to enable them to fill the same position in life as that occupied by their parents,—and as broad principles lying at the root of the plan, the Board wish that the institution shall be unsectarian, and open to the children of all European servants of the Company desirous of using its privileges and advantages. The school should be self-supporting, it being no part of the plan of the Board to supplement wages, or to relieve their servants in any way from the natural obligations of parents towards their children, the parents paying regulated fees for the boarding, clothing and education of their children, such education being limited to the plain and simple requirements necessary to enable the children to obtain their future living in their own position of life.

The above are the general outlines only of a plan which the Board desire to set on foot, and which must be supplemented by definite rules, which you, assisted by your able co-adjutors, on the spot, can best supply.

In now conveying to you the result of deliberations which have long engaged the anxious consideration, and which the recent changes in the position of the Company have alone enabled them, with the concurrence of the Secretary of State, to effect, the Board are confident that the subordinate members of the staff will accept the scheme now initiated as a further evidence of the Board's desire to advance, to the fullest extent in their power, both the social and moral interests of the servants of the Company and their families.

With reference to paras. 4, 5 and 6 of the Secretary of State's Despatch of the 23rd June, referring to the education of the children of those European and Eurasian servants of the Company for whom the Establishment in the Hills may not be available, the Board desire that you will place yourself in communication with the Government of India, and that you will forward to them particulars of any scheme which may be proposed, the cost of carrying out the same being charged as a working expense of the undertaking.

Subsequently the Board of Directors sanctioned, subject to the approval of Government, the purchase of the New Brewery Estate at Mussoorie, at a price

not exceeding Rs. 45,000, and preliminary expenditure up to Rs. 15,000. This proposal was approved by Government, and the Agent of the Company authorized to realize the necessary funds from the investments of the profits of the Savings Bank.

The Superintendent of the East Indian Railway Aided Schools in his report to the Agent of the Company for the half-year ended 31st December, 1881, writes—

“The average monthly receipts were Rs. 4,322-15-0, made up as follows:—

	RS.	A.	P.	RS.	A.	P.
East Indian Railway grants-in-aid,	1,018	0	0			
” ” rent of rooms allowed free,	425	15	0	1,443	15	0
School fees,				1,627	0	0
Government grants,				952	0	0
From other sources,				300	0	0
				<u>4,322</u>	<u>15</u>	<u>0</u>

The total number of pupils on the rolls and the average daily attendance have been—

	Children.	Apprentices and Workmen.	Total.
On rolls,	980	450	1,430
Average daily attendance,	804	251	1,055

“What I would solicit is that you will be kind enough to ask the Board if they would be prepared, as a preliminary measure, in view of the general scheme which it is proposed to introduce for the better education of the children of those servants of the Company for whom the Hill School may not be available, to sanction a grant from the revenue of the undertaking to an extent that would suffice to provide such a complement of furniture and appliances of the nature* referred to as would be suited to the circumstances of each school, the items to be the subject of a recommendation by the local Committee of the school, and to be approved by yourself, with a further grant up to say a maximum of Rs 300 a month, to be applied as required.”

To an application from the Agent to the above effect, the Board of Directors replied in para. 3 of letter No. 33, dated 10th March, 1882, as follows:—

“The Board have read with great interest the Report of the Superintendent, East Indian Railway Aided Schools, for the half-year ended 31st December, 1881, and with reference to the general remarks at the close of the Report, they have much pleasure in sanctioning a monthly grant from Revenue—if approved by the Government of India†—of a sum not exceeding Rs. 300, in augmenting the grants-in-aid of the schools, with a view to secure more efficient teaching power as opportunity offers, and to provide for the opening of new schools.

“The Board sanction the above sum, as suggested by the Superintendent and supported by you. They will, however, be glad to receive from you some details of the manner in which you propose to apply the grant,—distinguishing between the amount to be apportioned to the securing of more efficient teaching power and that to provide for the opening of new schools.

“With regard to the remarks of the Superintendent as to the insufficiency, in many instances, of furniture, maps, globes, drawings, easels, boards, &c., the Board are quite willing to authorize you applying to the Government for a grant from the Revenue of the undertaking, sufficient to provide suitable furniture and appliances for each school * * * upon your furnishing them with an estimate, they will be prepared to take the matter again into their consideration.”

The proposal that the Great Indian Peninsula Railway Company should join in building a school at Pachmari was discussed during the year.

It seems to be generally the opinion of the Company and the local Government officers that the scheme would not answer; and that parents would not care to send their children to a distance off the line. It is now proposed to establish an additional Railway school at Ahmednagar or Nasik, and the Chief Commissioner, Central Provinces, has recently urged the claim of the Christ Church School at Jubbulpore to the Company's support.

* Maps, globes, drawings, &c.

† This was approved on application.

The schools for the children of employés on the Madras Railway, established at Jalárpét and Pódanúr are reported by the Consulting Engineer to be working well. Madras Railway Schools. A school at Gooty has been sanctioned. At Raichur the school expenses are divided between the Great Indian Peninsula and Madras Railway Companies.

There are no special Schools for the South Indian Railway, the Company's educational requirements being met by existing establishments.

The Government of Bengal has established a hill school at Kurseong, and a native middle class school at Saidpur. A day-school has also been opened at Saidpur for the children of European and Eurasian employés on small pay. Bengal Railway Schools.

The Sind, Punjab and Delhi Railway Company established a hill school at Mussoorie, mainly by a grant from the Fine Fund. This school has done good work; the total expenditure for each child inclusive of dieting, tuition and sundries, averages about Rs. 17 a month. The school is assisted by a grant-in-aid from the Local Government, and a contribution from the revenues of the Railway of Rs. 2 per mensem for each child of the Company's employés has been sanctioned. Government has also sanctioned help being given out of revenue to poor parents to the extent of Rs. 3 per mensem per child towards meeting the expenses of children sent to the school for board and education. Sind, Punjab and Delhi Railway Schools.

A prominent feature in the Resolution No. 8 of the 8th October, 1881, mentioned at page 10 of the Administration Report for 1880-81, was the grant of free passes to children going to and returning from hill schools. This was referred to the several Railway Administrations, and from the summary of replies given in Appendix C, page x, where the Resolution is also given *in extenso*, it will be seen such a concession is usual as regards the children of all Railway employés. Free passes for children to and from school.

The Indian Railway Act, 1879, having been in operation for nearly three years, experience has shown that a few amendments are desirable. A draft Bill has accordingly been prepared in the Legislative Department of the Government of India, and referred to a Select Committee of the Council. This Bill with a "Statement of the Objects and Reasons" is printed in Appendix D, page xviii. It now appears doubtful whether the draft Bill is sufficiently comprehensive in its amendments of the Railway law, as owing to the contemplated extensions of Railways in India by private enterprise under varying agreements and contracts, a complete re-cast of the Railway Act may be found preferable to any partial amendment of the existing law. The Railway Act.

The total number of passengers who lost their lives on the railways from accidents to trains during the year 1881 was 4,* and the number injured 73; being per million passengers 0.73 and 1.33 respectively. The total of killed and injured was 1.4 per million passengers, who travelled on the average 48 miles each. Accidents.

The accident returns were reviewed quarterly throughout the year, detailed information regarding each line, and the orders passed by the Government of India, being published in the official Gazette.

A general abstract of accidents to trains for the whole year is now given on next page.

During the year there were 2,814 accidents, being 99 less than in the previous year, the number of miles worked over and the train mileage having increased as shown in the tabular abstract.

The more serious accidents as regards injury to persons may be briefly described.

* In addition to this number two passengers died from injuries received within 24 hours.

Abstract of Accidents to Trains during 1881.

Serial No.	Class of Accidents.	Number of accidents.		DURING 1881.						Remarks.
		1880.	1881.	Number of Passengers & others		Number of servants		Total.		
				Killed	Injured	Killed.	Injured	Killed	Injured	
1	Collisions between passenger trains, or parts of passenger trains,	3	5	..	..	..	..	..	..
2	Collisions between passenger and goods or mineral trains, engines and vehicles standing foul of the line, ..	64	63	..	(a) 19	1	(a) 9	1	28	(a) Accident on the Great Indian Peninsula Railway on 26th October, 1881, caused by a collision between an up passenger train and a down goods train. 13 passengers and 3 servants injured.
3	Collisions between goods trains, or parts of goods trains, ..	89	111	..	..	1	9	1	9	
4	.. .. light engines,	17	12	..	..	..	..	..	..
5	Passenger trains, or parts of passenger trains leaving the rails,	46	56	..	6	..	..	..	6	(b) Accident on the Bombay, Baroda and Central India Railway on 20th April, 1881, caused by a mail train being turned into a wrong line and run into a goods train. 14 passengers injured.
6	Goods trains, or parts of goods trains, engines, &c., leaving the rails,	321	322	..	..	3	12	3	12	
7	Trains or engines travelling in the wrong direction through points,	60	57	..	(b) 15	2	3	2	18	(c) Accident on the Rajputana State Railway on 24th July, 1881, caused by a ballast train running with brake-van foremost coming into contact with a cow. The portion of the line where the accident occurred was unfenced. 1 person killed and 5 injured.
8	Trains running into stations or sidings at too high a speed, ..	4	8	..	5	..	..	..	5	
9	.. .. over cattle on the line,	991	1,030	..	3	(c) 1	(e) 7	1	10	
10	.. .. over obstructions on the line,	111	114	..	2	(d) 2	(d) 4	2	6	
11	.. .. through gates at level crossings,	63	60	..	..	..	5	..	5	
12	The bursting of boilers or tubes, &c., of engines,	95	132	..	..	2	1	2	1	(d) Accident on the Rajputana State Railway on 30th September, 1881, caused by the trolley of a Permanent Way Inspector coming into contact with a down goods train. 2 persons killed and 3 injured.
13	The failure of machinery, springs, &c., of engines,	315	246	..	..	..	..	..	..
14	.. .. tyres,	11	13	..	..	1	5	1	5	
15	.. .. wheels,	12	12	..	..	..	..	..	..
16	.. .. axles,	50	45	(e) 4	1e) 19	..	1	4	20	(e) Accident on the Sind, Punjab and Delhi Railway on 26th May, 1881, caused by the failure of the rear axle of a covered goods wagon attached to an up local passenger train.
17	.. .. brake apparatus,	1	1	..	..	..	..	..	..
18	.. .. couplings,	89	77	..	..	..	..	..	..
19	.. .. tunnels, bridges, viaducts, culverts, &c., .. .. .	..	1	..	..	..	..	..	..
20	Broken rails,	77	33	..	..	..	..	..	..
21	The flooding of portions of permanent way,	33	37	..	1	..	1	..	2	
22	Slips in cuttings or embankments,	28	20	..	..	..	..	..	..
23	Fire in trains,	227	170	..	..	..	..	..	..
24	.. .. at stations or involving injury to bridges or viaducts, ..	39	30	..	..	..	..	..	..
25	Other accidents,	167	159	..	3	6	11	6	14	
	Total,	2,913	2,814	4	73	19	68	23	141	
										1880. 1881.
										Miles open, .. 8,917½ 9,719
										Train Miles, .. 31,138,861 35,830,313
										No. of Passengers in millions, .. 48 54½

On the accident which happened on the Sind, Punjab and Delhi Railway to a local passenger train on the 26th May, the Consulting Engineer reported as follows :—

No. 3576 G., dated 28th May, 1881.

In continuation of my telegram of yesterday's date, I beg to submit the following report on the accident which occurred on the Sind, Punjab and Delhi Railway to No. 16 up local on the morning of the 26th instant.

2. This train runs from Jullundur Cantonment to Lahore, and judging from the time (9 o'clock) the accident happened, was running to time. The through timing for this train is 16 miles an hour; it must therefore have been running at about 25 miles an hour when the accident occurred.

3. At about the 36th mile from Lahore and about 4 miles from Amritsar the rear axle of wagon No. 1520 broke close to the boss inside. The broken axle with wheel attached passed under C. G. wagon No. 934, 3rd class carriages Nos. 253 and 288, and finally fouled the front axle of 3rd class carriage 288 which it derailed.

4. The train ran some 400 yards before it was stopped by the driver, who put on the brake on feeling the check caused by the accident.

5. On pulling up, the state of matters was as follows :—

Covered goods wagon 934 was found perfectly capsized down the right bank; next to it in front was the underframe of 3rd class carriage No. 253 completely inverted with wheels in the air, the superstructure of this carriage being smashed to pieces. Next came 3rd class carriage No. 288 thrown off to the right of the line and slightly fouling it.

Then on the roadway, but derailed, were three 3rd class carriages—Nos. 382, 315, and 243.

6. All the killed and wounded were found under No. 253.

Killed 4—2 men, 1 woman, 1 child.

Wounded 19—14 men, 4 women, 1 child.

Of these it is feared 2 (1 man and 1 woman) will not recover.

7. The engine ran in to Amritsar for assistance. The Deputy Commissioner, the Deputy Superintendent of Police, the Civil Surgeon, and the Station Master at once went out and brought in the killed and wounded, the latter being housed and carefully attended to at the Civil Hospital, Amritsar.

8. On receipt of the news at Lahore, the Agent, the Deputy Consulting Engineer, the Locomotive Superintendent, Assistant Traffic Manager, Assistant to Chief Engineer, Mr Keene, and Dr. Center went to Amritsar, and after a visit to the Hospital went on, with the exception of Dr. Center, to the scene of the accident, where they remained until the line was cleared at 19-30.

9. An inspection of the flaw showed it to be not a new one, although it was impossible to detect its existence before it broke, fracture being just within the boss of the wheel. The axle at point of fracture was $4\frac{1}{8}$ -inch, and was under one of the old 6-ton carriage goods wagons, which at the time contained 110 maunds of goods.

10. A good many of these axles have failed, and I think it would be safer if no wagon of this type were allowed to run with passenger vehicles. About 1,000 wagons, however, are still running on these axles.

11. The mileage of these axles is not known, as no axle register was kept formerly. For the last 3 years, however, such a register has been maintained, with the intention, I believe, that after an axle has run a certain mileage it shall be condemned, even though it appear to be perfectly sound.

12. The damage done to the permanent-way was not much; two rails and some sleepers broken, and the timbers on two culverts of 10 feet and 14 feet span smashed, necessitating renewal before communication could be restored.

13. From the nature of the accident no one appears to have been in fault.

14. The Deputy Commissioner, Amritsar, has been asked whether he proposes to hold a magisterial enquiry, and to this a reply is awaited. The estimated damage is Rs. 15,000.

P.S.—Since writing the above, I have heard that both of the bad cases—one spine, one concussion of the brain—died yesterday, the 27th, making 6 fatal cases in all.

The rest are doing well.

Fourteen passengers were slightly injured by the collision between a mail and goods train on the Bombay, Baroda and Central India Railway, owing to the former having been turned into a wrong line by the pointsman.

On the Rajputana line a ballast train returning to Abu station with brake-van foremost came in contact with a cow. Three trucks, out of 12 composing the train, and the brake-van were derailed, injuring two women and three men, severely, and the Guard slightly, one of the women having eventually died from

the injuries received. The vehicles derailed were considerably damaged, and several sleepers at the site broken. The line was unfenced. Another accident on the same line was caused by the trolley of a Permanent Way Sub-Inspector having come in contact with a goods train. Two trolley-men were killed, and two others and the Sub-Inspector slightly injured.

On the Great Indian Peninsula Railway, 7 servants and 13 passengers were injured by a passenger train running into a goods train outside the distant signal at Chinchvad on the 26th October. The injuries were mostly of a trivial nature, and the Driver and Guard of the goods train, and the Assistant Station Master, who were to blame, were suitably punished.

It may be observed from the abstract that 36.6 per cent. of the total number of accidents was due to cattle straying on the line; of the 1,030 under this class, 456, or 44.2 per cent., were on unfenced sections of railway. With the extension of the fencing, which has been provided for, these cattle accidents should be much reduced in number.

Although the number of accidents from the failure of axles have become far less than in former years, their results are usually so serious that special attention has been given to the subject.

A special meeting was held on the Sind, Punjab and Delhi Railway, between the Agent, the Consulting Engineer to Government, and the Locomotive Superintendent, at which the following Minutes were recorded :—

This Meeting was held to consider whether any special action was necessary in consequence of the two late serious accidents to Passenger Trains near Muzaffarnagar and Ghaziabad, arising from broken axles; in the first case of a 3rd class carriage, in the second of a brake-van.

In the latter case, five carriages were totally smashed; fortunately they were empty; and the Guard only was hurt. In the Muzaffarnagar case, the train was brought to a stand still by the presence of mind of Mr. Walter, an employé of the Oudh and Rohilkhand Railway, who happened to be a passenger. In either case there might no doubt have been a lamentable loss of life.

In the Amritsar case last year 6 people were killed and 12 wounded. The Locomotive Superintendent reported, after that accident, that the 13 preceding cases of broken axles (during the period including which the axle-mileage had been registered) amounted to one case in 20,000,000 vehicle miles.

This accident, like all those preceding it, arose from the fracture of a goods wagon axle, which on that occasion was travelling on a Mixed Train. These are of the light 6-ton pattern, and are all gradually being replaced by 10-ton axles, and the Locomotive Superintendent expressed his belief that they were as strong for the 6-ton wagons as the stouter axles were for the 10-ton wagons.

It was, however, judged prudent after that accident to issue an order that the 6-ton wagons were to be run as seldom as possible on Passenger Trains, and that when they were so run, they should always be put in rear of the Passenger carriages with a brake-van intervening. This order has since been strictly carried out. On the East Indian Railway and the two connected State lines, these 6-ton wagons are not allowed to run at all.

Until the present year, all the accidents have been to goods wagons; it is only in the last two accidents that carriage axles have broken, and they have hitherto been considered safe, the load being lighter. Nor should the occurrence of two breakages, even though happening within two months, give cause for unreasonable alarm. In the first case it certainly was not due to wear and tear, but to a flaw in the original forging, and there will probably always be a certain number of such faulty axles which may show their weakness at very uncertain intervals.

The following tabular statement shows the number of failures of axles on other lines as compared with this during the last five years :—

YEARS.	S. P. & D. RAILWAY.		E. I. RAILWAY.		G. I. P. RAILWAY.		O. & R. RAILWAY.	
	Axle failed.	Vehicle mileage.	Axle failed.	Vehicle mileage.	Axle failed.	Vehicle mileage.	Axle failed.	Vehicle mileage.
1876, ...	0	32,845,453	1	171,243,209	14	121,281,205	0	22,465,586
1877, ...	2	45,166,643	7	220,456,261	46	172,478,568	1	24,551,769
1878, ...	4	46,463,890	23	205,680,382	40	140,232,067	1	27,595,139
1879, ...	8	60,275,309	10	204,193,883	9	121,203,117	0	25,401,658
1880, ...	5	61,670,543	5	202,045,617	10	113,452,592	3	28,047,977

These, however, include engine axles. In 1881 there were two failures on this line, including the Amritsar case, and in the first quarter of 1882, as above noted, there have been already two.

On 31st December, 1881, there were on the Sind, Punjab and Delhi Railway 8,185 axles under stock.

Of these 4,011 were 10 ton axles.

„ 4,174 „ 6 „

There were 1,151 axles under coaching stock.

Of which 53 are 10 tons.

„ 1,098 „ 6 „

There were 1,877 goods vehicles of 10 tons.

„ 1,538 „ „ 6 „

3,415

Of these 1,538 lighter goods vehicles, 820 were covered, and 718 were open, all of which are to be converted to a higher carrying capacity.

The conversion of the light goods stock went on till lately at the rate of about 200 vehicles per annum. But last year it was hurried (chiefly owing to the Amritsar accident), and during last half-year 200 wagons were converted, and 200 more will be done this half-year, while an indent went home in February for 400 pairs of wheels and axles, and 300 axles alone, which should arrive in time to be made up next half-year, if at once telegraphed for as urgent.

It will be seen that nearly the whole of the Passenger stock of the line is on light axles, and that there is no sound reason for considering them unsafe. Still, the fact remains that two bad accidents have recently occurred to Passenger vehicles, and that the axles under them are lighter than what are now used in Passenger stock recently built both on this and other lines. It seems probable therefore that—though no immediate action appears necessary—they will also have to be converted eventually, and should the number of failures seriously increase, the work on the Passenger vehicles would of course have to take precedence of that on the Goods, and might have to be pushed on at a rapid rate.

The Agent has already wired to his Board to comply without delay with the last indent sent home, and an indent is going home for a machine to bore out the old wheels to receive the larger axles, which will both facilitate the work and lessen the ultimate expense. It has been ascertained also that axle boxes can be made up rapidly at Roorkee, if necessary, though the cost will be higher than if procured from England.

No further action appears at present to be called for except that the order of last year to the Traffic Department forbidding the 6-ton goods wagons to be run in front of Passenger vehicles should be amended, and that these wagons should be absolutely prohibited from running with Passenger Trains at all.

The attention of the Traffic and Locomotive Departments should also be specially directed to the danger arising from unpunctuality of the train service, which gives rise to over fast running to make up time, and that such fast running should be distinctly prohibited.

General Rules for the interchange of Rolling Stock between all connected broad gauge Railways in India were passed at the Conference of 1879. During the ensuing year some differences of opinion arose as to the intention of Rule XVII, which reads thus—

“That the Receiving Railway may call upon the Forwarding Railway to accept empty wagons with a view to equalize the ton-mileage.”

Consequently at the Conference held in January 1880, the following additional rule was passed, to be read in connection with No. XVII:—

“Rule XVII should only be brought into force when the daily average excess of wagons passing the junction in one direction exceeds for one week thirty per diem, and in that case the forwarding Company should not be called upon to take more than one-third of such excess number in empties. The demurrage on these empties to be paid at the rate of two pies per ton of carrying capacity per hour instead of at the usual rate.

“Forty-eight hours' notice to be given by wire by the receiving Company of its intention to forward empties.”

Disputes, however, still continued, leading to arbitration and the partial withdrawal of the Oudh and Rohilkhand Railway Company from the rules. Proposals were therefore put forward for the revision of the rules, by a Railway Conference, and the Secretary of State and the several Boards of Directors having agreed to these, the chief of which was that every Railway Administration should be bound by the revised rules for two years, and that subsequently one year's notice of withdrawal should be necessary, orders were passed for the Conference to as-

semble during the autumn of 1882. Although the revision of the interchange of stock rules is to be the first and principal business to be disposed of, the Conference will be empowered to discuss other questions of general railway interest.

In the last Administration Report it was mentioned that Messrs. Cook and Son were in communication with the Indian Government and the Guaranteed Railway Companies regarding the terms on which the firm should establish a system for working "Cook's Indian Tours."

The terms finally agreed to, with certain modifications made by one or two Railway Companies, are as follows:—

1. Return tickets, 1st and 2nd class, available for six months, on the usual basis of a fare and a half.
2. Single tickets, 1st and 2nd class, to be available for two months.
3. Both return and single tickets to admit of breaks of journey at any station, for any length of time within the period allowed.
4. The Railway Companies to allow 10 per cent. on both return and single tickets as commission to Thomas Cook and Son to recoup the expenses they will incur in advertising, drawing of tours, maps, programmes, &c.
5. The Railway Companies to allow a further 10 per cent. on the single tickets only, for the benefit of the passengers.
6. Thomas Cook and Son to issue to passengers a "voucher" or "warrant," specifying the description and class of tickets required, which will be presented by the passenger to the booking clerk, who will have instructions to issue such tickets in exchange, sending the "voucher" or "warrant" into audit as cash.
7. Thomas Cook and Son to render at the head-quarters of each Railway Company in India, a monthly statement of "warrants" they have issued at all their offices, and attach a cheque payable at such head-quarter's town for the amount.
8. Should the facilities for break of journey be other than those accorded to the general public, Thomas Cook and Son to supply a perforating machine (Cook's Tours), with which the tickets will be stamped, so as to identify the passenger, and ensure for him the abovementioned time for travelling and breaks of journey.

These terms were accepted by the Government of India for all State Railways, as applicable solely to *bonâ fide* tourists and not to ordinary passengers, subject to one year's notice of withdrawal.

Statistical tables giving a summary of the Revenue Accounts of all Indian Railways and an analysis of the working of the principal lines are given in Appendix FF. In order to show the general average cost of working Indian Railways, the results have been collected under the heads of broad gauge and metre gauge, and so as to reduce the number of figures these results have been divided by the mileage worked.

Excluding the few small lines, the results of which are not analysed in Part II of the Statistics, the mean mileage of each gauge worked during the year was 6,820 on the broad, and 2,467 on the metre, gauge.

The average working expenses per mile of road worked, classified under six main heads, was as follows in rupees:—

	Broad,	Metre.
Maintenance,	2,064	1,097
Locomotive.	2,950	1,789
Carriage and wagon,	925	308
Traffic,	1,379	694
General charges,	821	512
Total,	8,139	4,400

The general charges have been reduced by the amount of telegraph receipts, and the miscellaneous expenses by sundries, the total expenditure agreeing with item 18 of the analysis of working, Part II of Statistics. The work done for this expenditure, represented by the number of gross tons moved over each mile of road, was—

						Broad.	Metre.
Coaching,	...	...	...	...	...	286,861	138,169
Goods, ...	...	...	...	...	...	847,522	238,059
					Total,	1,134,383	376,228

The actually productive work done, represented by the number of freight tons moved over each mile was—

						Broad	Metre.
Coaching,	...	...	...	...	...	21,732	13,989
Goods, ...	...	...	...	...	...	307,622	85,604
					Total,	329,354	99,593

Whence the cost of moving 1,000 gross tons one mile on the two gauges was—

	Broad.	Metre.
	Rs.	Rs.
	7,1748	11 6950

Dividing the expenses between coaching and goods in proportion to the gross ton mileage, the results per mile open were—

						Broad.	Metre.
Coaching,	...	...	...	...	...	2,176	1,642
Goods, ...	...	...	...	...	...	5,963	2,758
					Total,	8,139	4,400

Consequently the expenses of moving 1,000 freight tons one mile averaged—

						Broad.	Metre.
Coaching,	...	...	...	...	...	100.13	117.38
Goods, ...	...	...	...	...	...	19.38	32.22

In addition to the working expenses, all Indian lines are weighted with interest charges on their capital cost, which have to be defrayed whether the lines earn enough or not. Consequently these charges have to be taken into account as part of the cost of the work done. Divided between coaching and goods proportionately to the gross ton mileage, these charges averaged during the year for each mile of road worked as follows :—

						Broad.	Metre.
Coaching,	...	...	...	...	...	2,218	1,184
Goods, ...	...	...	...	...	...	6,551	2,040
					Total,	8,769	3,224

Combining interest charges and working expenses, the outlay per mile averaged—

						Broad.	Metre.
Coaching,	...	...	...	...	...	4,394	2,826
Goods, ...	...	...	...	...	...	12,514	4,798
					Total,	16,908	7,624

Whence the full cost per 1,000 gross ton miles and per 1,000 freight tons miles respectively was as below :—

						Broad.	Metre.
Per 1,000 gross tons,	...	...	...	...	...	14 90	20.26
Per 1,000 freight tons—							
Coaching,	...	...	...	...	...	202 19	202.02
Goods, ...	...	...	...	...	...	40 68	56.05

The average distance which each ton of goods lifted was carried was—

	Broad.	Metre.
Miles,	197.21	86.86

The working expenses of every railway may be broadly divided into two classes of expenditure, viz. :—

- 1st. "Standing" expenses which are either altogether independent of the amount of the traffic on the line, or which, at any rate, are not liable to vary directly with any increases or decreases in the traffic.
- 2nd. Working charges which vary directly with the amount of the traffic, but remain approximately constant for each unit of work done: these may be "Direct" expenses.

Among the first class are the cost of general management, general technical supervision, a proportion of the repairs and maintenance of permanent way and bridges, repairs of stations and buildings, part of the station staff and lighting, clothing, &c. All these charges are liable to vary, but they do not vary sensibly with every change in the traffic, though to a certain extent most of them are, no doubt, affected by great and gradual increases or decreases in the amount of work done. At all events, it is possible to arrive at an approximate average of the cost per mile per annum of such charges for each class of railway, which average, though not always true for any particular line in any one year, will be fairly correct for a number of lines every year, or for every line in a number of years.

All expenses not included in the first class will fall into the second, and constitute the direct working expenses per unit of work done.

Thus an increase or decrease of traffic will entail a direct proportionate increase or decrease in the annual working expenses under the second class of outlay, but the rate per unit of work done will remain constant or nearly so.

On the other hand, if accidents and arbitrary charges are eliminated, the annual outlay under the first class will remain constant, or nearly so, regardless of the increases or decreases in the traffic; but its effect on the rate per unit will be inversely as the change in the traffic, *i.e.*, increasing the rate as the traffic diminishes, and decreasing it as the traffic increases.

The interest charges will obviously operate in the same way as the Standing expenses.

To arrive at an approximation to the average annual fixed charges per mile on Indian Railways, the following working expenses per mile during the past year have been abstracted :—

<i>Maintenance.</i>				Broad.	Metre.
				Rs.	Rs.
General superintendence,	..	..	..	352	212
Maintenance, permanent way,	..	..	..	1,088	619
Repairs of bridges,	..	..	..	216	80
" stations, &c.,	..	..	..	165	64
Other charges,	..	..	..	243	122
Total,				2,064	1,097

<i>Locomotive.</i>					
General superintendence,	..	..	..	236	154
Wages of drivers, &c.,	..	..	..	638	385
Fuel,	..	..	..	1,000	667
Water,	..	..	..	62	38
Oil, tallow, &c.,	..	..	..	95	56
Maintenance of locomotives,	..	..	..	636	364
Other charges,	..	..	..	283	125
Total,				2,950	1,789

	<i>Carriage and Wagon.</i>				Broad. Rs.	Metre. Rs.
General superintendence,	..	..	..	..	62	37
Repairs of vehicles,	..	..	..	..	737	219
Cleaning, oiling, &c.,	..	..	..	..	80	44
Other charges,	..	..	..	..	46	8
					925	308
	<i>Traffic expenses.</i>					
General superintendence,	..	..	..	..	186	105
Station staff,	..	..	..	..	689	328
Train staff,	..	..	..	..	251	88
Fuel, lighting, &c.,	..	..	..	..	125	66
Clothing,	..	..	..	..	19	12
Printing, stationery, &c.,	..	..	..	..	66	51
Miscellaneous,	..	..	..	..	43	44
					1,379	694

Grouping the items of the above heads of charge and of general charges into two classes of expenditure, and apportioning the outlay on maintenance of permanent way, station staff, and lighting, as fairly as possible between them, the following result:—

					Broad.	Metre.
1st class, or Standing expenses,	..	..	..	..	2,632	1,753 (a)
2nd " or Direct "	..	..	..	..	4,507	1,980 (b)
Fuel, .. .. .	..	..	..	..	1,000	667 (c)
					8,139	4,400

Although this division of expenses may be subject to correction in detail, the totals may be assumed to be approximately correct; and as any moderate change in the totals will affect the following calculations, which are based on them, to an inappreciable extent, the above figures are taken as sufficiently correct for the purpose of this analysis.

Dividing the above sums over the work done per 1,000 gross ton miles, we have:—

					Broad. Rs.	Metre. Rs.
Under (b),	..	..	..	..	3·973	5·263
" (c),	..	..	..	..	0·882	1·773
Total of (b) and (c),	..	..	..	..	4·855	7·036
Under (a),	..	..	..	..	2·320	4·659
					7·175	11·695
I.—Interest charges,	..	..	..	..	7·730	8·569
					14·905	20·264

The earnings of the railways during the year per mile of road reduced by sundries, &c., were as follows:—

* Broad. Rs.	Metre. Rs.
17,732	7,174

It would appear accordingly that the broad gauge railways, as a whole, made, on the average, a profit of Rs. 824 per mile over and above all expenses and interest charges, while the metre gauge railways' earnings fell short of their expenses and interest charges by Rs. 450 per mile during the past year.

					Broad. Rs.	Metre. Rs.
* Gross earnings,	..	..	..	..	12,46,04,650	1,81,67,777
Less—						
Steam-boat, sundries, &c.,	..	..	..	..	36,75,765	4,70,128
					12,09,28,885	1,76,97,649
Per mile,	..	..	..	..	17,732	7,174

The average number of trains run over each mile during the year and per diem was as follows:—

	Broad.		Metre.	
	Year.	Day.	Year.	Day.
Coaching,	1,424.45	3.900	1,036.47	2.838
Goods,	2,663.50	7.293	1,579.68	4.325
Total,	4,087.95	11.193	2,616.14	7.163

The average gross weights in tons of the trains on the two systems were—

	Broad.	Metre.
Coaching,	201.384	133.307
Goods,	318.199	150.701
Mean,	277.495	143.810

While the freight tons carried per train were—

Coaching,	15.256	13.497
Goods,	115.495	54.191
Mean,	80.567	38.069

The average capacity tonnage hauled per train was—

Coaching,	48.79	36.96
Goods,	233.77	100.45
Mean,	162.80	74.90

The portion of freight tonnage to gross tonnage per train was therefore—

	Broad.	Metre.
Coaching, ... ..	.075758	.101246
Goods, ... ..	.362966	.359590
Mean, ... ..	.290340	.264714

Thus the coaching traffic was, on the whole, worked much more economically as regards the haulage of dead weight on the metre gauge lines than on the broad gauge, while the working of the goods traffic was slightly better in this respect on the latter. Taking the traffic as a whole, however, there was less dead weight hauled on the broad gauge, in proportion to freight, than on the metre gauge lines, owing mainly to the much greater development of the goods traffic on the former as compared with the latter.

The working expenses per train mile, distinguishing between share of Standing expenses, direct working charges, cost of fuel and interest on capital, were—

	Broad. Rs.	Metre. Rs.
Standing, ... ..	.6438	.6701
Direct,	1.1025	.7569
Fuel, ... ..	.2446	.2549
Total,	1.9909	1.6819
Interest,	2.1451	1.2323
Grand Total,	4.1360	2.9142

Whence, dividing these sums by the average gross weight of trains on the two gauges respectively, and multiplying by 1,000 we have the cost of hauling 1,000 gross tons one mile on the two systems, as before, to have been Rs. 14.905 and Rs. 20.264.

Now, the gross ton traffic on the broad gauge lines during the year under review was to that on the metre gauge lines as 3.01515 to 1, whereas the latter are, theoretically, capable of carrying at least half the traffic of the former.

If the traffic on the metre gauge lines had been sufficiently developed to work up to this standard, the standing and interest charges would have been reduced in the proportion of 1 to .66332 by being spread over a larger amount of gross ton mileage, leading to a reduction in the cost per 1,000 gross tons of Rs. 4.538.

Other charges remaining the same, the following are the results per 1,000 gross tons :—

						Broad. Rs.	Metre. Rs.
Standing,	...	...	...	...	...	2 320	3 089
Direct,	...	...	...	...	...	3 973	5 263
Fuel,	...	...	...	...	...	882	1 773
Interest,	..	...	...	..	...	7 730	5 681
Total,						14 905	15 806
Or without fuel,						14 023	14 033

The inference that may be drawn from the foregoing comparisons is that the average metre gauge railway, owing to its smaller prime cost and the smaller profit it has consequently to make to yield equal returns on the capital, is capable, with a traffic proportionate to its carrying capacity, to compete on virtually equal terms with an average broad gauge line also working up to its capacity. It cannot of course carry so much by about one-half, but it can carry the half of which it is capable at practically much the same cost per unit as the broad gauge railway can carry double the quantity. By virtual equality in economy of working it is implied that there will be found no greater difference on an average between railways of the same class, or occasionally in the working of the same railway at different times. Where so much depends on local conditions (temporary as well as permanent), the *personnel* of the staff, and the variable character of the traffic itself, no closer approach to ultimate equality can be calculated on. If all classes of railways were strictly limited to earning nothing more than would just cover their working expenses and interest charges, the metre gauge would, no doubt, labour under a disadvantage, which may be estimated at from 5 to 8 per cent. But as there is no such limit, and all railways are striving to make profits in excess of the bare interest charges, the small working disadvantage under which the metre gauge may labour vanishes in the larger proportionate gain, in the form of interest on the capital outlay which any excess profits made by it would yield. The more nearly the traffic approaches to the maximum carrying power of the two gauges, the closer their working expenses *cum* interest will tend towards equality, and the greater the margin that will be afforded for adjusting charges by the difference in the rates of interest which an equal net profit will yield on capital. Thus, practically, when railway traffic attains its maturity, or at all events, sufficient development, to afford full employment for all lines according to their several powers, there is every reason to believe that the average cost to the public for its transport will be the same, irrespective of gauges, and at the same time the average clear profits from the working of the lines will yield approximately equal returns on the capital embarked as a whole, whether the lines be broad or narrow.

An average of a large number of lines working under a great variety of conditions, the advantages and disadvantages of which tend to neutralise each other, implies virtually a general similarity of circumstances.

When, however, individual lines are compared with one another, considerable discrepancies must be expected.

The results of the foregoing analysis are given in the following table :—

						AVERAGE OF PRINCIPAL RAILWAYS.	
						Broad gauge	Narrow gauge.
1.	Mean mileage worked,	...	...	...		6,820	2,467
2.	Working expenses, per mile,	...	...	...	Rs.	3,139	4,400
3.	" " " coaching,	...	...	...	"	2,176	1,642
4.	" " " goods,	...	...	...	"	5,963	2,758
5.	Gross weight moved, per mile,	...	...	...	Tons	1,134,383	376,228
6.	" " " coaching,	...	...	...	"	286,861	138,169
7.	" " " goods,	...	...	...	"	847,522	238,059

						AVERAGE OF PRINCIPAL RAILWAYS.	
						Broad gauge.	Narrow gauge.
8.	Freight tons moved, per mile,				Tons,	329,354	99,593
9.	" " " coaching,				"	21,732	13,989
10.	" " " goods,				"	307,622	85,604
11.	Cost per 1,000 freight ton miles,				Rs.	119.51	149.60
12.	" " " coaching,				"	100.13	117.38
13.	" " " goods,				"	19.38	32.22
14.	Interest charges, per mile,				"	8,769	3,224
15.	" " " coaching,				"	2,218	1,184
16.	" " " goods,				"	6,551	2,040
17.	Expenses and interest, per mile,				"	16,908	7,624
18.	" " " coaching,				"	4,394	2,826
19.	" " " goods,				"	12,514	4,798
20.	" standing, per mile,				"	2,632	1,753
21.	" direct " "				"	4,507	1,980
22.	" fuel " "				"	1,000	667
23.	" interest " "				"	8,769	3,224
24.	Combined cost per 1,000 gross ton miles,				"	14,905	20,264
25.	Expenses, standing " "				"	2,320	4,659
26.	" direct " "				"	3,973	5,262
27.	" fuel " "				"	0,882	1,773
28.	" interest " "				"	7,730	8,569
29.	" per 1,000 freight ton miles,				"	51.336	76.551
30.	" coaching " "				"	202.19	202.02
31.	" goods " "				"	40.68	56.05
32.	" standing " "				"	7.991	17.602
33.	" direct, " "				"	13.684	19.880
34.	" fuel " "				"	3.036	6.697
35.	" interest " "				"	26.625	32.372
GOODS PROPORTION.							
36.	Expenses, standing, per 1,000 freight ton miles,				"	6.296	13.562
37.	" direct " " " "				"	10.877	13.878
38.	" fuel " " " "				"	2.405	4.906
39.	" interest " " " "				"	21.097	23.702
40.	Earnings (reduced by sundries) per mile,				"	17.732	7.174
41.	" coaching, per mile,				"	5.139	2.945
42.	" goods " "				"	12.456	4.161

CHAPTER II.

THE PRINCIPAL EVENTS AND REMARKS ON THE WORKING OF THE EAST INDIAN RAILWAY AND OF THE SEVERAL STATE RAILWAYS DURING THE YEAR.

CONTENTS—East Indian Railway—Indus Valley and Kandahar—Punjab Northern—Dhond and Manmad—Patna and Gya—The Nizam's—Calcutta and South-Eastern—Khamgaon—Amraoti—Wardha—Coal—Sindia—Ghazipur and Dildarnagar—Rajputana—Holkar and Sindia—Neemuch—Nagpur and Chhattisgarh—Rangoon and Irrawaddy Valley—Northern Bengal—Tirhoot—Cawnpore and Farkhabad—Muttra—Achnera—Bhavnagar—Gondal—Muttra and Hathras—Mysore—Nalhati—Gaskwar of Baroda's—Kanua, Dhuria and Mogal Hat.

EAST INDIAN RAILWAY.

The following is taken from the report for the East Indian Railway furnished by the Consulting Engineer for Guaranteed Railways at Calcutta.

The length of line constituting the Undertaking on which rates and fares are calculated is 1506·75 miles, of which 410·59 miles are double. The total length of single track, including sidings, is 2,250 miles.

Construction.—The following are the principal works of construction completed during the year :—

- (a). Additional coal sidings at Howrah.
- (b). Permanent station at Trishbigga.
- (c). Retaining wall for ballast on convex side of curves on the Chord line.
- (d). Shed for the manufacture of chairs and sleepers at Jamalpore.
- (e). Passing station at Dheena.
- (f). Additional goods shed and sidings at Cawnpore.

And the principal works in progress at the end of the year were—

Doubling the line between Buxar and Mogulserai, 11 miles finished.

Additional viaduct for Soane floods near Arrah.

Extension of carriage shops at Howrah.

Overbridge across Howrah yard.

Improvement of the water supply on the Jubbulpore extension.

Maintenance.—The way and works have been maintained in an efficient manner throughout the line. The relaying of the line with steel rails has almost been stopped owing to the stock of these rails having run out. As soon as a further supply has been received, the relaying on the Allahabad District from Mogulserai to Allahabad, also between Manauri and Bharwari and on the Chord Line District between Durgapur and Raneegunge, will be continued. The progress made in putting in additional rail bearings has been very slow, owing to the scarcity of wooden sleepers. D. O. cast-iron plate sleepers are being put in place of the chocks first laid.

The following statement shows the progress made in relaying the line with steel rails :—

Names of Districts.							Lengths of road laid with steel rails.	Lengths of road laid with iron rails.	
							Miles.	Miles.	
Howrah district,	..	..	..	..	..	..	139.16	164.97
Chord Line district,	..	..	..	..	..	..	47.07	363.67
Dinapore district,	..	..	..	..	..	..	14.39	407.09
Allahabad district,	..	..	..	..	..	..	22.60	414.62
Delhi district,	..	..	..	..	..	..	14.26	329.50
Total,							..	237.48	1679.85

The following statement shows the progress made in putting in the full complement of sleepers:—

Names of Districts.							Total length of road laid with full complement of sleepers.	Total length of road under sleepers.	
							Miles.	Miles.	
Howrah district,	..	..	..	..	..	..	175.31	128.82
Chord Line district,	..	..	..	..	..	..	398.18	12.56
Dinapore district,	..	..	..	..	..	..	36.56	384.92
Allahabad district,	..	..	..	..	..	..	295.43	141.80
Delhi district,	..	..	..	..	..	..	92.74	251.02
Total,							..	998.21	919.13

		1880.	1881.
The cost of maintenance per mile per month was,	Rs.	244-3-0	240-12-8
Number of sleepers renewed during the year,	Wooden,	No. 291,603	250,086
	Iron,	76,924	103,203
The length of rails renewed during the year in miles,	Steel,	Miles 52.70	37.36
	Wrought-iron,	34.76	32.94

Locomotive Department.—26 new engines were erected and put on the line in replacement of a similar number of condemned engines. Of these, 20 were received from England, and 6 were built in the Railway workshops, chiefly from duplicate pieces in stock. The new types of passenger and goods engines received from England are very powerful, both can take trains of 600 tons over grades of 1 in 200 at a speed of 13 miles per hour.

The Locomotive stock and workshop machinery has been maintained in good working order.

The average daily train mileage run by the engines was—

	1st half.	2nd half.
In 1880,	50.50	47.25
„ 1881,	49.75	51.50
Decrease,	0.75	Increase, 4.25

The consumption of coal per train mile in pounds was—

	ENGINES.	
	Passenger.	Goods.
In 1880,	38.82	50.85
„ 1881,	38.18	51.78
Decrease,	0.64	Increase, 0.93

During the year 23 engines were condemned, making 37 up to the 31st December, 1881. The following table gives the age and mileage run by each:—

Number of Engines.	AGE.		Train miles	Engine miles
	Years.	Months.		
4	24	10	278,357	297,724
7	25	1	267,040	283,669
14	23	2	334,524	355,861
16	22	9	375,305	382,602
69	15	6	325,495	329,333
80	20	9	197,437	211,572
150	20	2	111,271	225,620
92	21	4	190,784½	243,411½
149	21	2	72,814½	226,584½
30	18	7	408,126	411,062½
33	17	9	441,336½	444,654½
39	16	8	321,070½	342,494
56	16	9	392,467½	396,656
73	21	3	328,335½	332,649½
75	21	3	272,156	279,140½
77	21	4	310,579½	314,410½
79	18	8	11,924½	32,004
100	17	11	18,233½	40,558½
113	25	5	137,768½	360,462½
142	20	4	110,918½	313,517½
187	18	6	271,426½	283,761
216	18	2	255,189	286,340
242	17	3	304,365	342,293½

The native drivers and shunters continued to work satisfactorily. There are now 117 native drivers, 118 native shunters, and 775 native firemen—total 1,010—working on running engines.

The employment of natives as drivers and shunters has now been tried for seven years, and the results appear very satisfactory. A saving of Rs. 20,65,246 has been effected during this period in salaries and overtime allowances.

The cost of engine-men, firemen, and all labour connected with running engines was—

	Rs.	Engine-mile.
In 1880,	10,72,554	8,992,865
„ 1881,	10,72,954	9,529,686
Increase,	400	536,821

Collieries.—The Kurhurballie and Serampore coal mines yielded—

	Tons.
In 1880,	257,800
„ 1881,	278,500
Increase,	20,700

The sale of the surplus steam and refuse coal to foreign railways and to the public was restricted during the year to the disposal of it by public auction at the pit's mouth.

Carriage and Wagon Department.—The rolling-stock and workshop machinery have been efficiently maintained.

A dining and a cooking carriage were constructed for the use of His Excellency the Viceroy at a cost of Rs. 15,890.

100 new third class carriages and 382 iron covered goods wagons were also built.

The working expenses (repairs and oiling) per train-mile amounted to—

	As.
In 1880,	3 06
„ 1881,	2 80
Decrease,	0 26

The vehicles renewed and turned out were—

In 1880,	No.	Rs.
„ 1881,	312, at a cost of	3,29,125
	208, at a cost of	3,93,800

besides 159 coal hoppers altered to carry 11 tons each.

At the end of the year the total number of vehicles running on the line was 9,167.

Telegraph.—The lines of telegraph have been efficiently maintained.

Earnings and Expenditure.—Exclusive of the flotilla,—

The total earnings amounted to	Rs.
„ expenditure „	4,54,11,472
	1,44,63,162
Balance net earnings,	3,09,48,310

The details are given in the table below :—

Abstract of Earnings, Expenses, and Profits.

Years.	Miles open	Train miles (Tram Department).	Earnings*	Expenses	Profits.	PER MILE OPEN.			PER TRAIN MILE.			Percentage of working expenses to earnings	Percentage of profits on Capital expended.	Capital on which guarantee is paid or paid up Capital.	Rate per cent. of profits on total Capital paid up.	
						Earnings.	Expenses.	Profits.	Earnings.	Expenses.	Profits.					
1877	1503.15	8 852,482	4 43,00,208	1,40,40,136	3,02,60,072	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1878	1504.31	8,064,980	3,97,36,891	1,41,57,895	2,55,78,996	29175 56	9340 47	20135 09	5 00	1 58	3 42	31 69	9 34	2,58,39,222	9 00	
1879	1504.31	8,251,606	4,32,87,400	1,43,03,061	2,90,84,339	26415 36	9411 55	17003 81	4 93	1 75	3 17	35 61	7 86	3,65,17,184	7 60	
1880	1504.32	7 914,520	4,29,14,423	1 41,53,658	2 87,60,771	28775 59	9441 57	19334 02	5 24	1 73	3 52	32 61	8 83	33,68,69,417	8 63	
1881	1506 75	8 330,636	4,53,74,623	1,44,34,780	3,09,44,843	28327 45	9408 67	19118 79	5 40	1 78	3 62	32 98	8 83	The old Capital Account has been closed		
						30117 55	9580 98	10537 47	5 45	1 71	3 72	31 81				

* N.B.—Steamer traffic has been excluded from this table except in the two columns giving percentage of profits on Capital expended and Capital paid up.

The earnings from—

Coaching traffic amounted to	Rs.
Goods traffic „	1,18,92,133
Upon the total earnings	3,22,38,495
The percentage of coaching traffic is	4,54,11,473
„ of goods traffic is	26 18
	70 99

The traffic shows a steady increase in every branch, although not exempt from fluctuations during the year.

Details of Passenger Traffic.

Description of Classes.	NUMBER CONVEYED.		Increase in 1881.	Decrease in 1881.	Increase per cent.	Decrease per cent.	RECEIPTS.		Increase in 1881.	Decrease in 1881.	Increase per cent.	Decrease per cent.
	1880.	1881.					1880.	1881.				
1st class	43,563	42,249	..	1,314	..	3 02	Rs.	Rs.	..	35 758	..	6 91
Per cent. on entire passenger traffic	0 51	0 47	..	..	..	..	5 00	4 54	..	..	..	..
2nd class	152,022	158,158	6,136	..	4 03	..	7,23,021	6,60,987	..	62 034	..	8 58
Per cent. on entire passenger traffic	1 77	1 76	..	..	..	..	6 98	6 22	..	..	..	..
Intermediate class	600,559	605,982	5,423	..	0 90	..	4,67,417	4,77,887	10,470	..	..	2 24
Per cent. on entire passenger traffic	6 99	6 76	..	..	..	..	4 52	4 50	..	..	..	..
3rd class	7,792,724	8,162,773	370,049	..	4 75	..	86,45,980	90,02,163	3,56,183	..	..	4 12
Per cent. on entire passenger traffic	90 73	91 01	..	..	..	..	83 50	84 74	..	..	..	..
Total	8,588,868	8,969,162	380,294	..	4 43	..	1,03,54,044	1,06,22,905	2,68,861	..	..	2 60
Percentage of passenger traffic to total railway receipts .. .. .	..	..	..	..	..	..	24 16	23 44	..	..	..	..

The average load in tons of each

Goods train was	...	...	...	1880.	1881.
„ wagons was	..	..	..	149 00	167 75
				6 98	5 75

Details of Goods Traffic.

Description of Goods.	WEIGHT CARRIED.		Increase in 1881	Decrease in 1881.	RECEIPTS.		Increase in 1881	Decrease in 1881.
	1880	1881.			1880.	1881.		
	Tons.	Tons.	Tons.	Tons.	Rs.	Rs.	Rs.	Rs.
<i>Merchandise.</i>								
For the public,	1,774,696	2,025,310	250,614	...	2,36,31,467	2,55,08,080	18,76,613	..
Military stores,	14,233	12,967	...	1,266	5,02,212	4,96,483	...	5,729
Railway materials for construction,	35,730	105,931	70,201	..	40,338	1,44,970	1,04,632	...
Railway materials for revenue,	736,390	734,926	...	1,464	5,47,697	6,33,278	85,581	...
<i>Minerals.</i>								
For the public,	732,222	751,602	19,380	...	44,00,126	47,76,623	3,76,497	..
„ construction,	113	374	261	...	181	583	402	..
„ revenue,	177,725	195,854	18,129	...	5,34,347	5,37,799	3,452	...
Total,	3,471,109	3,826,964	355,855	..	2,96,56,368	3,20,97,816	24,41,448	..
Percentage of goods traffic to total railway receipts,	..	..	..	..	69 20	70 82	...	...

The following table gives an abstract of the outwards and inwards goods traffic at the Howrah and Calcutta Stations :—

Abstract of Goods forwarded from, and received at, Howrah and Calcutta Stations during the years 1880 and 1881.

Names of Articles.	RECEIVED AT HOWRAH AND CALCUTTA.		Increase in 1881.	Decrease in 1881.	FORWARDED FROM HOWRAH AND CALCUTTA		Increase in 1881	Decrease in 1881.
	1880.	1881.			1880	1881.		
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Beer, spirits and wines,	141	171	30	...	3,484	3,474	...	10
Coal,	388,838	399,300	10,462	...	38	428	390	..
Copper,	13	385	372	...	4,001	5,700	1,699	...
Cotton and twist,	47,190	38,948	...	8,242	4,715	4,378	...	337
Ghee and oil,	4,519	5,626	1,107	...	2,775	2,665	...	110
Grains and pulses,	245,122	411,743	166,621	...	579	1,707	1,128	...
Gunny,	502	485	...	17	13,300	16,796	3,496	...
Hides and horns,	28,796	20,610	...	8,186	57	157	100	...
Indigo,	4,684	5,731	1,047	...	14	9	...	5
Iron,	1,041	957	...	84	24,164	45,820	21,656	..
Lacdye,	4,481	6,377	1,896	...	28	99	71	...
Opium,	7,712	7,199	...	513	4	4	...	..
Piece goods,	339	429	90	...	49,155	48,964	...	191
Salt,	10	18	8	...	92,563	100,996	8,433	...
Saltpetre,	20,349	18,554	...	1,795	51	35	...	16
Seeds,	198,500	198,624	44	...	1,613	2,096	483	..
Stones,	94	2,324	1,330	...	191	118	...	73
Sugar,	572	4,700	3,128	...	1,973	2,811	838	...
Miscellaneous, including railway materials,	62,794	86,777	23,983	...	98,377	122,638	24,261	...
Total,	1,018,177	1,209,458	191,281	...	297,082	358,895	61,813	...

The bulk of the increase was due to the large export of wheat from Calcutta to Europe owing to the short yield of the harvest in the United States, the less supply therefrom, and the consequent rise in price of corn in the European market. The increase in iron is due to a larger quantity of foreign railway material being imported, and in salt to a larger influx of English salt from Liverpool.

The following table gives an abstract of the outwards and inwards goods traffic at Jubbulpore Station:—

Abstract of Goods Traffic forwarded from, and received at, Jubbulpore Station during the years 1880 and 1881.

Names of Articles.	RECEIVED AT JUBBULPORE.		Increase in 1881.	Decrease in 1881.	FORWARDED FROM JUBBULPORE.		Increase in 1881.	Decrease in 1881.
	1880.	1881.			1880.	1881.		
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Beer, spifits and wine, ...	213	26	...	187	...	1	1	...
Coal, ...	9,180	24,393	15,213	...	...	...	...	...
Cotton and twist, ...	214	198	...	16	469	318	...	...
Grains and pulses, ...	798	170	...	628	454	2,274	1,820	...
Lac dye, ...	53	19	...	34	480	434	...	46
Piece goods, ...	274	266	...	8	79	19	...	60
Salt, ...	127	4,024	3,897	...	235	130	...	105
Seeds, ...	166	261	95	...	75	10	...	65
Sugar, ...	2,808	3,622	814	...	35	35	...	...
Miscellaneous, including railway materials, ...	4,895	7,524	2,629	...	1,473	7,974	6,501	...
Total, ...	18,728	40,503	21,775	...	3,300	11,195	7,895	...

Working Expenses.—The gross expenditure exceeds that of 1880 by Rs. 2,72,464, or 1 92 per cent., the excess being chiefly due to the greater number of engines replaced during the year.

Abstract of working expenses during the years 1880 and 1881.

Heads of charges.	EXPENSES.		Increase in 1881.	Decrease in 1881.
	1880.	1881.		
	Rs.	Rs.	Rs.	Rs.
Maintenance, ...	44,08,053	43,53,787	...	54,266
Locomotive, ...	34,83,169	38,70,740	3,87,571	...
Carriage and wagon, ...	15,27,989	14,57,344	...	70,645
Traffic, ...	25,88,624	26,32,148	43,524	...
General charges, ...	17,06,137	17,27,008	20,871	...
Steam-boat, ...	37,040	28,382	...	8,658
Special and miscellaneous, ...	4,39,686	3,93,753	...	45,933
Total, ...	1,41,90,698	1,44,63,162	2,72,464	...

Details of the steamer traffic are given below for the last five years:—

Steamer Traffic.

Years.	Earnings.	Expenses.	Deficit.	Profit.
	Rs.	Rs.	Rs.	Rs.
1877, ...	45,550	87,719	42,169	...
1878, ...	41,118	38,924	...	2,194
1879, ...	28,801	32,231	3,430	...
1880, ...	30,687	37,040	6,353	...
1881, ...	31,849	28,382	...	3,467

The foreign traffic was—

	Maunds of goods.	Rs.	Number of passengers.	Rs.
In 1880, ...	1,92,93,942	96,84,862	468,719	16,97,399
„ 1881, ...	2,36,64,452	1,00,31,719	684,893	24,82,700
Increase, ...	43,70,510	3,46,857	216,174	7,85,301

INDUS VALLEY AND KANDAHAR STATE RAILWAY.

The same practice as followed in last year's report, has been adopted, viz., the progress of works of construction and of expenditure on capital account is reviewed for the financial year 1881-82, while the working of the open line and the accounts of earnings and expenditure are considered for the calendar year 1881

Total length of open mileage.—The total length of line open for public traffic on the 31st March, 1882, was the same as last year, viz., 641 miles, including 7 miles of the Sind, Punjab and Delhi Railway between Mooltan and Muzaffarabad worked over by this Railway, but in accordance with the Director General of Railways (No. 300T, dated 14th November, 1881,) the length of the Pir-Chowki extension, 19 miles, used for troop traffic, but not open to the public, has been included in the mileage for purposes of calculation, making the total open mileage 660 miles.

Finances.—The total capital expenditure on final heads on the Indus Valley and Kandahar State Railway during the year 1881-82 was Rs. 49,95,693, and the net expenditure to the end of 1881-82 has been Rs. 7,72,86,340, but the assumed capital on which the interest has been calculated, has been taken at Rs. 7,77,13,030, being the net expenditure, including suspense accounts, to the end of previous year plus half the net expenditure during the year 1881-82.

The finance accounts of capital and revenue expenditure for 1881-82, will be found on page 40.

On the 660 miles of open line 1,834,372 train miles were run, earning Rs. 55,35,161, and costing Rs. 43,57,873, or 79 per cent., leaving 21 per cent. of the earnings as net profit due to the year.

The earnings and expenses per train mile have been Rs. 2.91 and Rs. 2.28 respectively.

The return on the capital expended was 1.48 per cent. per annum.

Of the total earnings, coaching traffic contributed, in round numbers, 27 per cent., goods traffic 64 per cent., and sundries (including steam boat and electric telegraph) 9 per cent.

In round figures, the maintenance of the line cost 15 per cent. of the gross earnings, the locomotive and carriage and wagon expenses 34 per cent., the traffic expenses 11 per cent., while general administration and sundry expenses cost 19 per cent.

The earnings and expenses for the past two years are shown in the following table:—

Year.	Average miles open for traffic.	EARNINGS.			EXPENSES.		
		Gross	Per mile per annum	Per mile per week.	Gross	Per mile per annum.	Per mile per week.
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	
1880, ...	575	66,62,383	11,586	223	47,39,983	8,244	157
1881, ...	653	55,35,161	8,484	163	43,57,873	6,674	128

of their flotilla, and the following steamers and flats were purchased at the close of the year for a lump sum of Rs. 3,50,000.

The large flats, Bahawalpore and Sind, were taken over for purposes in connection with the Indus bridge, the remainder for both ferry work and bridge work.

Steamers.	Flats.	Corrugated Barges.
Tug C.	Umritsur.	Class IV, Nos. 2, 3 & 4.
Parah.	Mooltan.	" V. " 1 & 2.
Cranbourne with her two flats.	Shikarpur.	" VI. " 1 & 2.
Delhi and Meerut.	Bahawalpore.	
	Sind.	

In addition to these a dredger hull was also purchased for Rs. 15,000, for a landing stage on the Rohri side of the river Indus.

As the vessels were only taken over in the month of March 1882, it is premature to pass any opinion in this report on the result of this transaction as affecting the working of the line.

The following is a statement showing the steamers, flats and barges on this Railway on 31st March, 1882 :—

Name and distinguishing mark of vessel.	Horse power.	Registered tonnage.	Remarks
STEAMERS AND TUGS.			
Cranbourne,	150	229	
Parah,	65	243	
Fateh Mubarak No. 11,	17	63	
Steam Launch No. XII,	3	15	
Corrugated iron tug C,	40	80	
FLATS AND BARGES.			
Iron flat No. 1, .. .. .	..	162	
Corrugated iron barge No. 2, .. .. .	..	44	
Iron flat No. 3, .. .. .	..	47	
Corrugated barges Nos. 4 & 5, .. .. .	..	48	
Dredger barges Nos. 6 & 7, .. .. .	..	61	
Delhi, .. .. .	..	290	
Meerut, .. .. .	..	290	
Umritsur, .. .. .	..	192	
Mooltan, .. .. .	..	192	
Shikarpur, .. .. .	..	192	
Bahawalpore, .. .. .	..	441	
Sind, .. .. .	..	441	
Corrugated iron barges Class IV.—Nos. 2, 3 & 4, .. .. .	..	84	
" " " V.—" 1 & 2, .. .. .	..	43	
" " " VI.—" 1 & 2, .. .. .	..	35	
Barge native craft " Sand fly," .. .. .	..	46	

ENGINEERING DEPARTMENT.

The Indus Valley and Kandahar lines were amalgamated on 23rd July, 1881, under one officer, and formed into three Divisions for maintenance purposes :—

Northern Division from 0 to 274 miles,
 Southern " " 274 to 501 miles,
 Kandahar " " 0 to 133 including 19 miles Pir-Chowki extension,

and a capital Division—

Indus Bridge,

formed for that bridge and for the workshops, and other capital works at Sukkur.

Maintenance of line.—The mean mileage open throughout the year was 653·1 against 567·9 during 1880.

The total expenditure during the year amounted to Rs. 8,09,035 against Rs. 7,57,171 in 1880. The excess expenditure, which is chiefly under maintenance and repairs, is partly due to the damage done to the way and works by heavy rain-fall, and partly to the commencement made in plantations and to the charges on account of carriage of revenue stores being debited, under recent orders, against the respective departments to which they belong.

From a comparison with the half-yearly Revenue Accounts for 1880 and 1881, it will however be observed that a great reduction has been effected under General Superintendence, the figures for 1880 and 1881 being respectively Rs. 2,73,888 and Rs. 2,37,760.

The total cost of maintenance has been—

Labor.—Rs. 3,52,883, or about Rs. 45 per mile per month.

Materials.—Rails—2·76 miles of rails of all kinds were renewed during the year.

Sleepers.—2,672 sleepers were renewed during the year.

The total cost of materials per mile per month has been nearly Rs. 6.

Under the remaining heads of Abstract A (excluding General Superintendence) an expenditure of Rs. 22 per mile per month has been incurred. The heaviest item of this, Rs. 10, is under "Repairs of Stations and Buildings."

The road and buildings have been maintained in good order. There was a slight interruption to traffic on the Kandahar State Railway in July 1881, owing to parts of the surface line in the desert being breached by floods.

Construction works.—The progress of works constructed on account of Capital was as follows :—

INDUS VALLEY STATE RAILWAY.

Earthwork, Northern Division.—Raising banks, mile 160 to 202.

Southern Division.—Restoring bank to full section, mile 343 to Kotri.

Flattening slopes in cutting, Laki Pass.

Training works, Sulej bridge.—The main left bank bund has been extended to the sluices at the head of the Nowrangah Wah, and other bunds have been strengthened, and a new cross bund thrown up.

Bridgework.—Existing bridges have been raised, mile 160 to 202, to suit the new formation level due to the raising of the banks on that part of the line.

Two new bridges have been built on this length—A 4-60 feet plate girder bridge at mile 160, and a 5-60 feet Warren girder at mile 162; and 12 spans of 40 feet have been added to a bridge in mile 163, to comply with Major Forbes' recommendations. Also, on the same account, a bridge of 15-40 feet plate girders has been built in mile 252, and a 12-40 feet in mile 253.

Ballasting.—Is nearly finished on the Northern Division, except where the bank has been raised during the year.

On the Southern Division only a little boxing remains to be done.

Stations and buildings.—Third class passenger sheds have been provided during the year at the following stations :—

Muzaffarabad, Bahawalpur, Larkana, and goods sheds at Bahawalpur, Khanpur, Larkana, and Carriage Examiner's offices at Khanpur and Radhan.

Workshops, Sukkur.—The buildings for carriage-shop, saw-mill and smithy were finished during the year; but the internal fittings and erection of machinery are still in progress.

Erecting shops and boiler shop were in progress.

A stores building at Sukkur with enclosed yard, has also been put in hand during the year and is well advanced towards completion.

Quarters for the staff connected with the Locomotive Workshops at Sukkur have also been built there; these consist of 8-4 roomed bungalows: 4 of which are finished, and the other 4 are in a forward state.

A bungalow and office for the Locomotive Superintendent have just been started.

20 Units 3rd class quarters,
30 „ 4th „

for natives have also been provided in connection with the shops.

Several other minor works have been executed, such as latrines, maintenance gangs' huts, &c.

KANDAHAR STATE RAILWAY.

This branch line during the year was formed into one division:—

Kandahar division from 0 to 133 miles, including 19 miles of Pir-Chowki extension.

Construction Works.—The progress of works constructed on account of Capital was as follows:—

Bridgework.—The bridging on this line, Ruk to Sibi, is now nearly completed. All the large bridges are finished. In the desert there are still 10 minor bridges in progress.

On the Pir-Chowki extension there are 26 minor bridges remaining to be finished; the large ones are all completed.

Ballasting.—Ruk to Jhutput finished.

In desert 27 miles finished.

„ 34 „ partially ballasted.

„ 27 „ unballasted, in progress.

Pir-Chowki extension.—4 miles finished.

5 „ partially ballasted.

10 „ unballasted, in progress.

Stations and buildings.—Ruk junction station has been taken in hand, but is not yet finished.

A permanent station is being built at Shikarpur, also a goods platform and shed with office.

Goods platforms are also being provided at Jhutput, Nuttal and Bellput, and a goods office and shed are being provided on the Commissariat platform at Rindli station.

Throughout the desert, the wattle and daub structures provided for the menial staff and linemen have been replaced with kucha-pucka buildings.

Wells have been sunk at some of the desert stations and at Sibi, but they are not a success: the water is brackish and they have been very costly.

LOCOMOTIVE AND CARRIAGE AND WAGON DEPARTMENTS.

Rolling stock.—The rolling stock in hand on the 31st March, 1882, was as follows:—

121 Locomotives.

375 Coaching vehicles.
2,594 Goods vehicles.

The average number of engines taken out of running for repairs during the year 1881 was 9, which is equivalent to 7·4 per cent. of the total locomotive stock on the line on 31st March, 1882.

Of the 121 engines, 4 are old construction engines awaiting heavy repairs at capital cost.

The 93 running engines were, during January 1882, increased to 113 by the arrival of 20 new H. B. class. These 20 engines have all been posted to the Southern Section on the Mail and Mixed service.

During the year, the following goods stock was received from the Sind, Punjab and Delhi Railway :—

100 Iron low-sided wagons.
370 Covered goods wagons.

The 12 brake-vans hired from the East Indian Railway during July and August 1880, have been purchased for the use of the line, and are to be put in thorough repair.

The undermentioned rolling stock was built at Adamwahan for the Punjab Northern State Railway :—

5 1st class carriages.
5 2nd class carriages.
17 Brake-vans.

40 3rd class ambulance carriages, sanctioned by the Government of India, in No. 157 R.S., dated 23rd August, 1881, were also built. The whole 60 might have been completed only that 20 had to be kept back for certain alterations required by the Consulting Engineer for Guaranteed Railways, Lahore.

The Adamwahan workshops, limited as they are in extent, have been much pushed to keep up with the extensive repairs required to maintain the old engines of the line.

Engines have been thoroughly repaired during the year, in which work very large boiler jobs have been carried out.

Besides the usual work required to maintain the locomotives and plant of this line, numbers of jobs of other Departments have been executed.

The carriage and wagon shops have been greatly pushed to turn out the work they have done during the year owing to the very temporary accommodation and plant available.

The following tables show the comparison of expenses in the locomotive and carriage and wagon departments during 1881 and 1880 :—

Locomotive Expenses.

Main heads of Account.	1880.	1881.
	Rs.	Rs.
General Superintendence,	1,09,478	1,23,370
Running expenses,	3,40,495	3,28,826
Fuel,	8,93,439	7,55,295
Water,	34,876	57,067
Oil, tallow, and other stores,	80,671	40,308
Maintenance and renewal of locomotive engines and machinery,	3,15,656	2,50,217
New minor works,	5,782	1,595
Unclassified expenditure,	234	1,10,940
Total,	17,80,631	16,67,618

Carriage and Wagon Expenses.

Main heads of Account.	1880.	1881.
	Rs.	Rs.
General Superintendence,	19,850	20,816
Repairs and renewals of vehicles and machinery,	1,47,764	1,40,338
Cleaning carriages and wagons and oiling,	58,587	45,880
New minor works,	16,814	6,355
Unclassified expenditure,	9	5,170
Total,	2,43,024	2,18,559

The increase under carriage of Revenue Stores (unclassified expenditure) is accounted for by the fact that charges relating thereto have for the first time been debited.

The total locomotive expenses have been reduced by Rs. 1,13,013.

The total carriage and wagon expenses are less than those of 1880 by Rs. 24,465.

TRAFFIC DEPARTMENT.

The line was divided into the following sections, each in charge of a District Traffic Officer:—

Northern Section from Mooltan to Rohri,	281 miles.
Southern „ from Sukkar to Kotri,	227 „
Kandahar „ from Ruk to Pir-Chowki,	152 „

The Kandahar Section was amalgamated with the Southern District from September 1881 to February 1882; but the two sections were, however, again separated in the beginning of March 1882, experience having shown that the two Sections formed too extensive a charge for one District Officer.

The following table will show the receipts of the year as compared with 1880:—

Items of receipts.	1880.	1881.	Increase in 1881.	Decrease in 1881
	Rs.	Rs.	Rs.	Rs.
Coaching,	18,03,907	14,98,701	...	3,05,206
Goods,	40,08,327	35,41,393	...	4,66,934
Sundries,	8,50,149	4,95,067	...	3,55,082
Total,	66,62,383	55,35,161	...	11,27,222

Passenger traffic.—1,559,969 passengers were booked and carried for an average distance of 60 miles, against 1,364,425 in 1880 carried for an average distance of 71 miles, showing an increase of 195,544 passengers. The passenger mileage or number of passengers carried over one mile in 1881 was 93,349,349, or about 390 passengers per mile open per day.

The average contents in 3rd class vehicles were 13.20 persons against 19.46 in the previous year.

The receipts from coaching traffic were Rs. 14,98,701 in 1881 against Rs.

18,03,907 in 1880. The following table shows the number of passengers booked at the principal stations on the line during 1881 :—

Mooltan,	104,496	Ruk,	90,753
Shujabad,	41,747	Larkana,	66,281
Bahawalpur,	90,277	Sehwan,	35,882
Ahmadpur,	55,104	Kotri,	42,358
Khanpur,	37,150	Shikarpur,	112,146
Rohri Bunder,	51,997	Jacobabad,	77,897
Sukkur Bunder,	43,234	Sibi,	85,077
Sukkur Mam,	70,096		

Goods traffic.—The weight of goods carried in 1881 was 566,612 tons against 505,919 tons in 1880, showing an increase of 60,693 tons.

The earnings from goods traffic were Rs. 35,41,393 against Rs. 40,08,327 in 1880, showing a decrease of Rs. 4,66,934.

The average distance over which consignments of goods were carried was 165 miles in 1881 against 175 miles in 1880.

The total traffic train mileage was 18,34,372 against 17,21,719 in 1880.

The average number of vehicles per train was 22.05 in 1881, against 24.98 in 1880.

The average receipts per train mile were Rs. 2.91 in 1881, against 3.70 in 1880.

The number of loaded goods vehicles run in 1881 were 17,061,231 against 17,774,044 in 1880, and the number of empties 12,656,054 against 9,773,980, or in other words the number of empties run were 74 per cent. of the whole number run in 1881 against 54 per cent. in 1880.

The following table shows the weights of the principal goods booked in 1881 :—

Description.	1880	1881.	DIFFERENCE.	
			Increase	Decrease.
	Tons.	Tons.	Tons.	Tons.
I. & II.—Cotton,	9,167	8,489	...	678
VI.—Fruits and nuts,	5,685	5,916	231	...
VII.—Grains and pulses,	56,558	119,126	62,568	...
XVIII.—Sugar,	15,105	15,661	556	...
XXI.—Wool,	6,300	7,143	843	...
XXII.—All other Merchandise :—				
Miscellaneous,	22,251	29,627	7,376	...
XXIII.—Military stores,	39,562	23,967	...	15,595
XXIV.—Railway materials for foreign lines,	94,246	40,714	...	53,532
XXV.—Railway materials for construction,	183,603	251,306	67,703	...
XXVI.—Coal,	5,060	13,622	8,562	...
XXVII.—Revenue stores, ... ..	...	21,218	21,218	...

Special concessions were made with a view to divert the traffic to the railway by a reduction in the rates: this experiment has proved a success in the matter of grains and pulses, the quantity carried during the year 1881 having increased by 62,568 tons.

The increase of 67,703 tons under Railway material for construction is apparently due to the extra quantity carried for the large capital works which were in progress during 1881.

The item of Revenue stores appears for the first time.

The other increases are due to fluctuations of traffic.

Compensation claims.—The total amount paid on account of compensation

for claims during 1881 was Rs. 42,750 as compared with Rs. 32,843 paid during 1880, showing an increase of Rs. 9,907. There is a large decrease under the heading of thefts, and with improved Police supervision, there is no doubt that the amounts paid yearly for loss of goods by theft would diminish considerably.

The compensation paid on account of fires is chiefly, if not solely, due to the defective construction of the "King—King" type of covered goods wagons. Measures have been adopted to remedy this defect.

A heavy item of Rs. 2,159-8-3 is included, due to the accident at Sibi which occurred on the 3rd August, 1881.

The traffic expenses during 1881, compare as follows with those of 1880 :—

Main heads of account.				1880.	1881.
				Rs.	Rs.
Salaries, wages, &c.,	..	..	..	72,268	83,021
Station staff,	..	..	..	2,39,865	2,64,468
Train staff,	..	..	..	97,419	97,395
Fuel, &c.,	..	..	..	1,29,525	85,465
Clothing,	..	..	..	7,900	9,772
Printing and stationery,	..	..	..	42,818	55,352
Charges for delivery and collection of goods,	..	..	..	..	954
Miscellaneous expenses,	..	..	..	7,784	1,971
Payments to other lines,	..	..	..	31,487	29,992
Unclassified expenditure,	..	..	..	255	3,881
Total,				6,29,261	6,32,271

The excess under salaries, wages, &c., is almost wholly due to the Afghan war bonus being charged during 1881.

The increase under station staff is chiefly due to the entertainment of extra establishment on account of the transport of troops returning from Afghanistan during the first half of 1881. There is a slight reduction under train staff, but the expenditure under the remaining heads has, it will be observed, been considerably decreased, except under printing and stationery, which includes a sum debitable to previous half years; under collection of goods, &c., on account of opening of steam traffic agencies and under unclassified expenditure, against which carriage of Revenue stores has been debited for the first time.

Demurrage and Mileage charges.—The fact that a large proportion of the traffic conveyed over this line is "through foreign" traffic, renders the equalization of ton mileage a difficult matter, and one which, to a great extent, must always be in favour of the Sind, Punjab and Delhi Railway.

The refusal, moreover, on the part of the Sind, Punjab and Delhi Railway, to equalize ton mileage during September, October and November 1881, has tended to largely increase the charges paid to the Sind, Punjab and Delhi Railway for mileage and demurrage.

Movement of troops.—The withdrawal of troops from Southern Afghanistan during the early part of the official year, and the arrangements made by this Railway for their conveyance from Sibi to Pir-Chowki, were fully detailed in a special report.

Opening of Ferozepore and Fazilka agencies and opening of Adamwahan Bridge station.—River agencies at Ferozepore and Fazilka were opened on the 1st October, 1881, and 1st February, 1882, respectively, and in connection with these agencies, the Adamwahan bridge station was also opened on the 14th October, 1881.

From date of opening up to 31st March, 1882, 29,162 maunds of goods earning Rs. 24,671 were despatched from Ferozepore agency, or at an average of Rs. 1,028 per week, and 39,370 maunds were despatched from Fazilka, the freight on which amounted to Rs. 16,252, or about Rs. 2,031 per week,

Some heavy claims for compensation had to be paid for goods lost or damaged by sinking of boats. In opening these agencies, however, it appears to have been considered necessary to accept river risk as a chief means of attracting custom, and undoubtedly it is a great inducement; but the result of this unconditional acceptance of all risk has seriously interfered with the profits of the undertaking, and it is now under consideration to modify the conditions, so as to exclude total loss by sinking of boats.

Train Service.—The train service during the whole year consisted of two passenger trains, one mail and one mixed both ways, with regular and extra goods and special troop trains as required. A local fast service for the conveyance of 2nd and 3rd class passengers was started between Sukkur and Shikarpur on the 15th October, 1881. This service proved very popular during the winter months, though the earnings did not exceed, on an average, 1 rupee per train mile run.

The local service between Mooltan and Bahawalpur has doubtless been, to some extent, a convenience to the public, but it can only be kept up without loss when the goods traffic is sufficiently steady to require the running of regular trains.

New Stations. Opening of flag stations.—Consequent upon a representation having been made by the inhabitants of the adjacent villages, a flag station was opened at the Buch level crossing, about 2 miles south of the Buch station on the 14th September last.

Sultankote flag station situated on 19-2 mile between Shikarpur and Humaon was similarly opened on the 23rd January, 1882.

Sehwan Bunder Station.—For the convenience of 3rd class passengers between Sehwan Railway Station and the city, a trolley service over the branch line to the Bunder was started on the 8th January, 1882, and although it can hardly be said that it is paying itself, the convenience to the public is very great, and as the service is much appreciated, better results are anticipated in the future.

The fare between the city and the Sehwan Station is half an anna.

Goods traffic to and from the city of Sehwan has also been conveyed without extra charge since the above date, and is greatly appreciated. The opening of the Bunder Station for goods traffic was with the view of securing the traffic from the Munchar lake. During the summer months, this traffic is conveyed in boats down the Aral which flows into the Indus near Sehwan.

Indus Ferry.—The arrangements for working the Indus Ferry have during the year been satisfactory, and the crossing of vehicles at night with the aid of the electric light for 17 nights in October and 11 nights in November 1881 has been a marked success.

During the year ending 31st March, 1882, 32,430 vehicles, 49 engines complete and two tenders were crossed, as compared with 23,052 vehicles and 102 engines, during the preceding 12 months.

There was only one accident at the slips during the period under notice. One the 13th September, 1881, an 11-ton Sind, Punjab and Delhi Railway covered goods wagon, whilst being loaded on to a flat at the Rohri slips, owing to a defect in its own break gear and the pontoon being unsuited to the work, fell over, and dropped into the river.

STORE DEPARTMENT.

The arrangements ordered in the Manager's note recorded in Official Meeting No. 17, dated 30th July, 1881, Resolution 463, have effected a marked improvement in the working of the Store Department. With reference to para. 3 of that note, the Storekeeper remarks, that the transfer of his head quarters from Kotri to Adamwahan has resulted in considerable saving in both establishment and rent, while the efficiency of the Department has not been impaired, and work generally has suffered less from delays owing to the closer proximity of

the Store-keeper's office to that of the Manager, by which orders have been received and carried out more expeditiously; and with regard to para. 14, that tenders for a 12 months' supply of such stores as were in constant demand were invited, and the compliance with indents has been greatly facilitated by the acceptance of tenders for this periodical supply.

The machinery for the new workshops at Sukkur, the conveyance of which was a heavy transaction, was received and has been duly made over to the Engineering Department without any damage or loss in transit.

In August 1881 the Upper Section, Kandahar State Railway Stores were, by the orders of Government of India, contained in their No. 105 R.T., dated 16th June, 1881, placed under the control of the Storekeeper, Indus Valley State Railway, who has thereby been able to utilize a great many of these stores for use on the Indus Valley State Railway. These stores have also been relieved of very large quantities of metre gauge P. W. material which have been despatched to Delhi and Bombay for use of the Rewari-Ferozepore State and Southern Maharratta Railways respectively.

Verification of Stores.—The verification of stores was completed on the 26th April, 1881.

The stores of the Upper Section, Kandahar State Railway, were in so confused a state, that in accordance with late Manager's request, Mr. T. Wood, Stock Verifier, was deputed to verify and re-value the stores. Mr. Wood reported his arrival on this line on 24th August, 1881, and commenced operations on 29th August, 1881, completed the verification on 5th November, 1881.

Heavy reductions in the establishment of the Department, both as regards officers, subordinates and office staff have been made during the year.

AUDIT AND ACCOUNTS.

Owing to the stoppage of the works on the Upper Section, Kandahar State Railway, a reduction of 7 Accountants and 19 Clerks was made in the Examiner's office. The number of Accountants attached to the Railway on the 31st March, 1882, was 10 as against 17 on the 1st April, 1881. The average pay of Accountants on the same dates was Rs. 175 and Rs. 149 respectively, and of Clerks Rs. 41.48 and Rs. 44.95.

Capital Expenditure, Indus Valley Railway.—The final outlay on capital account during the year amounted to Rs. 35,42,211, details of which under main heads of account will be found in the statement of capital outlay on page 40.

The principal items of expenditure were as follows :—

	Rs.
Raising banks, Northern Section,	74,000
Restoring and raising banks, Southern Section,	26,524
Flattening slopes of cuttings, Southern Section,	12,532
Raising old bridges and constructing additional waterways, Northern Division,	1,92,767
Platelayers' and gangmen's huts, Northern and Southern Division, ...	13,374
Ballasting the line,	4,58,747
Rohri Reclamation,	21,145
Platforms and additional Station accommodation,	38,999
Offices at Sukkur for Locomotive Department and head quarters, ...	16,475
Locomotive Workshops and general store buildings at Sukkur, ...	3,01,843
Quarters for Locomotive Staff at Sukkur,	64,580
Other Staff quarters on the line,	15,839
New water supply, Laki,	11,379
Other watering arrangements,	14,780
Steam ferries, steamers and barges purchased from Sind, Punjab and Delhi Railway for Sukkur ferry, &c., in place of hiring,	3,65,000
Charges on account of locomotive and carriage stock received from England through Agency of Sind, Punjab and Delhi Railway, ...	12,21,916
Payment on account of Dhond and Manmad stock transferred to this line,	29,967
6 Sharp Stewart engines transferred from the Punjab Northern (State) Railway,	2,00,035
60 Third Class carriages,	2,61,201

	Rs.
Payment on account of 60 high-sided wagons from Bombay, Baroda and Central India Railway,	38,894
4 Engines from Sindia Railway,	68,165
Repairing Dhond and Manmad wagon stock,	12,628
Purchase of 12 brake-vans from East Indian Railway,	36,000
12 South Indian Railway engines written back to debit of stores,	— 86,991
Converting 2 South Indian engines into shop engines,	13,778
Preliminary operations, Sukkur bridge,	15,938
Other items,	1,02,696
Total Rs., ...	35,42,211

Kandahar State Railway, Lower Section.—The total capital outlay on final heads during the year amounted to Rs. 14,54,329, particulars of which under main heads of classification will be found in the statement of capital outlay on page 40. The principal items of expenditure may be enumerated as follows:—

	Rs.
Earthwork,	82,005
" old Jacobabad Division,	33,621
Minor Bridges, Pir-Chowki Extension,	33,619
" " Desert,	20,355
Major Bridge, No. 12,	32,036
" " " 13,	21,028
" " " 14,	21,246
" " " 16,	23,018
Nari Bridge,	3,19,898
Bridge No. 25,	14,181
" " 11,	15,510
Kumbari Bridge,	67,174
Begari Bridge,	19,094
Sukkur Canal Bridge,	17,866
Bridge No. 18,	12,732
Linemen's huts, Kandahar State Railway,	37,994
Ballast,	5,57,787
Permanent Way, ..	— 1,14,970
Ruk Junction Station,	21,208
6 Unit Barrack No 3 Sibi,	11,459
Ruk Junction Station Machinery,	16,942
Well at Bellput,	14,366
" Sibi,	42,833
Tank House, Sibi,	11,431
Well at Nuttal,	11,401
Tank House, Jacobabad,	11,603
Establishment,	66,022
Other items,	3,36,227
Total Rs., ...	17,57,686
Less credit obtained for engines and rail carriers transferred to Punjab Northern State Railway,	— 3,03,357
Total Outlay, ...	14,54,329

The principle adopted for the regulation of capital expenditure on this section is to limit it beyond the frontier, as far as practicable, to the construction of a permanent roadway.

The stores of the late Upper Section were transferred to this section in the period under review, increasing the Suspense balances at the end of the year by Rs. 3,77,938.

Kandahar Railway, Upper Section.—The works on this section having been finally stopped, under the orders of Government, the outlay incurred, including loss from re-valuation and depreciation of stores, was transferred to the Military Department as a war charge. The amount so charged off was Rs. 44,63,960, of which Rs. 4,36,723 were for loss on re-valuation and depreciation of stores.

Traffic Audit.—Proposals were made by Government to place the Joint Audit Establishment in 1880 under the control of the Sind, Punjab and Delhi Railway for the division of through traffic between the three Punjab Railways under the Government Examiner of Guaranteed Railway Accounts, Lahore, but

as these proposals were not accepted by the Sind, Punjab and Delhi Railway, the system was abandoned after being in operation 12 months. Owing to the mode of distributing the charges according to the value of traffic, &c., divided, the arrangement was much more costly to the Railway than doing the work in its own office. The Station balances were reduced from Rs. 69,689 on the 31st March, 1881, to Rs. 35,557 on the 31st March, 1882.

Store Accounts.—Stock of the stores belonging to the Upper Section, Kandahar Railway was taken by the Stock Verifier attached to the office of the Director General of Railways, and prices for them were fixed by him at generally Port rates. The value of the stores so ascertained, less a sum allowed by Government for anticipated losses on transfers to other lines and further depreciation, was transferred, as already mentioned, to the Lower Section. As regards the Indus Valley Railway stores, the price list compiled by the officer appointed for the stock taking and the Chief Storekeeper, was incomplete, and lists of unpriced articles were, under the orders of the Manager, taken in hand by the Storekeeper for settlement of prices in communication with the heads of departments concerned. In some cases, however, there were still omissions, and in others the rate and stock units differed, rendering further references necessary before the list could be made complete. The rate list thus compiled has been recently scrutinized and, so far as possible, compared with actual cost where known and local rates lists, with the result that some modifications were made: mainly reductions in price. The stores in stock on the 1st January priced out at the rates thus determined, give a total but slightly differing from the value in the General books.

The system of advertising for tenders and letting contracts for the supply of stores was introduced during the year with very beneficial results.

Objectionable Outlay.—In consultation with the Manager, it was arranged that Audit should not be accorded to any objectionable item of expenditure except under special reference to him in each case. This, coupled with the fact that all expenditure is now subject to pre-audit, has had the effect of considerably reducing objectionable outlay. The amount of objectionable expenditure on the Indus Valley line on the 31st March, 1882, was Rs. 4,63,301, which may be thus classified:—

		Rs
Excess over estimates,	.. .. .	26,544
No sanctions—		Rs
Current works,	.. .. .	4,19,069
Due to adjustment of old suspense accounts and liabilities,	.. .. .	17,688
		4,36,757
		4,63,301

With the exception of a small item of Rs. 30, the whole of the sum of Rs. 4,19,069 is expenditure in connection with the workshops and store building at Sukkur.

In connection with the Kandahar line the amount of objectionable expenditure on the 31st March, 1882, was Rs. 1,92,335, classified as follows:—

		Rs.
Excess over sanctions,	.. .. .	1,84,176
No sanctions,	.. .. .	8,159
		1,92,335

Suspense Accounts.—These have been generally cleared up. The Capital Miscellaneous Advance Accounts of the Indus Valley line were cleared up and finally closed, and all items of this kind are now dealt with in the Revenue Suspense Account which is in fair order. In the Miscellaneous Advance Account of the Kandahar line, there remain only a few normal items which will be adjusted during the current year.

Open Line System.—The open line system of Engineering Accounts was introduced from the commencement of the year, and has worked well. Owing

to the heavy work in progress on the Kandahar line, the Engineers on it were allowed to retain funds up to the 30th September, after which date the ordinary course of pre-audit was followed.

Capital Account 1881-82, Indus Valley State Railway.

Main Heads of expenditure.	OFFICIAL YEAR 1881-82.			Net expenditure to end of previous year	Net expenditure to end of 1881-82.	Sanctioned estimate. (a)
	Outlay.	Deduct receipts on capital account.	Net expenditure.			
Preliminary Expenses, ...	16,341	5	16,336	10,75,877	10,92,213	10,80,756
Land, ...	-11,552	...	-11,552	3,02,706	2,91,154	3,07,090
Construction of Line, ...	2,99,533	70	2,99,463	2,18,47,430	2,21,46,893	2,23,37,858
Ballast and Permanent Way, ...	4,44,330	90	4,44,240	1,79,04,071	1,83,48,311	1,85,34,175
Stations and Buildings, ...	5,18,649	120	5,18,529	44,52,252	49,70,781	50,10,141
Total Construction Account,	12,67,301	285	12,67,016	4,55,82,336	4,68,49,352	4,72,70,060
Plant, ...	45,494	10	45,484	15,78,016	16,23,500	18,61,744
Steam Ferries, ...	3,81,827	...	3,81,827	34,302	4,16,129	4,26,349
Rolling Stock, ...	18,26,706	387	18,26,319	73,76,105	92,02,424	86,33,510
Establishment, ...	20,883	5	20,878	68,49,299	68,70,177	68,51,330
Total Expenditure on Final Heads,	35,42,211	687	35,41,524	6,14,20,058	6,49,61,582	6,50,42,993
Suspense Accounts, ...	3,64,348	...	3,64,348	26,66,031	23,01,683	22,12,740
Grand Total Expenditure, ...	31,77,863	687	31,77,176	6,40,86,089	6,72,63,265	6,72,55,733

Capital Account 1881-82, Kandahar State Railway, Lower Section.

Main Heads of Expenditure.	OFFICIAL YEAR 1881-82.			Net expenditure to end of previous year.	Net expenditure to end of 1881-82.	Sanctioned estimate. (a).
	Outlay.	Deduct receipts on capital account	Net expenditure			
Preliminary Expenses, ...	...	...	...	1,94,841	1,94,841	1,94,841
Land, ...	7,430	1	7,429	15,678	23,107	27,678
Construction of Line, ...	9,44,461	85	9,44,376	7,98,315	17,42,691	17,29,315
Ballast and Permanent Way, ...	4,42,736	42	4,42,694	69,62,417	74,05,111	72,92,417
Stations and Buildings, ...	2,46,176	23	2,46,153	6,05,669	8,51,822	9,45,669
Total Construction Account, ...	16,40,803	151	16,40,652	85,76,920	1,02,17,572	1,01,89,920
Plant, ...	35,893	3	35,890	2,09,811	2,45,701	2,28,811
Steam Ferries, ...	...	...	...	...	...	...
Rolling Stock, ...	-2,88,389	...	-2,88,389	18,31,323	15,42,934	15,81,323
Establishment, ...	66,022	6	66,016	2,52,535	3,18,551	3,20,535
Total Expenditure Final Heads, ...	14,54,329	160	14,54,169	1,08,70,589	1,23,24,758	1,23,20,589
Suspense Accounts, ...	2,63,354	...	2,63,354	3,09,003	5,72,357	6,54,503
Grand Total Expenditure, ..	17,17,683	160	17,17,523	1,11,79,592	1,28,97,115	1,29,75,092

PUNJAB NORTHERN STATE RAILWAY.

The mean mileage open during the year was 361·5 against 214 in preceding year.

The Khushalgarh Branch is constructed on the broad gauge with a ruling grade of 1 in 70, though there are some lengths of 1 in 50 down into Khushalgarh station, it runs mostly on the watershed through a very poor and sparsely cultivated and inhabited country. A small passenger traffic has developed, and a little trade in firewood from Khushalgarh, and in favourable seasons a traffic in gram.

The line however does not follow a main traffic route to any place or district

of importance, and though perhaps useful from a military point of view, is almost useless as a Railway feeder and does not pay its working expenses.

The extension from Haji Shah to Attock 5 miles, was originally made as a temporary line to convey construction material down to the river, but as it could convey passengers to the middle of the Attock bazaar, it was opened for traffic on the 1st April. Now that the Trans-Indus section is opened, it saves 5 miles of cartage of all goods.

The permanent line at Harq bridge and Kala-ki-Serai, were opened for traffic on 1st January, 1882, by which two most dangerous diversions were got rid of.

Miani to Bhera.—This is a short extension of the Salt Branch, running along the District road. It was sanctioned in Government of India's No. 822 R.C., dated 25th October, 1881, and opened to traffic on the 2nd February, 1882. The traffic on it promises to be exceedingly good.

Of the main line to Peshawar the following works remained to be completed on 31st March, 1882:—

- Ratyal Ravineś.
- Golra to Mārgalla Pass and Tunnel.
- Diversion from Campbellpore to Khairabad, including Indus bridge.
- Khairabad to Peshawar City.
- Peshawar City to Cantonment.

A surface line inclusive of Ferry to Khewra Salt Mines, and temporary bridge over Jhelum River, was sanctioned in Government of India's No. 70A. R. C., dated 27th January, 1882.

The line was in progress.

LAHORE AND JHELUM DIVISION.—The principal works carried out during the year were:—

- Jhelum.*—Completion of engine shed.
- " workshop for engine shed.
- New refreshment room and lavatory.
- Re-arrangement of sidings.
- Weigh-bridge.
- Subway.
- Additional staff and menials' quarters.
- Walls to goods yard.

And Jhelum is now a well arranged and fairly convenient station.

Lala Musa.—A large depôt for the Salt Department and quarters for staff was commenced and completed, the object of it being to enable Salt Merchants at a distance to pay the amount for salt they require into the nearest Treasury, and on sending their receipt to the salt depôt, the salt will be forwarded to them. The system so far does not appear to be very successful.

Over-bridge from broad to metre gauge platform was commenced and completed, small workshop for metre gauge stock commenced and completed. Steam-pump put down, broad and metre gauge tanks connected, and broad gauge column substituted for metre gauge column.

Menials' quarters, re-arrangements of sidings.

Amongst other works taken in hand may be enumerated—

New station Badami Bagh, a subsidiary station near Lahore City, and useful as a ticket collecting station, and fairly popular with passengers. New station Kathala on north side of Chenab. There was formerly a flag station here, but it has now been made into a crossing station for Chenab Ferry trains.

New station for Taraki quarry to develop stone and lime traffic with Lahore, &c., on the main line.

The Chenab training works were continued. A grant of Rs. 50,000 from capital having been sanctioned. The works so far have been fairly successful, the deep water channel has been pushed away from the south abutment, and is now working towards the centre of the river. When once there, it is hoped that it may be kept there at a moderate additional expenditure; and that it will then be practicable to considerably reduce the length of the bridge.

Two small screw pile bridges with metre gauge girders at miles $83\frac{3}{4}$ and $85\frac{3}{4}$ were removed, and masonry piers and plate girders substituted. One lakh cubic feet ballast put down. New well sunk in Dina Station.

Ratyal Ravines.—The work was pushed on with vigour and nearly completed, but the increased depth of rock cutting, owing to the grade having been flattened to 1 in 100, made the progress appear somewhat slow.

Covered way, mile 128½.—At this place there was a deep cutting, in which slips were constantly taking place, and blocking the line. The Grand Trunk Road also crossed the line at both ends of this cutting, rendering it a most dangerous place; several accidents having occurred there in spite of special signalling arrangements. It was therefore decided to arch over the cutting, and carry the Grand Trunk Road over the top, a diversion was carried round the hill, and 269 feet of arch, commenced 9th January, and completed on 22nd March 1882.

Salt Branch.—Jowrah, Malikwal, Phalian road flag stations were converted into crossing stations.

Miani.—Goods platform extended, small goods shed built, wall built round goods yard.

Bhera Extension.—Works commenced in December 1881, and opened to traffic on 2nd February, 1882.

Khewra Extension.—Commenced in February 1882. About 80,000 cubic feet of ballast put down on Salt Branch.

MISSA TO ATTOCK AND KHUSALGARH BRANCH.—Balasting was carried on throughout the year on the whole line and is still in progress.

Of the works at the Stations.

Missa.—New station, staff quarters, &c., completed.

Gujar Khan.—Water service and pumping engine erected.

Mandra.—Water service and pumping engine erected.

Rewat.—Water supply from tank completed.

Sohan.—Two catch sidings, north and south of the bridge, half mile long laid in. Station and staff quarters built.

Rawalpindi.—New station commenced, corrugated iron goods shed 40' × 300' erected. Tank and water service and pumping engine erected. Horse-dock built. Eight blocks menials' quarters, guards-running-room for 20 men, over-bridge and approaches, north end of station, all built.

Rawalpindi Workshops.—27 houses, and servants quarters for officers and locomotive staff were in hand, of which 20 have been finished.

One barrack for 10 drivers built. Institute still in progress. Three blocks quarters for menial staff built.

Two bays were added to engine shed.

Smithy shop half finished, was completed.

Carriage fitting and erecting shops are still in progress, but approaching completion.

Store shed was built. Roads to serve the houses, and one from station to

workshops, were built including a bridge 3 spans of 35 feet, and completed. An 8 feet wall round the shops and stores with office at entrance completed.

Wire fencing put up round the whole of the Railway property. Cemetery and lodge, partly finished.

Temporary water supply for engine shed, and erection of three pumping engines and tanks on staging, finished.

Permanent water supply of a pumping station, and well at the Chota Ley-line of rising 10-inch main $1\frac{3}{4}$ miles to reservoir $200' \times 200' \times 12'$, including a bridge of 3 spans of 50 feet, and supply mains 10, 8, 6, 4-inches still in progress.

Five miles of permanent way were laid in, and 15 lakhs cubic feet earthwork were executed. Both these are still in progress.

Kala-ki-Serai, Hassan Abdal, Burhan.—Stations, staff quarters and water service, completed from 1880-81.

Lawrencepore.—New station and staff quarters, commenced and completed.

Haji Shah.—Temporary station and running rooms, engine shed, water service and goods shed completed from 1880-81.

Attock.—Temporary station and platform erected.

Khushalgarh Branch.

Kutbul,	}	Completion of permanent stations, staff quarters and water service.
Fattehjung,		
Gagan,		
Kahal,		
Pind Sultani,		
Langar,		

KHUSHALGARH.—Running room and turntable were erected.

The widening and raising of 8 bridges 60 feet Bombay, Baroda and Central India Railway pattern in order to bring them to standard dimensions of fixed structures, was commenced and nearly finished, namely :—

	Feet.
Mehloo,	1 60
Nundna,	3 60
Kirly,	2 60
Deriana,	1 60
Kamalpur,	3 60
Kutra,	2 60
Basala,	2 60
Doomel,	1 60

The capital cost of the open line on 31st March, 1882, was approximately,

	Rs.
Mam Line,	5,83,24,165
Salt Branch,	21,80,246
Total,	6,05,04,411

TRAFFIC.

During the year there has been no abnormal traffic, the increased traffic caused by the Afghan war and scarcity in Northern Punjab, owing to defective rainfall having ceased by the commencement of the year.

The passenger traffic suffered from the severe sickness prevalent in Lahore, Amritsar, &c., last autumn, and also from the diminished expenditure on construction, fewer men leaving home to seek for employment. A favorable cold weather harvest is also stated to have kept merchants and others at home. The passenger traffic however promises fairly, and on the completion of the Attock bridge, when the exact mileage of all stations can be finally settled, the Manager proposes to reduce the 3rd Class fare to 2 pies, the present fare being $2\frac{1}{2}$ pies by mail train, and 2 pies by local over Salt Branch and portion of main line below Jhelum only.

Goods traffic does not promise well. The country through which the line passes is mostly poor and unproductive. There is no large staple of export except the Khewra Salt, and the trade with Cabul and Kashmir, though valuable, is of small bulk, and owing to external influence the former trade appears likely to diminish instead of increase owing to the crushing duties placed on tea, &c., for Central Asian market.

Endeavours have been made to stimulate local traffic by quoting special rates for bhusa, beer, firewood, stone and lime.

The only restriction as to rates at present in force is that, double mileage is charged on all goods (except for a few special exceptions) in down direction over Jhelum to Pindi Section. This does not appear to have caused any appreciable diminution of traffic, or caused the traffic to take to the road.

The number of passengers, &c., carried and receipts were as follows :—

		1880-81.		1881-82.	
		Nos.	Rs.	Nos.	Rs.
<i>Coaching.</i>					
First Class, ...	...	6,051	34,407	6,467	42,927
Second ,, ...	...	24,478	60,258	19,814	57,197
Third ,, ...	...	18,90,769	8,97,182	17,89,951	10,97,908
	Total, ...	19,21,298	9,91,847	18,16,232	11,98,032
Miscellaneous, ...	...	...	1,66,553	...	1,33,932
	Total Coaching, ...	...	11,58,400	...	13,31,964
<i>Goods.</i>					
Tons carried, ...	...	3,79,120	22,23,991	2,61,543	17,09,054
Electric Telegraph, ...	...	...	6,953	...	4,502
Sundries, ...	...	...	4,15,762	...	1,45,747
	Total, ...	...	26,46,706	...	18,59,303
	Total Earnings, ...	...	38,05,106	...	31,91,268

The expenditure was approximately as follows :—

		1880-81.	1881-82.
Maintenance, ...	...	3,65,827	4,72,766
Locomotive, ...	...	12,65,413	14,40,715
Carriage and Wagon, ...	...	1,14,922	1,33,890
Traffic, ...	...	3,77,866	4,11,515
General Charges, ...	...	1,65,752	2,33,909
Special and Miscellaneous, ...	...	8,05,594	1,82,151
	Total, ...	30,95,374	28,74,942
	Net Earnings, ..	7,09,732	3,16,323

The earnings per open mile were—

	1880-81.	1881-82.
	Rs.	Rs.
For the year, ...	17,781	8,780
Per week, ...	342	169

The expenses per open mile were—

	1880-81.	1881-82.
For the year, ...	14,464	7,953
Per week, ...	278	153
Mean open mileage, ...	214	361.5
Train mileage, ...	10,55,700	11,01,814
Earnings per train mile, ...	3 6	2.88
Expenses per train mile, ...	2 9	2 61

Ordinary Third Class return tickets at a fare and a half between the principal stations available for 15 days have been instituted, and special Mela return tickets at still lower fares were tried for the large fairs in March and April. These have

not been made use of as much as was anticipated, but will probably prove more successful when better known.

Just at the close of the year a ticket office was opened in the Sudder Bazaar, Rawalpindi, for sale of Third Class tickets. Contractor to be paid 2½ per cent on all tickets up to a sale of Rs 1,500 per week, and 2½ additional on all sales above that,

Sale of Tickets in Bazaar, average amount to be determined at close of the half year. It was also proposed to open a city office on the same terms, but negotiations with various contractors fell through.

As far as can be judged the natives like the arrangement and find it a convenience; they can buy their tickets at their leisure, often hours before the train starts; and are not subject to the crowding and struggling, bullying and extortion of the police and booking clerks, that take place at large stations. No complaints have been made as to the working, and it is proposed to extend the system to various other large stations, either through the agency of contractors or by opening railway booking offices. The terms paid to the contractors make it rather expensive, and it is hard to say whether the Railway obtains a corresponding advantage by additional traffic gained by the contractor touting.

It is proposed to introduce an Intermediate Class for upper class natives at 3 pies per mile, and carriages are being altered for the purpose.

On platforms stone hydrants are being fixed at all watering stations to enable passengers to get out of the train and fill their water vessels. These are much appreciated, and in time it is hoped that a considerable reduction will be effected in the number of bhisties and Hindu water-men maintained at stations.

During the hot weather a brake-van has been made over to a contractor, who is bound to carry ice, iced water, and aerated waters for sale in all mail trains. This is a great boon to the staff and travelling public, but owing to the want of energy of the contractor, has not been worked quite satisfactory.

The principal items of goods traffic were as follows :—

	1880-81.		1881-82	
	Tons	Rs	Tons	Rs
Coal and coke,	4,644	22,830	23,456	85,052
Cotton, raw,	1,211	19,583	156	4,292
Piece goods, Europe,	4,616	40,159	2,931	64,453
" Country,	1,385	13,866	1,257	23,966
Fruits and nuts,	5,037	38,604	3,780	42,035
Wheat,	85,753	3,71,757	32,563	2,30,885
Grain and pulse,	36,727	1,93,021	9,730	70,192
Other summer crops,	8,865	40,264	6,103	41,054
Rice,	8,940	52,310	4,658	45,020
Other rain crops,	6,003	45,122	3,903	30,956
Hides,	1,921	20,454	1,389	11,946
Liquor,	2,723	30,966	2,507	31,234
Iron,	4,080	31,808	4,011	34,428
Salt,	40,804	1,48,701	46,522	2,02,154
Sugar,	13,865	85,035	14,134	1,06,974
Indigo, ... ..	...	...	380	10,953
Tea, ... ..	...	...	1,075	22,340
Oil, ... ..	...	...	1,567	23,413
Firewood, ... ..	...	...	16,403	43,294
Seeds, ... ..	...	...	3,400	17,695
Stone, ... ..	...	...	1,596	5,406
Timber, ... ..	...	...	12,278	73,272
Military stores,	152,546	30,663	1,864	43,414
Railway materials, ... ..	...	4,72,981	38,853	1,92,893
Miscellaneous, ... ..	...	4,93,951	27,027	2,35,108
Live stock, .. ..	...	56,473	...	7,118
Demurrage, &c., ... ..	...	15,443	...	16,605
	379,120	22,23,991	261,543	17,09,054

This Table does not show altogether satisfactory results.

The increase in coal is mostly for Railway purposes. Falling off in cotton due to road competition. The dealers will not press at all, and consequently the rate per train is high, though special rates have been quoted to try and drive it off the road. Piece goods, fruits and nuts, show falling off in quantity, though an increase in receipts is due to large length of line open.

Grain traffic is entirely dependent on whether the local harvest is good or otherwise. Hides falling off, attributable to close of Afghan War.

Liquor, iron, do not show much sign of development.

Salt and sugar show fair progress.

Indigo, tea, oil, firewood, seeds, stone, timber give promise of a fair business.

The falling off of 3 lakhs in Railway material is due to approaching completion of lines.

Expenditure —Calls for no particular remark. The increases are moderate and due to the increased length of heavy line open. Fuel, Rs. 7,69,655, it will be seen costs over 25*per cent. of total working expenditure, the bulk of this goes to swell the receipts of East Indian Railway and Sind, Punjab and Delhi Railway, so is not wholly a loss to Government.

Further efforts have been made to develop the Salt Range coal, the arrangements for working which have now been put under the Salt Department, but hitherto the quantity and quality supplied have proved of little account.

The present Locomotive Superintendent, who only took charge in August 1881, has already affected considerable economies in his department, and the result of next year's working will, it is anticipated show a considerable improvement on the results of the year under notice. Native drivers and shunters have been introduced on the branches and hitherto have given satisfaction.

Compensation, Rs. 51,624, is a very high item, but is mostly due to old claims arising from pressure during Afghan War which are not yet cleared off.

It is believed that in the year under review the line has been seen at its worst. There has been comparative stagnation in goods and passenger traffic owing to re-action from Afghan War, and the amount of money then being spent in the country, and owing to good harvest, whilst the expenditure had not been quite brought down to its normal limits. In future years a moderate development in both coaching and goods traffic without any corresponding increase, if not a positive decrease in expenditure, is anticipated.

There have been two series of frauds which appear to call for notice.

In July, September and October, there were a number of robberies from the travelling cash-safes, and although a special detective was put on, no clue whatever could be obtained. By changing the safes and putting special men to run through with the safes, the robberies were put a stop to.

The other series of frauds was in connection with the Telegraph Department. Messages with replies prepaid to a large amount were received at Mian Mir, Amritsar, Sialkot, &c., purporting to come from persons at stations on this Railway, and these amounts were paid over to the party in whose name the telegrams were received. The *modus operandi* appears to have been for a man by the name of Bhag Singh to get into one of the Telegraph offices, when either he or a friendly signaller in collusion with him sent off these messages and he himself then proceeded to Sialkot, &c., by next train, and received the message. By the exertions of Mr. Heymerdinger, the Traffic Inspector, and a detective Inspector, Gunda Ram, sufficient evidence was obtained to ensure a conviction; Bhag Singh was sentenced to one year's rigorous imprisonment including a month's solitary confinement, and a fine of Rs. 100, or to two months more like imprisonment, for each of the three offences, the sentences to take effect one after the other.

Three other men were put on their trial but escaped conviction.

The working of the Railway Police is not satisfactory. There were several robberies in the goods-yard at Rawalpindi, in December and January. There was also a serious robbery at Lawrencepore of indigo under charge of the Police.

The Police Commission travelled over the line in March to enquire into the working of the Railway Police, and it is hoped that their labors will result in some radical changes being made ere long.

The medical arrangements have worked fairly well, the Railway hospital at Rawalpindi being especially effective, but the want of one medical officer responsible for the efficacy of the medical and sanitary arrangement of the whole line is still felt.

The committee of the Lawrence Asylum at Murree was addressed with a view to ascertaining whether they could admit some Railway-children, the reply was unfortunately in the negative. There are hardly enough children at Rawalpindi to render a school self-supporting even with moderate assistance from the Fine fund, and an application for a grant of Rs. 100 per mensem from Revenue was refused. It is hoped this cold season that a European School will be started at Rawalpindi.

Adult native schools have lately been started at Rawalpindi, Lala Musa and Jhelum, to teach native Drivers, Firemen, Pointsmen, &c., to read and write English, so far they have proved a great success, and the attendance is large and regular.

Rs. 5,000 has been raised by private subscription towards the erection of a Railway Church at Rawalpindi, and a grant of Rs. 4,000 made by the Punjab Government, so that it is hoped that a Church will be built before the close of 1882-83.

On 31st March there were 746 depositors, of whom only 17 were voluntary.

Provident Fund.

						Rs.
Compulsory deposits—amounted to	..	..	..	..	..	23,958
Voluntary	..	..	..	..	..	3,053

A representation has been made to Government that owing to the peculiar circumstances of this line, the bonus received from net earnings is not sufficient to take the place of pensions, and that employes are therefore placed at a disadvantage as compared with other lines, which have been constructed under more favorable circumstances, and which are not so difficult to work.

A scheme is under consideration for enabling men wishing to save money, to receive part of their pay in stock notes, and if this can be effected it will no doubt tend to encourage thrift.

LOCOMOTIVE AND CARRIAGE DEPARTMENT.

The Locomotive head quarters were transferred from Jhelum to Rawalpindi in the year under review.

Workshops.—The new workshops commenced in the beginning of the year are still under construction. The shop work has to be carried on under considerable difficulties arising from want of proper machinery and insufficient space. In another six months, however, it is hoped that the Engineers will have finished the shops, and that the new machinery will be erected, which will give a considerable impetus to work of all kinds, and greatly increase the outturn.

During the year 75 new Third Class carriages have been built at Rawalpindi

for the use of the line; but the work was not carried out without trouble and delay owing to the want of sheds and stores.

The want of a proper locomotive office and store is much felt, and causes much additional work and inconvenience.

Running.—The substitution of the trip system of paying overtime to Drivers and Firemen in place of the hour system, gave rise to great discontent among the European Covenanted and Uncovenanted Drivers, and on the 28th October, 1881, the majority of the Rawalpindi men struck work. The matter was promptly taken up, and measures adopted which prevented any interruption of traffic while the strike lasted.

In a few days the men resumed work, some however left the service in preference to working under the new rules which were enforced, while the majority settled down to the new order of things and are now fairly content. The number of native drivers and shunters has been considerably increased during the year, with fairly good results. The Salt Branch line is entirely worked by native staff under the supervision of the Locomotive Foreman at Lala Musa, while the whole of the shunting at engine changing stations is performed by native shunters.

The L Class Engines have given a good deal of trouble during the year, and a considerable amount of attention has been devoted to rectifying their defects. A number of alterations have been made in them, with the result of reducing the number of failures. The following was the engine stock in hand at the close of the year 1881-82:—

<i>Broad Gauge.</i>							
H. Class,	...	...	...	...	...	...	28
H. A. Class,	...	...	...	...	...	...	11
H. B. Class,	...	...	...	...	...	...	10
D. and M. Class,	...	...	...	...	...	...	8
L. Class,	...	...	...	...	...	...	50
							107
<i>Metre Gauge.</i>							
A. Class,	...	...	...	...	...	...	2
B. Class,	...	...	...	...	...	...	6
E. Class,	...	...	...	...	...	...	4
							12
							119

Since then the 6 D. and M. 10 of the A., and 3 of the H. A. Class Engines, have been transferred to the Indus Valley State Railway.

Close attention was and is being paid to the consumption of running stores, especially coal and oil, and a consumption statement detailing the consumption of each Driver on the line in order of merit, is posted monthly with remarks against each man's name on the running shed notice boards. This has been followed by good results, as besides creating a feeling of emulation amongst the men which induces them to try and stand well on the list; the men feel that the consumption of each individual man is closely watched; and are accordingly more careful.

The Salt Range coal, the use of which it was hoped would reduce the heavy working expenses under the head of "Fuel" has up to the present turned out a failure. It is still being used on the Salt Branch, but the result is loss of time with trains. No attempt appears to have been made by the Contractors to separate the shale from the coal, and until this is carefully done better results than those already obtained, need never be expected from this coal. Until the Contractors who supply the coal, take a personal interest in the matter and bring in nothing but what may be fairly termed coal, the use of this fuel will be an additional expense instead of a saving. The Contractors receive a high rate for the Salt Range coal, quite enough to repay them for the trouble of sifting it. The price of coal forms such a heavy item in the working expenses of this line, that every effort ought to be made to develop local resources in this respect.

TRAFFIC DEPARTMENT.

Extension of the open line, and opening of new stations.—The Kohat Branch, comprising the seven stations of Kutbal, Fatehjang, Kahal, Pind Sultani Road, Langar and Khushalgarh, was formally opened for traffic on the 1st April, 1881. The rails were not, however, then laid into Khushalgarh, and that station was not actually opened until the 16th April, 1881.

The temporary line from Haji-Shah to Attock was also opened on the 1st April, 1881, for passengers, their luggage, and parcels only. The culverts and bridges on this extension being unfit to take the main line engines, a special engine was kept in steam at h, to work the trains between that station and Attock.

Attock has since developed into an important station; and all goods traffic to and from the Peshawar extension is now dealt with there. The situation is confined, and during a great part of the year the heat and dust are next to unbearable. Complaints have been made of the want of shelter for 3rd class passengers, but with a bazaar within easy reach, it is doubtful if the want is as great as is represented. Under any circumstances the Attock station must be a miserable place, and, it is to be hoped that the bridge will be finished before another hot season.

The bridges and culverts between Haji-Shah and Attock have been strengthened, and the main line trains run regularly to and from Attock with the same engines that work them between Rawalpindi and Haji-Shah.

The Badami Bagh station, about 2 miles out of Lahore was opened for coaching traffic only, on the 1st April, 1881. It is a convenience to passengers for Lahore arriving from stations north of Lahore, being nearer the city than the Lahore station, and the up-trains are often nearly emptied at Badami Bagh. Passengers booking from Lahore northwards still use the Lahore station, they can take their seats at leisure, and if they go early enough are sure of finding room; while the fare from both stations is the same. The state of the approach road to the Badami Bagh station may also have some effect in deterring passengers from selecting it as a point of departure: there is, in effect, no road connecting that which passes the fort and the Badami Bagh station, and wheeled vehicles have the greatest difficulty in getting within 300 yards of the booking office.

Missa, originally opened as a crossing station only, was opened for coaching traffic on the 7th August, and for goods traffic on the 1st October, 1881. It now pays expenses, but is too rear Gujarkhan to obtain the custom of more than a very limited circle

Sohan, between Riwat and Rawalpindi, was opened as a crossing station, and also for passenger traffic, on the 4th September, 1881

The approaches to the Sohan bridge had always been a source of anxiety, and the opening of a crossing station immediately south of the bridge, on the only piece of ground available, about midway between Riwat and Rawalpindi, rendered it necessary to provide catch sidings on either side of the bridge, the sidings are protected by semaphore signals, which act at the same time as the distant signals of the station; and then working is regulated by the working of the station semaphore. Hitherto the result has been eminently satisfactory. The pace of trains is carefully regulated down the inclines towards the bridge, and, with the exception of occasional reports of delays to trains at the catch siding points during the cold weather, owing to torpid signalmen, there has not been a hitch in the arrangements. To ensure wakefulness during the cold weather, it was found necessary to slightly strengthen the staff, and to shorten the watches. Since this was done, complaints have ceased.

The Jani-ka-Sang flag station on the temporary line between Tarnaul and Kala-ki-Serai was opened for passengers only on the 1st October, 1881. All trains have to water there, and since passengers have been booked, the station has done very well. It earns more than any other flag station on the main line.

With the opening of the permanent line through the Margalla tunnel, probably much of the traffic now booked at Jani-ka-Sang will be lost to the Railway.

Several short lengths of permanent line were opened for traffic during the year; but these did not affect the sites of the present stations, and it is not proposed to correct the present mileage tables for charge on traffic of all descriptions, until the final completion of the permanent line.

Change of name.—In view of the proximate opening of the Pabi station, close to a large village of the same name on the Peshawar extension, the name of the Pabi station between Kharian and Jhelum was changed to Kariala on and from the 1st April, 1881.

Pinjan was closed as a crossing station on and from the 15th July, 1881, and passengers were not booked there after that date. The station had never paid its expenses.

On the Salt Branch, the Pind Dadan Khan ferry station, on the south bank of the Jhelum opposite the village of Pind Dadan Khan was opened for traffic of all kinds on the 1st April, 1881. It was closed early in June 1881, a considerable portion of the line between Miani and the river bank being swept away.

The Phalian Road station between Dinga and Baha-ud-din was opened for passenger traffic only on the 1st August, 1881. The Sher Mohomed and Syed Dinwala flag stations on either side of the Phalian Road station were closed on and from the same date. The new station does a slightly better traffic than was done at the other two combined; but it is never likely to be of importance except as a crossing station.

Bhera, 10 miles beyond Miani, was opened for traffic of all kinds on the 2nd February, 1882.

This extension is likely to be a profitable one, the passengers and goods traffic being both fairly good.

Lala Musa Salt Godown.—Extensive godowns were erected for the Northern India Salt Revenue Department during the year, at Lala Musa. The sales from this depôt have not hitherto been numerous, and the reduction of the Salt duty has had wonderfully little effect in stimulating consumption of the salt produced at the Mayo Mines; but the depôt is likely to be of great assistance, as it will enable the salt department to regulate their despatches from the Miani (and ultimately from the Khewra) station; and the traffic thus dealt with on the salt department premises at Lala Musa leaves the transfer platform free for general traffic, of which unfortunately, there has been but little in the year under report.

Jhelum station yard.—The Jhelum station yard has been relaid. The long Commissariat and Stores sidings, which were completely out of the control of the Station Master, have been taken up and a fan of sidings provided north of the passenger platform. A permanent station building has been provided; the goods yard and great part of the station premises enclosed by a wall; and the traffic to be dealt with locally having greatly fallen off; an unsightly goods shed has been removed.

With the exception of timber and boulders for road metal (for which very low freight rates are quoted) the goods traffic at Jhelum either inwards or outwards is now nothing. The wants of the town itself are not great; and it has water carriage at its doors. It serves no district, east, west, or north; and but for its Cutcherries, which bring some passenger traffic, it would rank in point of traffic as a 3rd class station.

Rawalpindi Station.—The Rawalpindi goods yard was enclosed by a wall, and an open shed provided on the goods platform during the year. Thefts have since greatly decreased, although a series of robberies occurred in January 1882. The Police stationed on the premises were believed to be more or less implicated in the thefts; and on the removal or dismissal of the men suspected, the

losses ceased; and there has been very little to complain of at this station since.

Lawrencepore.—The Lawrencepore permanent station about 200 yards south of the temporary station, was occupied on the 1st February, 1882. The building is of the pattern of the Badami Bagh station; and is a good type for a 3rd class station; a good siding at the back of the passenger platform, close to the station building, has also been provided. There was much difficulty in working the traffic while the alterations were going on; and it is to the credit of the Station Master that no accident occurred.

Lawrencepore does a very fair goods traffic; Hazroo a centre of trade, is within 5 miles, and there were thefts of valuable consignments (notably indigo) lying at the station under police guard, awaiting delivery! The merchants of Hazroo have now appointed an agent, who has a serai close to the station; and this man removes all consignments immediately on arrival. Losses by theft at Lawrencepore have therefore ceased.

Resumption of through traffic.—The restrictions on local and through booking, which led to the suspension of all through traffic with foreign railways in March 1881, were withdrawn on and from the 1st May, 1881, from which date the interchange of traffic with the Sind, Punjab and Delhi Railway was resumed. Railways beyond Ghaziabad and Delhi respectively consented to resume booking on and from the 1st June, 1881.

All restrictions on particular classes of goods were withdrawn; but with a view to control the traffic in grain, which was said to be awaiting transport to Rawalpindi and elsewhere in very large quantities, the charge for this staple was maintained at the 3rd class goods rates; and double mileage was charged on all downwards traffic to stations north of Jhelum to meet the greatly increased cost of working this part of the line.

Grain.—The rate for grain was reduced to 1st class in local booking from the 15th June, and in foreign booking from the 15th July, 1881.

On and from the 1st October, 1881, all grain, whether booked upwards or downwards, local or foreign, was charged at the ordinary special grain rate; the double mileage charge on downwards traffic to stations north of Jhelum being maintained.

Reduction of Rates.—On and from the 1st January, 1882, the double mileage charge on traffic booked downwards to stations north of Rawalpindi, including the Khushalgarh branch was withdrawn; and double mileage is now charged over the section between Jhelum and Rawalpindi only.

Special rates were during the year quoted for bhusa, beer, firewood, stone and lime.

Special Rates—alteration of fares—In coaching traffic, an alteration of passenger fares took effect from the 1st July, 1881.

The rates up to this date were :—

- Main line, mail train, 3 pies per mile.
- Main line, mixed or local train, 2 pies per mile.
- Salt Branch, 1½ pies per mile.

These were modified as under :—

- Main line, mail and mixed through trains, 2½ pies per mile.
- Main line, local train, 2 pies per mile.
- Salt Branch, 2 pies per mile.

The sickness which prevailed in the autumn of 1881, seriously affected the passenger traffic, it having been already steadily declining since the movements of establishments, followers and speculators connected with the military operations beyond the frontier had ceased.

The diminished outlay on the unopen line also affected traffic in the open line; fewer men came to seek for work, and fewer went home to spend their savings.

The results of the change of fares cannot thus be deduced from the statistics of passenger traffic for the last half of 1881. But the enquiries made into the causes of the decline above referred to, appear to indicate that a lower rate than $2\frac{1}{2}$ pies per mile is necessary to touch the poorer part of the population. The advantages of an unification of 3rd class fares are obvious; and as the differences of speed between the fastest and the slowest trains can never be great, it may be advisable to charge an uniform rate of 2 pies per mile throughout the line, by all trains.

Third class return tickets at reduced rates were issued between Rawalpindi and Lahore from the 1st December, 1881; and between Lahore and other principal stations from the 1st January, 1882.

Mela Traffic.—Third class return tickets at further reduced fares were issued between Attock, Rawalpindi, Lala Musa, Jhelum, Miani, Bhera, Gujrat, Wazirabad, Gujranwala and Lahore, in March 1882, available for return up to the end of April 1882, for the Baisakhi Melas at Hardwar; Vishnu Devi, about 40 miles from Sialkot; Katas, near Khewra; and at other places in the neighbourhood of the Railway.

They were not largely availed of. This may be due in some measure to the notices regarding extra train accommodation and reduced fares having been circulated too late owing to the pressure of other work. An extra train was run daily each way between Lahore and Attock and was timed to suit the local traffic. On the return from Hardwar, however, the passengers appear to have all preferred the night train from Lahore, and as this would not accommodate them, they had to be carried by goods train, to which passenger vehicles were attached for them.

It is proposed to run the daily extra train next year between Lahore and Rawalpindi only; and to start it from Lahore after the evening mail train.

Ice and Bazaar Packages—Reduced rate for ice and bazaar packages, such as bread, flour, fruits, meat, vegetable, &c., were introduced from the 15th August, 1881.

Parcels delivery Service.—An attempt was made from the 1st September, 1881, to organize a parcels delivery service in Rawalpindi. As addressees have, however, in the majority of instances, preferred to send to the station for their parcels, the extra charges for delivery might be discontinued on and from the 1st September, 1882.

Traffic working.—There has been some improvement at stations in the way the traffic, both coaching and goods, is conducted.

Rawalpindi gave a great deal of trouble up to the autumn of 1881; and in May and June 1881 some very scandalous cases occurred in the goods shed there. The then Station Master, Mr. Gerard, was discharged, as also several native goods clerks.

There is now no reason to complain of actual dishonesty among the Rawalpindi staff; although it is difficult to find among the lower paid clerks obtainable here men who are really conscientious in the performance of their duties.

Claims—The amounts paid during the last half of 1881 as compensation for goods lost or damaged were heavy. As separate reports on this subject have been made, it is not necessary to analyse the accounts, but it may be mentioned that the arrears of work in the claims branch in March 1881, would have been sufficient to keep a separate office with a well paid assistant at work for the remainder of the year.

The fabrication of claims has become a profession amongst many of the dealers who patronise this railway, and no doubt these are sometimes successful.

Troop Movements—The troops traffic in 1881-82 was inconsiderable. The Khushalgarh Branch was availed of for the return of the Waziri expedition, and since that time the only regiments and detachments carried have been in the ordinary course of relief.

Considerable numbers of mules and ponies were sent from Jhelum to Secunderabad, Bellary, and stations in the south of India.

Health.—Great anxiety prevailed at one time. Lahore was most unhealthy and several of the staff died, while all were more or less affected by the prevailing sickness.

A few cases of cholera occurred at Jhelum; but in most of them the germs of the disease had evidently been brought from Lahore, and an epidemic was fortunately averted.

Rawalpindi and stations north of Jhelum were fairly healthy throughout the year.

Rates of pay.—The following are the numbers of the subordinate staff drawing Rs. 100 and over in the years 1879-80, 1880-81, and 1881-82 respectively, the lengths of line open being also given for the several years.

	1879-80.	1880-81.	1881-82.
100 to 150,	8	27	24
150 to 200,	4	11	6
200 to 250,	Nil	1	3
250 to 300,	Nil	Nil	1
300 to 350,	1	1	1
Miles open,	147	243	378½

Traffic expenses.—The total traffic expenses of each half year per open mile from January 1880 to December 1881 were as follows:—

1st half of 1880,	1119'06
2nd " " " " " " " "	661'94
1st half of 1881,	581'31
2nd " " " " " " " "	566'54

As already explained, the expenses of 1881 were swelled by adjustment of the accounts of past years.

The cost of "repairs to stores" in 1881-82 was heavy. There was an accumulation in the workshops at Jhelum; and the bills for work done had all to be met in this year.

Accidents.—There were no serious accidents during the year.

Great damage was done to rolling stock at Jhelum by a sudden storm on the 26th June, 1881.

The traffic staff were not free from blame and were punished; but the extreme length of the sidings at that time made the working of the station difficult to control.

Fires in trains.—There were one or two cases of serious damage to or loss of goods in transit by fire, owing to the use of wood fuel for goods trains between Lahore and Jhelum, and for all trains on the Salt Branch.

It is next to impossible to ensure an ordinary wagon being spark proof; and the remedy must rest in the invention of an improved form of spark arrester for wood fuel.

Working agreement with Sind, Punjab and Delhi Railway.—Six months' notice of termination of the working agreement for the joint occupation of the Lahore station was given on the 30th November, 1881; and a fresh agreement has since been drawn up and now awaits ratification.

The broad conclusion to be drawn from the transactions of the year is that the future of the passenger traffic is hopeful, and that only in exceptional seasons will there be a really paying goods traffic. The cost of haulage is very great;

consisting of one span of 40 feet girders, besides which no other masonry works occurs, beyond culverts, on this section of the line.

The main line from Campbellpore to the River Indus was, with the exception of the platelaying, completed by May 1881. On this section the principal masonry works are two-bridges of 40 feet span each, one of 20 feet, besides several large culverts and two over-bridges for roads. Permanent way material was not immediately available for platelaying, the line from Khairabad to Peshawar having precedence, it was not until October that material could be spared for the Campbellpore-Indus line; after that the work was commenced, and by December the line was completed to the Indus, and brought into immediate use for the carriage of the Attock bridge material stored at Campbellpore station.

At Attock bridge the early part of the year was devoted to the collection and preparation of material for the construction of the abutments, extensive quarries were opened, and large quantities of stone brought to site; a commencement was made on the east abutment in May and continued till July, when owing to financial difficulties the works were temporarily suspended and were not resumed until September; the east abutment was completed to the level of the bed stones in February 1882, leaving the superstructure to be built after the erection of the first span of girders.

The construction of the west abutment of the Attock bridge was entrusted to a European Contractor of some standing, he however failed in his engagements and retired from his contracts, thus greatly retarding the work upon which a fair commencement was not made until December 1881; subsequently the organization on the division permitted of the work being carried on very rapidly, and the masonry was up to the level of the bed stones by the end of May 1882.

It was not until the beginning of November 1881 that the state of the river permitted a resumption of operations on the rock in mid-stream on which the centre, or No. 3 pier, of the bridge has since been founded; the cofferdam constructed during the previous season was found to have been undermined in two or three places where the Portland cement concrete had not, owing to sand, rested on the rock; the superstructure, however, was intact.

Measures were first taken to repair the cofferdam, after which it was hoped the interior could have been pumped dry, and the cells excavated for the reception of the standards and struts; these expectations were not realised, the rock was found to be so honey-combed with galleries and natural caves communicating with the river outside the cofferdam, that no pumping would keep it dry, the result was to bring in vast quantities of sand which only added to the difficulties of the situation.

A new plan of operations was subsequently adopted, the space enclosed by the cofferdam was divided into eight sections, by cross walls built also of cement concrete, each of these sections, was by means of dredging and diving cleared entirely of sand and boulders until the rock was perfectly clean, the section or chamber was then filled with hydraulic concrete, which after a lapse of three or four days was sufficiently consolidated to be cut through, when a cell, only sufficiently large to admit of the iron shoe of the standard, was excavated in it down to the rock; where the rock was solid no great difficulty remained after this in founding the standard, but where the reverse was the case and caves were found, the operations of clearing these caves of sand, &c., and filling them with hydraulic cement—subsequently to be cut through—had to be repeated until compact, hard rock was finally reached.

The foundations of No. 3 pier were practically secured by the end of February, and two lengths of standards and struts were fixed by the end of the financial year, since which date the pier has finally been completed.

No difficulties were encountered with any of the other piers of the bridge, although much patience was required to cut through the hard, compact rock of the river bed; to avoid any possibility of injuring the rock, blasting was not resorted to, the work was all done with hammer and chisel. By the end of March, piers

1, 2 and 3 were all well advanced, and the cells for No. 4 pier standards were also ready, although the ironwork was not actually in place until April. At date* of writing all the piers are completed.

Preparations for the staging of the girders were commenced in March, but it was June 1882 before the actual girder erection began. At time of writing one span of girders is in position and the rivetting in an advanced state; staging for No. 2 span is also ready, and the erection of the girders has commenced.

On the west approach to the Attock bridge the works are very heavy, but as that portion of the line cannot be opened for traffic until the completion of the bridge, they had to give precedence to the works north and west of Khairabad, they were therefore not pushed so vigorously; the heavy embankment immediately at the rear of the Attock bridge was finished, and the excavation of the two tunnels was carried on, the headings of both of these tunnels is now through, and the excavation to full section and the lining is in progress.

With the exception of the foundations of one of the piers nothing had been done at the end of March 1882 on the bridge of 3 spans of 60 feet girders, in the 234th mile, the work is, however, now approaching completion.

The end of the financial year saw the completion of the line from Khairabad to Peshawar city, although it was not inspected by the Consulting Engineer until April 17th, nor made over to the Manager, open line, till May 1st. The small section from Peshawar city to the Cantonment station, a distance of 4 miles, has yet to be completed; uncertainty as to the location of the station has caused delay with this short piece of line.

The most serious difficulty on the Khairabad-Peshawar Section of the line was the tunnel at the 235th mile (known as "Tunnel No. 3"), the hill through which the tunnel is constructed consists on its north face of loose shale, which having no cohesion, necessitated expensive timber framing and strutting to provide against the slips, which, notwithstanding the precaution taken, were of constant occurrence.

The bridgework on this section of the line consists of the Bara bridge in the 269th mile

2	Spans of 100 feet girders, and numerous other bridges of minor importance aggregating
76	Spans of 40 feet girder openings.
43	" 20 " "

besides smaller bridges and culverts.

There are five stations, viz., at Khairabad, Akora, Nowshera, Pabi and Peshawar city, all of which were completed when the line was opened for traffic.

DHOND AND MANMAD STATE RAILWAY:

Revenue.—The staff engaged for the working of the line by the State had completely dispersed by the end of 1880-81, and the liquidation of the accounts connected therewith was carried on by the Examiner of Guaranteed Railway Accounts at Bombay during the year under review.

The line having been worked since the 1st January, 1881, by the Great Indian Peninsula Railway Company as an integral part of their undertaking, it is not possible to give full detailed information in this report of the earnings and expenses. The results of the working by the Company have been calculated in accordance with the agreement, which does not provide for any special details concerning the State line being separately recorded. The following table, however, for the calendar year 1881, shows the main features of the year's work in comparison with those for 1880:—

Main Heads.	1881.	1880	Increase in 1881.	Decrease in 1881.
	Rs.	Rs.	Rs.	Rs.
Gross earnings, ...	6,33,863	6,95,094	...	61,231
Gross expenses, ...	5,11,305	6,06,875	...	95,570
Net Earnings, ...	1,22,558	88,219	34,339	...

Thus, while there was a decrease of 9 per cent. in the earnings as compared with 1880, the reduction in the working expenses was equivalent to 15 per cent., the net result being a gain to Government of 39 per cent. as compared with that obtained when the line was under State management. The working agreement may, therefore, on the whole, be regarded as satisfactory. The Capital outlay on the line having amounted to Rs. 99,49,395 at the close of the year, the net earnings shown above are equivalent to about $1\frac{1}{2}$ per cent. thereon. They average Rs. 845 per mile against Rs. 609 per mile in 1880.

The gross earnings during the year were derived from the four main sources of receipt in the following proportions :—

	Rs	Percentage of Total
Coaching traffic, ...	3,33,899	52 67
Goods ,, ...	2,96,623	46 80
Telegraph ,, ...	1,137	0 18
Sundries, ...	2,204	0 35
Total Rs., ...	6,33,863	100-00

A comparison of the above amounts with those for 1880 being shown below :—

Main Heads	1881.	1880.	Increase in 1881	Decrease in 1881
	Rs.	Rs.	Rs.	Rs.
Coaching traffic, ...	3,33,899	3,20,825	13,074	...
Goods ,, ...	2,96,623	3,39,760	...	43,137
Telegraph ,, ...	1,137	5,043	...	3,906
Sundries, ...	2,204	29,466	...	27,262
Total Rs., ...	6,33,863	6,95,094	13,074	74,305
			Net Decrease in 1881, ...	61,231

Coaching traffic is thus shown to have increased 4 per cent. as compared with the preceding year; but, while there was an improvement of Rs. 57,979 during the first half of the year, there was a falling off of Rs. 44,905 during the second. The former is satisfactory, and would no doubt have been maintained throughout the year, but for the cessation of military movements after the close of the Afghan War which led to a large decrease under "Troops and Police," a similar decrease having occurred throughout the Great Indian Peninsula Railway system. Under "Goods Traffic" a falling off of Rs. 43,137 is shown, which is nearly 13 per cent. of the earnings for 1880. This again was composed of a decrease of Rs. 50,260 in the first half of the year reduced by an improvement of Rs. 7,123 in the second. Details of the various commodities dealt with during the year not being available, it is not possible to say in what items of merchandise the fluctuations making up these differences have occurred. The Telegraph earnings of the year were reduced by a sum of Rs. 342 paid to the Government Telegraph Department on account of bearing messages appertaining to the preceding year. As regards the sundry earnings of the line, the large decrease shown is due to the figures of 1880 having included considerable sums realised by hire

of locomotives and vehicles to foreign lines; this source of income having entirely ceased with the transfer of its rolling stock to other State Railways, which was effected preparatory to the line being made over to the Great Indian Peninsula Railway.

The working expenses of the year are shown to have amounted to Rs. 5,11,305 only against Rs. 6,06,875 in 1880. The former figure is of course composed chiefly of the sum paid to the Railway Company for working the line, which, under the agreement, amounted to Rs. 4,96,466, being the balance of the gross earnings of the year after 22 per cent. thereof had been paid to Government. The difference, viz., Rs. 14,839, between this sum and the total actually charged, is due to certain liabilities of the line unconnected with its working by the Company, the principal of which were the following:—

	Rs.	A.	P.
Amount paid to the Indus Valley State Railway as cost of repairing 6 engines made over to them,	8,091	5	5
Amount charged to Revenue on account of loss on stores in transit from England,	2,061	0	0
Amount paid to the Government Telegraph Department for interest on the Capital cost of the telegraph lines and fittings, &c., for the half-year ended 30th June, 1881,	3,313	12	8

The charge for interest due to the Government Telegraph Department for the second half of the year was not known in time to include it in the accounts of 1881. It was therefore booked against Revenue during 1882, but arrangements have been made with that Department, which it is hoped will ensure such liabilities being in future regularly included in the accounts of the period to which they relate. No further particulars regarding the working expenses can be given, the sum paid to the Railway having, as already stated, been a lump sum percentage of the gross earnings, so that no analysis of the amount is practicable; but it may be noted that they absorbed only 80 per cent. of the gross earnings as against 87 per cent. so absorbed in the preceding year.

The State Railway Provident Institution was practically closed during the year, a sum of Rs. 31-7-4 having remained on hand. This is due to subscribers who cannot be found, and, as the amount is not likely ever to be claimed, proposals have gone forward for crediting the amount to Government.

With this single exception all the Revenue Accounts connected with the State management of the line have now been satisfactorily liquidated.

PATNA AND GYA STATE RAILWAY.

This line is under the same management as the Tirhoot Railway.

The Capital expenditure on this railway up to the 31st March, 1882, was Rs. 38,55,930, and the outlay during the year Rs. 2,77,785, which included the cost of completing the ballasting, provision of fencing, rebuilding station and quarters at Makdumpur, and other works of minor importance. The progress has been satisfactory, and the net result of the year's working would have shown a much larger percentage on the Capital outlay, but for the charges paid for the hire of rolling stock, amounting to over Rs. 61,000. More stock is not being provided for this line, as it is understood that it will shortly be made over to be worked by the East Indian Railway; but this question has now been long pending, and early settlement is much to be desired. The following figures show the working since 1879:—

Year.	Miles open.	Gross expenditure.	Expenditure.	Percentage of expenses to earnings.	FINANCIAL RESULTS.	
					Net profit or loss.	Per cent. in Capital expenditure.
		Rs.	Rs.		Rs.	°
1879, ...	57	2,30,510	1,28,723	56	1,01,787	3.58
1880, ...	57	4,81,556	2,70,300	56	2,11,256	6.56
1881, ...	57	5,13,431	3,34,285	65	1,79,146	5.11

The coaching traffic increased from Rs. 3,38,391 to Rs. 3,47,193; the goods from Rs. 1,38,952 to Rs. 1,60,132, the increase in the latter being mainly due to the earnings under "Miscellaneous."

During the year several trespassers have been run over, and to prevent this in future, fencing is now being provided.

ENGINEERING DEPARTMENT.

Besides the general works of maintenance and repairs, the following additional works and buildings were constructed:—

Chargeable to Capital.

Completion of works commenced in previous year.

1. Filling earth in Bankipur yard.
2. Dismantling and re-building Makdumpur station.
3. " " Station Master's quarters.
4. " " native servants' quarters.
5. Raising Makdumpur platform
6. 12-feet culvert leading to goods shed, Gya.

Works commenced, completed, or nearly completed, or in progress during the current year.

1. Extending goods shed, Gya.
2. European staff quarters, including out-houses at Gya.
3. Extending old platform, Jehanabad.
4. New west platform, "
5. Water-crane, "
6. Ashpit, "
7. Fixing demarcation stone (boundary) pillars.
8. Filling in ditches at Gya.
9. Ballasting whole line.
10. Fencing, including footpaths, over-bridges.

Chargeable to Revenue.

1. Filling in portion of Bankipur station yard.
2. Quarters for Permanent-way Inspector.
3. Making boundary bund at Chakund.
4. Filling pits in Gya yard.
5. Platform fencing at Mussourie.
6. Flooring doorways for Gya goods shed.
7. Deepening Jehanabad well.
8. Boundary bund round Mussourie.
9. Filling pits in Bankipur yard.
10. Stone pitching, culvert No. 83.
11. Double 15-inch irrigation duct between $\frac{2}{11}$ and $\frac{2}{12}$.

TRAFFIC DEPARTMENT.

The results of the working are as follows:—

					Receipts.	
					Rs.	
Coaching,	...	...	...	No.	573,829½	3,65,245
Goods,	...	...	...	Mds.	20,73,119	1,70,691
Sundries,	...	...	...	...	...	6,990
Gross Earnings,					...	5,42,926

against Rs. 4,96,477 for 1880-81, or an increase of 9 per cent.

There is an increase of 5 per cent. in number and 4 per cent. in receipts on the coaching traffic, and the following statement shows in comparison the chief commodities carried over the line in 1880-81 and 1881-82:—

				Maunds,	Maunds,	Percentage of in-
				1880-81.	1881-82.	crease decrease.
Seeds,	...	...	...	2,08,900	1,78,875	-14
Hides,	...	...	...	12,107	15,857	31
Saltpetre,	...	...	...	6,112	6,116	...
Food grains and pulses,	...	...	...	3,10,272	2,61,959	-16
Salt,	...	...	...	1,56,920	1,77,949	13
Piece goods,	...	...	...	29,052	30,651	5
Tobacco,	...	...	...	31,369	33,146	6
Indigo,	...	...	...	54	22	-59
Other goods,	...	...	...	7,81,361	13,68,679	75

It will be seen that the chief increase is in miscellaneous goods.

The figures below give the classification of the coaching traffic—

	In number.	Receipts.
First Class,	1,783	7,809
Second ,,	2,656	5,419
Third ,,	569,390	3,42,027

The through traffic with the East Indian Railway was—

	Mds.
Inwards,	505,581
Outwards,	714,870

and the proportion of empty to full running is 35·04 per cent., due to the ballast trains during the year which would necessarily always run empty one way.

The earnings on the line were Rs. 4·16 per train-mile as compared with Rs. 4·31 for the previous year.

The rates for both goods and passenger are assimilated to those of the East Indian Railway.

The amount paid as compensation for loss, damage or miscarriage is Rs. 6-12 only.

The terms for working the joint station at Bankipur have been agreed upon.

No serious accident occurred during the year; those affecting life and limb are summarized as follows :—

	No.
Passengers killed, ... ..	...
" injured, ... ..	...
Railway servants killed,	2
" injured,	2
Trespassers killed,	5
" injured,	2
Total,	11

LOCOMOTIVE AND CARRIAGE AND WAGON DEPARTMENTS.

Locomotive Department.—There are seven engines on the line, four of which are hired from the Calcutta and South-Eastern State Railway, and three from the East Indian Railway.

Two of the engines hired from the Calcutta and South-Eastern State Railway have had heavy repairs done to them in the Jamalpore shops, and one of them had heavy repairs done at Gya.

Several engine failures occurred, most of which were caused by leaking tubes. Very great trouble is experienced on this line owing to the bad water, which causes the tubes to leak very much.

The average consumption of coal was 48 lbs. per train-mile, and of oil 9·6 pints per 100 miles.

Carriage and Wagon.—There are 54 carriages and 20 ballast wagons the property of the line, and 40 covered goods, one horse-box, one carriage truck, one cattle truck, two brake-vans, and 20 ballast wagons hired from the Calcutta and South-Eastern State Railway.

Twenty covered good wagons and two composite carriages were returned to the Calcutta and Southern-Eastern State Railway during the year.

Seven vehicles had heavy, and 111 vehicles ordinary, repairs done to them.

NIZAM'S STATE RAILWAY.

The maintenance and working of this line were carried on by Government agency during the year.

Capital Account.—Expenditure on the following works was charged to this head during the year :—

Triangle and loop-siding at Wadi.
 Water supply at Wadi.
 Station at Gulaguda.
 Water supply at Hyderabad.
 Goods shed at Tandur.
 „ at Seram.
 Locomotive machinery.
 Rolling stock.

The total expenditure on Capital account amounted to Rs. 38,722; but this was diminished by credits and refunds, so that the net debit was Rs. 14,888.

Revenue Account.—The receipts and expenditure under this head during the calendar year 1881 were as follows:—

Receipts.

Particulars	No.	Amount.			Remarks
		Rs.	A.	P.	
<i>I.—Coaching Traffic.</i>					
1st class passengers,	2,592½	17,833	7	1	
2nd class „	11,896	25,031	7	8	
3rd class „	3,60,393½	2,08,369	5	6	
Miscellaneous, .. .. .	..	43,962	1	2	
Total, .. .. .	..	2,95,196	5	5	
<i>II.—Goods Traffic.</i>					
	Tons				
General merchandise,	71,783	4,07,224	4	4	
Military stores,	1,541	17,601	13	0	
Railway materials for construction,	974	2,426	13	8	
Minerals,	140	487	2	0	
Revenue stores,	9,556	10,445	13	4	
	No				
Live stock,	13,142	3,364	6	0	
Miscellaneous, .. .. .	..	2,400	6	1	
Total, .. .. .	..	4,43,950	10	5	
III.— <i>Electric Telegraph and Sundries,</i> .. .. .	..	17,687	9	10	
Total Earnings, .. .. .	..	7,56,834	9	8	

Expenditure.

Particulars	Amount			Remarks
	Rs.	A.	P.	
<i>Working Expenses.</i>				
Maintenance of way and stations,	74,243	8	9	
Locomotive expenses,	1,43,013	5	10	
Carriage and wagon expenses,	53,992	8	10	
Traffic expenses,	97,964	15	7	
General charges,	61,328	1	2	
Steam boat service, .. .. .	..	..	..
Special and Miscellaneous expenditure,	33,516	6	5	
Total Working Expenses,	4,64,058	14	7	

The net profits amounted to Rs. 2,92,776, equivalent to 2.38 per cent. on the total capital of Rs. 1,22,85,291. The return for 1880-81 was 1.84 per cent., so the increase is 0.54 per cent.

CALCUTTA AND SOUTH-EASTERN STATE RAILWAY.

The results of the year were more satisfactory than those of previous years, yet there still remains room for much improvement. The traffic receipts for both coaching and goods increased slightly, while the working expenses, disregarding the charge of Rs. 95,029 for additional rolling stock, were lower.

The following are the results of the working since the railway was surrendered to Government in 1869:—

Year.	Miles open.	Gross earnings.	Expenditure.	Percentage of expenses to earnings.	FINANCIAL RESULTS.	
					Net profit or loss.	Per cent on Capital expenditure
		Rs.	Rs.	Rs.	Rs.	Rs.
1869, ...	28	80,786	1,17,579	173	-36,793	...
1870, ..	28	98,844	1,03,670	105	-4,826	...
1871, ...	28	79,308	72,027	91	7,281	...
1872, ...	28	58,711	54,057	92	4,654	...
1873, ...	28	1,02,072	1,04,687	103	-2,615	-0.04
1874, ...	28	99,489	77,945	78	21,544	0.29
1875, ...	28	1,03,660	83,429	80	20,231	0.29
1876, .	28	98,343	1,06,824	109	-8,481	-0.12
1877, ...	28	1,18,487	96,847	82	21,640	0.31
1878, ...	28	1,25,694	94,372	75	31,322	0.45
1879, ...	28	1,34,087	89,088	66	44,999	0.68
1880, ...	28	1,42,098	1,01,344	71	40,754	0.61
1881, ...	28	1,52,512	1,01,307	66	51,205	0.76

Owing to the abnormally high capital cost of this line a fair return from the profits of working cannot be expected.

The line was maintained in good order, and the traffic worked without interruption. The girders of several of the minor bridges were strengthened or renewed, new sidings and an up-platform added at Sonapore station, the junction of the Diamond Harbour line, and many other minor additions and improvements made. The station accommodation at Sealdah has been found quite inadequate for the requirements of the increasing traffic, and an extension of the passenger station building has been sanctioned.

The line is short of carriage and wagon stock, much of which is old and rotten; and during the year it was found necessary to condemn many vehicles, leaving barely sufficient to work the traffic. Sixty 10-ton wagons have been ordered, and the engine stock has been increased by four new and powerful engines lately received from England. With these, and the stock expected from the Patna and Gya Railway, when it is transferred to the East Indian Railway, it is anticipated that for some time, at least, all requirements can be met.

ENGINEERING DEPARTMENT.

The condition of the way and works was maintained in the same state of efficiency as mentioned in last year's report, many of the bad sleepers and rail fastenings having been renewed.

The strengthening of the girders found to be under the required strength was completed, and the masonry abutments of the Piali bridge and other culverts were cement-plastered.

In consequence of the requirements of the Diamond Harbour extension, an additional platform was constructed at the Sonarpur Junction station, and additional sidings laid down to accommodate the traffic expected. A re-arrangement and extension of the sidings at Calcutta was also put in hand, and the platform and station building are to be added to.

As it was considered necessary that the Assistant Manager should live near the railway, orders were issued to build him quarters on the Sealdah station yard, which were completed during the year. Station and distant signals have been erected at Ballygunge, Jadubpur, and Sonarpur.

LOCOMOTIVE DEPARTMENT.

There are at present 13 engines belonging to the line, as shown below:—

4-wheel coupled .	...	...	...	...	...	2
6- " "	...	...	...	...	...	6
Tank-engine.	...	...	...	...	...	1
H. class 4-wheel coupled,	...	...	...	...	...	4
						—
						13

Of these three 6-wheeled and one 4-wheeled coupled are lent to the Patna and Gya State Railway.

The four H. class engines lately arrived from England are of the newest description. The native drivers on the line not having sufficient confidence to work these engines, which are fitted with steam brake and other improvements, the Locomotive Superintendent was compelled to send a European driver from the Northern Bengal State Railway to work them, and to instruct the natives. The consumption of coal and its cost compares as follows:—

Year.	COAL CONSUMED PER TRAIN MILE.		COAL CONSUMED PER ENGINE MILE.		Remarks
	Quantity.	Amount	Quantity.	Amount	
	lb.	As.	lb.	As.	
1880-81,	58.11	3 92	50 11	3.32	
1881-82,	62.78	4 22	51 14	3.44	

The increase on the consumption shown above is due partly to the working of the engine *Napier* at the Canning Rice Mills, for which no credit on train mileage is afforded, and also to a certain extent to carelessness on the part of the drivers.

The following statement shows the repairs executed and their cost:—

Number of engines.	Class of repairs.	Cost of repairs.			Remarks.
		Rs.	A.	P.	
2	Heavy,	3,374	4	9	
3	Light,	211	12	8	

The percentage of the working expenses on the gross earnings in 1880 and 1881, and the cost per train mile will compare as follows:—

Year.	Total gross earnings.	Total expenditure.	Per cent. of expenditure on gross receipts.	Cost per train mile.
	Rs.	Rs.		As.
1st half 1880,	73,023	14,250	19.51	12.2
1st ,, 1881,	83,726	12,145	14.51	9.14
2nd ,, 1880,	69,075	11,007	15.94	9.75
2nd ,, 1881,	68,786	10,945	15.91	8.93

There were two engine failures, one due to a stay breaking, and the other to mis-management on the part of the driver.

CARRIAGE AND WAGON DEPARTMENT.

The Locomotive Superintendent has decided to gradually renew the whole of the coaching and goods stock at a certain rate every year owing to the vehicles getting beyond repair, and this work will shortly be commenced.

The ten ballast trucks referred to in the previous year's reports were completed and 10 10-ton wagons were being built by Messrs. Burn and Co., and 50 ordered from England.

Eighteen high-sided and one covered goods wagons were condemned and removed from running. Of these 10 were subsequently sold to Messrs. Mitchell and Co.

Sixty-five wagons have been hired out to the Patna and Gya State Railway, and 18 to Messrs. Burn and Co., for work on the Diamond Harbour extension.

The cost of repairs during 1880 and 1881 compare as follow :—

	Cost of repairs, 1880.	Cost of repairs, 1881.	Remarks.
	Rs.	Rs.	
Coaching vehicles, .. { 1st half,	1,133	228	
{ 2nd ,,	625	944	
Goods ,, .. { 1st half,	2,837	904	
{ 2nd ,,	4,035	402	

The percentage of the working expenses on the gross earnings and the cost per train mile for the two years is given below :—

	Gross earnings.	Expenditure.	Percentage of expenses on gross earnings.	Cost per train mile.
	Rs.	Rs.		Rs.
1st half of 1880,	73,023	6,211	8.50	5.24
" 1881,	83,726	229	0.27	0.17
2nd half of 1880,	69,075	6,137	8.88	5.43
" 1881,	68,786	2,801	4.07	2.28

TRAFFIC DEPARTMENT.

The traffic throughout the year was carried on without interruption. The work done during the year is thus summarized :—

WARDHA COAL STATE RAILWAY.

The working of the Warora Coal Mines is included in that of this Railway.

The Capital expenditure during the year was due to enlarging the Workshops and procuring new plant, machinery and rolling stock.

The following statement exhibits the Capital account as it stood at the end of the year :—

Main heads of expenditure.	OFFICIAL YEAR 1881-82.			Net expenditure to end of previous year.	Net expenditure to end of 1881-82.	Sanctioned estimate.
	Outlay.	Deduct receipts on Capital account.	Net expenditure.			
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Preliminary expenses, ..	..	..	..	91,643	91,643	91,643
Land, ..	..	..	..	4,655	4,655	4,655
Construction of line, ..	54	..	54	15,72,493	15,72,547	15,72,547
Ballast and permanent way, ..	..	..	..	20,49,835	20,49,835	20,49,835
Stations and buildings, ..	6,217	..	6,217	3,44,964	3,51,181	3,69,881
Warora Colliery Works, ..	..	..	..	3,38,225	3,38,225	3,38,225
Total Construction Accounts, ..	6,271	..	6,271	44,01,815	44,08,086	44,26,786
Plant, ..	11,938	..	11,938	3,53,026	3,64,964	3,77,914
Steam ferries, ..	..	..	..	..	..	..
Rolling stock, ..	85,610	..	85,610	2,87,780	3,73,390	5,00,740
Establishment, ..	300	..	300	6,08,321	6,08,621	6,09,121
Total Expenditure on Final Heads, ..	1,04,119	..	1,04,119	56,50,942	57,55,061	59,14,561
Suspense accounts, ..	53,983	..	53,983	1,23,679	1,77,662	..
Grand Total Expenditure, ..	1,58,102	..	1,58,102	57,74,621	59,32,723	59,14,561

In the course of the year one additional locomotive, 60 10-ton coal wagons, 10 10-ton covered vans, one composite, two 3rd class and two 4th class carriages, two passenger brakes and two goods brakes were sanctioned. Of the above, one locomotive by Sharp Stewart and Co. was received from the Punjab Northern State Railway. The ironwork for 60 10-ton coal wagons was received from England, and 16 were erected at Warora. The total Capital account to the end of year for Colliery and Railway together stood at Rs. 59,32,723, of which Rs. 1,77,662 were in suspense.

At the Colliery the whole of the new work connected with Nos. 3, 4 and 5 pits has been debited to Revenue.

The following is an account of the working of the Railway and Collieries together :—

Heads.							Actuals, 1881-82.	
I. EARNINGS.							Rs.	
Coaching traffic,	..	..	..	..	..	..	36,279
Goods "	..	..	..	..	..	..	1,48,176
Electric telegraph,	..	..	..	..	..	..	1,066
Sundries,	..	..	..	..	..	..	56,776
Warora Colliery,	..	..	..	..	..	..	2,98,942
Total Earnings,							..	5,41,239
II. EXPENDITURE.								
Maintenance of way, works and stations,	..	..	..	..	..	..	28,610
Locomotive expenses,	..	..	..	..	..	..	45,330
Carriage and wagon expenses,	..	..	..	..	..	..	22,719
Traffic " "	..	..	..	..	..	..	21,101
General charges,	..	..	..	..	..	..	39,611
Special and miscellaneous,	..	..	..	..	..	..	7,624
Working expenses Warora Colliery,	..	..	..	..	..	..	2,85,130
Total Working Expenses,							..	4,50,125
Net Result,							..	91,114

Of the net earnings Rs. 13,812 is nominally due to the Colliery, and Rs. 77,302 to the Railway. As, however, the principal goods traffic on the line is the carriage of coal, the net results are entirely dependent on the successful working of the Colliery.

During the whole year the working of the Colliery has been carried on with but few accidents or mishaps. In August one man was killed by accidentally falling down the pit. The results of working have been generally satisfactory.

The old machinery at No. 1 pit has continued to work well. No. 3 pit was not completed at the end of the year, and the plunger pumps from the Attock tunnel could not therefore be put down this pit; the engines and house were however well advanced, and the boilers got into place; the delay was due to numerous breakages experienced when sinking through the sandstone.

No. 4 winding pit continued working satisfactorily. A new pit (No. 5) was commenced, carried down to the rock, and lined. It was intended to drain this pit by a bore hole meeting a drift from the old workings, but the progress of the drift, owing to the very hard sandstone met with, was slower than anticipated. It was decided, therefore, to put down a steam pump supplied with steam from an old broad gauge locomotive sent from the Indus Valley State Railway, and which was unfit for ordinary locomotive work; this arrangement has so far proved satisfactory.

In August 1881 it was decided to work into No. 3 seam; some headings were driven into it, and the coal was found equal to that of No. 2 seam.

The engine plane to No. 3 workings was well advanced; this, in addition to the headings into No. 3 seam will open out many new faces, and it is hoped will materially increase the out-put with a short lead during the next working season.

Early in the year an attempt to work the pillars in the north level was attended by a dangerous "creep" towards the dip, the site being 700 feet from No. 2 pit, direction 73° north-west, but the prompt and timely measures taken by the Mining Engineer proved successful, and no inconvenience has since been experienced, beyond the loss of a certain amount of coal.

In October it was decided to remove the pillars in the south level (one row of pillars to the dip being left intact); this was done without casualty of any kind,

and with an estimated yield of 70 per cent. of the coal in the pillars. This result, so satisfactory as compared with the pillar working in the north level, is due to the pillars having been left so much larger than those left in the other part of the mine, and to the system of splitting the pillars instead of undercutting and propping them.

The result of so much pillar working during the year has been to reduce the quantity of slack coal, the demand for which has now become equal to the supply.

On the 27th January, 1882, a fire broke out in the long wall workings north of No. 2 pit, and the efforts made for keeping it under control were successful. In April, however, (or subsequently to the date to which this report refers) a more serious fire occurred 110 feet north 83° west of No. 2 pit, which after various attempts to extinguish it had been tried was walled up. This had apparently the desired effect; but in June the fire again broke out in two places both nearer No. 2 pit, filling the workings with smoke and foul air, and eventually necessitating the drowning of the lower working up to the level of the fire. I regret to have to record that, whilst contending with the fire, the Mining Engineer, Mr. MacDonald, lost his life, having been overcome by the foul gas whilst endeavouring to withdraw the native workmen from the mine. By this unfortunate occurrence Government have lost an able and energetic servant, whose heart was in his work, and whose constant aim was to do his best for the interests entrusted to him.

The following table shows the quantity of coal put out during each month of the official year as compared with the quantities in 1880-81 :—

Month.	1881-82.			1880-81.		
	Tons.	Cwt.	Qrs.	Tons.	Cwts.	Qrs.
April,	4,461	9	1	2,965	12	3
May,	4,445	8	5	1,408	12	3
June,	5,344	1	1	64	4	3
July,	6,311	19	2	..	..	..
August,	5,468	15	1	..	..	..
September,	4,364	14	2	..	..	..
October,	3,925	8	2	1,488	7	2
November,	5,032	..	..	2,686	13	1
December,	6,903	..	..	3,830	14	2
January,	7,165	17	..	4,487	..	1
February,	7,232	14	..	4,527	14	2
March,	7,501	..	..	4,236	15	3
Total,	68,156	8	..	25,695	16	..

Out of this total quantity of 68,156 tons—38,640 tons were delivered to the Great Indian Peninsula Railway Company, and 11,310 tons to the Empress Mills Company at Nagpur. The slack coal amounted to 16,477 tons, or 24.17 per cent. of the whole out-put. The prices during the year, viz., Rs. 5 for Great Indian Peninsula Railway Company and Government use, and Rs. 9 to the public for large coal, Rs. 2 for small coal, remained unchanged.

The use of ponies for haulage alluded to in last year's report was continued throughout the year; the results have turned out very satisfactory, the cost being one anna per ton by ponies as compared with three annas per ton by manual labour.

As regards the working of the line of Railway, it was found that the bazar tickets alluded to in last year's report were not appreciated, they were consequently withdrawn on the 1st January, 1882.

The receipts from passengers show an increase of Rs. 6,877 over that of the preceding year. This may be considered due to the reduced rate for 4th class passengers to 2 pies per mile, and the establishment of two mixed trains per day, which came into force towards the end of the previous year. The receipts from goods also show an increase of Rs. 64,266, due partly to general increase of traffic, but mainly to the increased out-put and carriage of coal.

The Railway works, it is reported, were maintained in good order.

SINDIA STATE RAILWAY.

The working of the Northern Section of this line between Agra Fort and Dholpur, a distance of 34 miles, was made over to the East Indian Railway Company on the 16th December, 1879, and that of the Chumbul and Southern Sections to Gwalior on the 15th May, 1881, on the completion of the bridge over the Chumbul river; the total distance from Agra to Gwalior being 68 miles. The rates and fares are the same as those charged on the East Indian Railway.

Construction.—The completion by Messrs. Glover and Co., the contractors of the bridge over the Chumbul river, 12 spans of 186 feet, and 2 spans of 136 feet wrought-iron lattice girders, was the chief event of this year. The great height, 109 feet, of the massive stone piers above low-water, and the great depth, 50 to 75 feet to which the well foundations were sunk beneath this level, are due to the enormous floods which rush in sudden waves down the channel of this river and create great scour in the bed.

The Chumbul bridge was commenced in 1876, and has thus been 5 years under construction.

Earnings and Expenditure—

				Rs.
The total earnings amounted to	..	..	..	2,50,399
„ expenditure „	..	..	..	1,32,233
				<hr/>
			Balance net earnings, ..	1,18,166
				<hr/>

This is divisible between the East Indian Railway and Sindia State Railway in the ratio of two-fifths to the former and three-fifths to the latter.

The details are given in the table below :—

Details of Earnings and Expenses.

Earnings.				Expenditure.			
			Rs.				Rs.
Coaching traffic,	..	..	1,50,885	Maintenance expenses,	..	..	37,691
Goods traffic, ..	..	..	97,695	Locomotive expenses,	..	..	28,705
Electric telegraph,	..	..	1,798	Carriage and wagon expenses,	..	..	13,219
Sundries, ..	..	..	21	Traffic expenses,	..	..	22,031
				General	..	..	14,548
				Special and miscellaneous charges, ..	..	..	3,549
				Additional charges at 3 annas per mile,	..	..	12,500
			<hr/>				<hr/>
		Total, ..	2,50,399			Total, ..	1,32,233

The earnings from—

				Rs.
Coaching traffic amounted to	..	..	..	1,50,885
Goods traffic	..	..	..	97,695
Upon the total earnings,	..	..	..	2,50,399
The percentage of coaching traffic is	..	..	..	60.26
„ of goods traffic is	..	..	..	39.01

Details of Passenger Traffic.

Description of Classes.	NUMBER CONVEYED.		Increase in 1881.	Decrease in 1881.	Increase per cent.	Decrease per cent.	RECEIPTS.		Increase in 1881.	Decrease in 1881.	Increase per cent.	Decrease per cent.
	1880. * Northern Section only.	1881.					1880. Northern Section only.	1881.				
1st class,	1,052	1,522	470	..	44.67	..	Rs. 3,064	Rs. 6,146	Rs. 3,082	..	100.59	..
Per cent. on entire passenger traffic,	0.74	0.87	..	..	..	..	3.88	4.59	..	..	..	..
2nd class,	6,569	4,216	..	2,353	..	35.82	Rs. 5,890	Rs. 5,743	..	147	..	2.50
Per cent. on entire passenger traffic,	4.64	2.40	..	..	..	..	7.47	4.29	..	..	..	..
Intermediate class, ..	940	1,033	93	..	9.89	..	682	871	189	..	27.71	..
Per cent. on entire passenger traffic,	0.67	0.58	..	..	..	..	0.87	0.65	..	..	..	..
3rd class,	133,004	169,086	36,082	..	27.13	..	Rs. 69,226	Rs. 1,21,180	Rs. 51,954	..	75.05	..
Per cent. on entire passenger traffic,	93.95	96.15	..	..	..	..	87.78	90.47	..	..	..	..
Total, ..	141,565	175,857	34,292	..	24.22	..	Rs. 78,862	Rs. 1,33,940	Rs. 55,078	..	69.84	..
Percentage of passenger traffic to total railway receipts,	..	..	..	..	..	..	64.23	53.88	..	..	..	..

Details of Goods Traffic.

Goods.	WEIGHT CARRIED.				RECEIPTS.				
	Increase in 1881.		Decrease in 1881.		Increase in 1881.		Decrease in 1881.		
April, .. ..	..	..	..	..	4,461	9	1	..
May, .. ..	..	..	..	..	4,445	8	..	..
June, .. ..	..	..	..	..	..	..	..	..
July, .. ..	..	..	..	..	..	..	..	..
August, .. ..	..	..	..	..	..	..	..	..
September,	14,862	126,162	111,300	..	23,232	83,692	65,460	..	
October,	782	643	..	..	139	1,978	3,812	1,834
Northern railway materials for construction,	15,832	2,095	..	..	13,737	4,536	515	..
.. .. for revenue, ..	..	3,394	3,394	..	..	1,107	1,107	..
<i>Minerals.</i>									
For the public,	1,481	1,489	8	..	2,847	2,390	..	457	
.. construction,	53	..	..	..	29	..	..	..
.. revenue, .. ..	..	279	279	..	..	192	192	..
Live stock, .. ..	..	..	..	..	319	14	..	305
Rent, demurrage, &c., .. ..	..	..	..	..	176	950	784	..
Miscellaneous, .. ..	..	..	..	..	..	25	25	..
Total, ..	33,010	134,062	101,052	..	33,107	97,697	64,590	..	
Percentage of goods traffic to total railway receipts, .. ..	..	..	..	..	26.37	39.30	..	..

The traffic of this line is as yet small, and will take time to develop. The line is situated chiefly in the States of the Rana of Dholpur and of His Highness the Maharajah Sindia of Gwalior.

GHAZIPUR-DILDARNAGAR RAILWAY.

This short branch line, 12 miles in length, sanctioned as a productive work for 6½ lakhs on the broad (5 feet 6 inch) gauge, was opened on the 5th October,

1880, and at the close of 1881-82 had been working for little more than a year. The total Capital expenditure to the 31st March, 1881, amounted to Rs. 6,79,873, of which Rs. 86,334 were spent in 1881-82. The original sanctioned estimate for Rs. 6,34,151 was closed on the 31st March, 1881, and Capital work has since been carried on, against supplementary estimates sanctioned by the Local Government under the East Indian Railway Company, which works the line. These sanctions aggregating Rs. 1,45,083 have been accorded on the representation of the Consulting Engineer for Guaranteed Railways, Calcutta, that the additions provided for were absolutely required for safe and efficient working. The total supplementary sanctions since the closing of the original estimate amount to Rs. 1,45,442. The expenditure to the close of 1881-82 represents only a portion of these supplementary requirements, and provision to complete them has been made in the Capital budget estimate 1882-83. The actual cost per mile of this railway, at the close of 1881-82, stood at Rs. 56,656. This, which does not include rolling stock, is a high rate even for a broad gauge line on which no large bridges or important works were required. The rolling stock is found by the East Indian Railway Company. When the anticipated further expenditure in 1882-83 shall have been added, the total Capital cost will probably amount to Rs. 7 $\frac{3}{4}$ lakhs, or nearly Rs. 65,000 per mile, against the original sanction by the Secretary of State of 6 $\frac{1}{2}$ lakhs.

The money hitherto expended on Capital construction has been provided as follows :—

	Rs.
Subscribed by shareholders,	5,00,800
Contributions from Provincial funds,	60,000
Imperial grant, Productive Public Works,	1,19,073
	<hr/>
Total,	6,79,873
	<hr/>

This line, as already stated, is worked and maintained by the East Indian Railway Company, which finds the rolling stock, and charges its own train mileage rates, taking in addition $\frac{2}{5}$ ths of the net receipts in remuneration for its trouble. This contract is, it is understood, under reconsideration by the Secretary of State in connection with the general question of the working of State Railways by guaranteed lines.

This being practically the first year's working, no comparison in detail is attempted with the previous year's results.

The earnings and expenses for 1881 are shown in the following table :—

Traffic Earnings—

	Rs
Coaching,	19,135
Goods,	20,973
Telegraph,	1,021
Sundries, ... ..	...
	<hr/>
Gross earnings,	41,129
or Rupees 65.9 per mile per week.	
Deduct working expenses,	35,799
	<hr/>
Net earnings,	5,330
	<hr/>

The proportion of working expenses to gross earnings being 87 per cent., and of net earnings to Capital expended 0.78 per cent.

The financial condition of the undertaking at the close of 1881-82 is shown in the following table :—

Expenses.	Amount.	Earnings.	Amount.
	Rs.		Rs.
Interest on capital outlay to end of 1880-81, ...	79,659	Gross earnings to end of 1880-81, ...	17,878
" " for 1881-82, ...	25,468	" " during 1881-82, ...	41,129
Total, ...	1,05,127	Total, ...	59,007
Working expenses to end of 1880-81, ...	23,183		
" " for 1881-82, ...	35,799	Short earned to end of 1881-82, ...	1,05,102
Grand Total, ...	1,64,109	Grand Total, ...	1,64,109

Thus after paying interest on shareholders' debentures and on the Imperial grant, there is a deficit to the Provincial revenues of Rs. 1,05,102 for unrealized interest. The interest account stands as follows on the total capital outlay :—

	Rs.
Subscribed by shareholders, ...	5,00,800
Contributions from Provincial funds, ...	60,000
Imperial grant, ...	1,19,073
Total, ...	6,79,873
Payable to shareholders, ...	97,604
" to Government of India, ...	6,323
" to Provincial funds, ...	1,200
Total, ...	1,05,127

RAJPUTANA RAILWAY.

In the following remarks, the progress of works of construction and of expenditure on Capital account is reviewed for the financial year 1881-82, and the working of the open line, as well as the accounts of Revenue earnings and expenditure, are considered for the calendar year 1881.

The working of the Sindia State Railway, Southern Section, was transferred to the East Indian Railway on the 15th May, 1881.

The Muttra-Achnera Section, 22 $\frac{3}{4}$ miles, which has been constructed as a provincial work by the Government of the North-Western Provinces and Oudh, was opened for traffic on the 7th November, 1881, and has since its opening been worked by the Rajputana Railway.

In last year's report the completion of the Western Rajputana Railway was alluded to as the principal feature of the year 1880; and now may be recorded the virtual completion by the end of the year 1881 of the other arm of the System of Railways under which have been grouped for working purposes, the Rajputana Railway, the Holkar State Railway, and the Sindia-Neemuch State Railway.

The transfer of the head offices of the Rajputana Railway from Agra to Ajmere was noticed last year, and the absorption of the head offices of the Holkar and Sindia-Neemuch Railways has led to further demands for house accommodation, which, though much increased by the building operations of 1880 and 1881, is still insufficient, and must remain so until the completion of the general office buildings frees the houses now occupied as offices.

The Holkar State Railway, commenced in the end of 1871, was completed in 1877, and was shortly afterwards continued in the Sindia-Neemuch Railway to Rutlam; thence by successive stages to Neemuch and Chitor, at which point the completion placed Rajputana in direct railway communication with Malwa, and so made it possible to unite under one central management the group of Railways now known as the Rajputana-Malwa Railway.

It may be convenient to summarize in a convenient tabular form the total mileage of the component Railway of the System as now amalgamated, and to note that although for purposes of administration the Railways were amalgamated on the 1st December, 1881, the Revenue accounts of the Rajputana Railway and of the Holkar and Sindia-Neemuch Railways were kept wholly distinct to the end of 1881; and that in the subsequent paragraphs the figures (except where otherwise stated) must be understood to refer to the transactions of the Rajputana Railway only.

Opened for public traffic.	Miles.	Date on which opened for public traffic.
<i>Rajputana State Railway.</i>		
Delhi to Garhi Harsaru,	25½	Delhi-Rewari section, with Salt Branch [59 miles] for Salt traffic only, on 14th February, 1873, and for passenger traffic on 1st July, 1873.
Garhi Harsaru Junction to Bandikui Junction, ...	109½	Rewari to Ulwar [46½ miles] on 15th September, 1874.
Branch from Garhi Harsaru Junction to Farukhnagar, ...	7½	Ulwar to Bandikui [37½ miles] on 7th December, 1874.
Agra Fort Station to East Indian Railway Station, ...	1½	Agra-Bhurlpore section [32½ miles] for goods traffic, on 11th August, 1873, and for passengers on 20th October, 1873.
Agra to Bandikui Junction,	93½	Bhurlpore to Dausa [78½ miles] on 20th April, 1874.
Bandikui Junction to Phalera Junction,	90½	Dausa to Jeypore [38 miles] on 12th October, 1874.
Phalera Junction to Ajmere,	49½	Jeypore to Sambhar [38½ miles] on 1st March, 1875.
Ajmere to Nusseerabad,	14½	Phalera to Ajmere [49½ miles] on 1st August, 1875.
Sambhar Branch,	4½	Ajmere to Nusseerabad [14½ miles] on 14th February, 1876.
Japog Extension,	4	Agra Fort Station to East Indian Railway Station [1½ miles] on 1st January, 1876.
Extension Japog Siding,	2	Japog Extension [4 miles] in October 1876.
Extension of the Sambhar Branch to Jhowra, ...	17	Extension of the Sambhar Branch to Kharia [17 miles] on 20th December, 1879.
Deodani Siding,	2	Extension of Japog Siding [2 miles] on 20th December, 1879.
Kankaroola,	1½	Deodani Siding [2 miles]
From Ajmere east of Abu and through Palanpur to Ahmedabad on the Bombay, Baroda and Central India Railway,	304½	Ajmere to Beawar [32 378 miles] on 15th May, 1878.
<i>Sindia-Neemuch and Neemuch-Nusseerabad State Railways.</i>		
Indore to Nusseerabad,	304½	Beawar to Raipur [20 847 miles] on 12th August, 1879.
<i>Holkar State Railway.</i>		
Khandwa to Indore,	85½	Raipur to Sujat [20 587 miles] on 20th November, 1880.
<i>Muttra-Achnera Railway.</i>		
Muttra-Achnera Railway,	22½	Sujat to Palanpur [148 7 miles] on 1st January, 1881.
Grand Total,	1,139½	Palanpur to Ahmedabad [82 500 miles] on 15th November, 1879.
<i>Holkar State Railway.</i>		
(Included in Rajputana-Malwa Railway from 1st January, 1882.)		
<i>Miles.</i>		
Khandwa to Sanawad, opened on 1st February, 1874,	33	
Sanawad to Mortakka, opened on 1st April, 1874, ...	3½	
Mortakka to Choral, opened on 20th January, 1875,	20½	
Choral to Mhow, opened on 1st January, 1878,	15½	
Mhow to Indore, opened on 3rd August, 1876,	13	85½
<i>Sindia-Neemuch and Neemuch-Nusseerabad State Railway.</i>		
Indore to Ujjain, opened on 3rd August, 1876,	36½	
Fatehabad to Rutlam, opened on 11th July, 1878, ...	49	
Rutlam to Jaora, opened on 25th February, 1880, ...	20½	
Jaora to Mandsaur, opened on 8th April, 1880,	31½	
Mandsaur to Neemuch, opened on 2nd July, 1880, ...	30½	
Neemuch to Chitor, opened on 10th March, 1881, ...	34½	
Chitor to Nusseerabad, opened on 1st December, 1881,	101	304½
Muttra-Achnera Railway, opened on the 7th November, 1881,	22½	

From this statement it will be seen that the main line of the Rajputana Railway (including the Agra Branch of 95 miles) has now a length of 674½ miles; that the Farukhnagar and Sambhar Salt Branches contribute 38½ miles more; that the newly connected arm of the System has added 304½ miles in the Sindia-Neemuch Railways from Nusseerabad to Indore, including the Ujjain Branch of 12½ miles; and 85½ miles in the Holkar State Railway from Indore to Khandwa (which under treaty with His Highness the Maharajah Holkar, has in all respects, and in matters of account in particular, to be treated as a separate undertaking).

Capital expenditure.—The Capital upon which the return of interest given by the working of the Rajputana Railway for the year 1881 has been calculated

is Rs. 5,48,00,000, being the approximate Capital expenditure up to the 31st December, 1881.

The total Capital expenditure on final heads upon the Rajputana Railway, including main line and branches, as open during 1881, amounted on the 31st March, 1882, to Rs. 5,29,55,396, or Rs. 63,956 per mile of Railway.

But this figure includes equipment of rolling stock and expenditure on central workshops, which will hereafter be divided over the whole System, and the effect of which will be shown in a subsequent paragraph.

Similarly the Capital expended upon the 168½ miles of the Sindia-Neemuch State Railway amounted on the 31st March, 1882, to Rs. 1,34,42,035, or Rs. 79,775 per mile of Railway. On 135¾ miles of the Neemuch-Nusseerabad State Railway it amounted to Rs. 63,92,917, or Rs. 47,093 per mile; and upon the 85¾ miles of the Holkar State Railway to Rs. 1,26,45,635, or Rs. 1,47,472 per mile.

The average Capital expenditure upon the whole mileage of the System thus amounts to Rs. 8,54,36,033, or to Rs. 76,504 per mile of Railway. Keeping separate the mileage and cost of the Holkar State Railway, the cost per mile of Railway amounts to—

	Capital cost on 31st March, 1882, per mile of Railway.
	Rs.
Rajputana, Neemuch-Nusseerabad and Sindia-Neemuch Railways,	70,602
Holkar State Railway,	1,47,472

In addition to this the following amounts stood at the debit of Suspense Accounts of each Railway on the 31st March, 1882:—

	Rs.
Rajputana Railway,	33,33,431
Neemuch-Nusseerabad State Railway,	2,36,297
Sindia-Neemuch State Railway,	11,74,298
Holkar State Railway,	1,537
Making a total of Rs.	47,45,563

During the year 1881-82 the further expenditure upon the Rajputana Railway on Capital account was principally incurred on the following works:—

Junction arrangements at Achnera; construction of additional staff quarters at Bandikui; quarters for officers, clerks, and running staff at Ajmere; locomotive arrangements, new carriage and wagon shops, and new erecting shops at Ajmere; goods trans-ship station, Sabarmati; strengthening of line in the Serohi district and in the Delhi-Bandikui sections by additional culverts and protective works; a well and a 70,000 gallon tank, and engine repairing shops at Bandikui, and also the general offices at Ajmere.

Besides these works the completion of numerous 'miscellaneous works on the Western Rajputana State Railway absorbed a large amount of Capital.

A sum of Rs. 3,71,629 was during the year expended upon additional engine stock, and a sum of Rs. 9,79,260 upon additional carriage and wagon stock, of which were added during the calendar year:—

- 43 Locomotive engines.
- 172 Coaching vehicles.
- 480 Goods vehicles.

An approximate Finance Account of Capital expenditure for 1881-82 will be found at page 91.

General Results of the Working of the Rajputana Railway during 1881.—During the year 1881 there were on the average 735.26 miles of line open and under working. 2,895,571 train miles were run, earning Rs. 72,42,247, and costing Rs. 43,75,205, or 64.12 per cent., leaving 35.88 per cent. of the earnings as net profits.

The earnings and expenses per train mile have been Rs. 2.46 and Rs. 1.51 respectively.

The return upon the Capital expended is 5.23 per cent. per annum.

Of the total earnings, coaching traffic contributed in round numbers 31 per cent., goods traffic 68 per cent., and telegraph and sundries 1 per cent.

In round figures, the maintenance of the line cost 12 per cent. of the total earnings, the locomotive and carriage departments 33 per cent., the traffic department 7 per cent., while general administration and sundry expenses cost 6 per cent.

The earnings and expenses for the past six years are shown in the following table:—

Year	Average miles open for traffic	EARNINGS.			EXPENSES		
		Gross	Per mile per annum	Per mile per week	Gross.	Per mile per annum	Per mile per week
1876, ...	392	23,29,582	5,940	114	15,28,622	3,886	74
1877, ..	396	20,96,682	6,809	130	18,33,367	4,629	89
1878, ...	428	29,72,602	6,942	135	18,42,130	4,303	82
1879, . .	434	35,45,420	8,261	158	23,66,243	5,454	105
1880, ...	467	37,23,719	7,974	153	24,90,414	5,333	103
1881, ...	736	72,42,247	9,840	189	43,75,206	5,944	114

ENGINEERING DEPARTMENT.

A decrease of establishment on the Western Rajputana District has been effected by the abolition of the Sujat Division.

The District forming the Sujat Division was broken at Bhimalaya, and the line between that station and Sabarmati, about 200 miles, was put in charge of the Abu Division. The remainder of the Sujat Division, about 100 miles, was made over to the Ajmere Division; increasing the length of that district to about 242 miles. The quantity and importance of the Capital work now being carried out at the head-quarters of the Railway has rendered it advisable to form a Construction Division at Ajmere; and this has accordingly been done. The Malwa Railway has been formed into two Executive Divisions; namely, the "Holkar Division" from Khandwa to Rutlam, including the Ujjain branch, 172 miles, and the "Neemuch Division" from Rutlam to Nusseerabad, 218 miles. This charge will be extended to Ajmere after the coming monsoon. The Holkar Division is made considerably the shortest on the System, in order to allow for closer supervision of the Mhow and Balwara Ghauts and of the heavily graded road between Khandwa and Barwaha.

Maintenance.—The road and works have as far as possible been kept in thoroughly efficient condition during the year, except during the rains over the new banks on the Western Rajputana District, upon which it was then not possible to keep a good road. On the 15th July the line was blocked by breaches on the Serohi District, and the Railway was put to great expense and inconvenience. The breaches were quickly repaired and the line restored for the passage of trains on the 24th July. Breaches also occurred on the Delhi district on the 21st July, but such was the promptitude and management of the Executive Engineer, that hardly any stoppage of regular traffic ensued.

The total cost of maintenance of the Rajputana line, excluding general superintendence, relaying Delhi-Rewari line and new minor works, has been Rs. 6,47,440,* or Rs. 69-1-4 per mile per month, including sidings, against Rs. 3,45,743, or Rs. 53-10-8 per mile per month for the preceding year.

* Taking into account the credits of Rs. 33,491 and Rs. 1,080.

The chief cause of this increase in mileage cost has been the extensive damage to the line in the Serohi District, but a part is due to the extra expense of maintaining a new road, some of which is laid on iron sleepers.

The behaviour of the permanent way material has on the whole been satisfactory. The iron rails are not wearing or giving way more than is to be expected, considering the increased weight of the engines and speed at which some of the trains are run.

Four steel rails snapped in the road soon after they were laid, but there is every reason to believe that these failed from some local defect in the temper of the particular rails. No sign of a flaw or defect in the structure of the metal was visible, and no steel rails have since given way from any cause. The wear of the steel rails is extremely slow, and as they do not laminate or have not yet shown any signs of failure in this manner, they escape the most fruitful cause of renewal in the ordinary iron rails.

It was found to be impossible during the rains, when the banks were soft, to keep even a tolerably good road over the iron sleepers. They are more difficult to pack, and they much more readily become unpacked than the wooden sleepers; and the difference on each side of Bhimalaya, where the timber and iron meet, was very manifest. During the dry weather, however, the iron behaved fairly. The road was never quite so good as the timber sleepers, and the difference would of course lead to more extensive renewals of rails and wear and tear of rolling stock.

The experience gained during the year upon the life of good deodar sleepers has been very satisfactory. The whole of the oldest district of the system, that from Delhi to Rewari, has been relaid with twenty kilo rails; and during the relaying the sleepers were found to be in much better condition than was expected. The lasting qualities of good deodar sleepers under a very heavy traffic, and exposed to unusually severe strain from being placed under 36 lbs. unfished rails, have proved much higher than was usually anticipated. Deodar sleepers compare most favourably with the half round creosoted pine sleepers which were imported. The latter are composed chiefly of sapwood and are rapidly going to pieces.

The iron work of the girder bridges has done justice to the opinions which were passed upon it when it was first received. It is of exceedingly good quality, and no iron structure, except the trestles of the Amanishah bridge, which were supplied directly by the contractors for the construction of the line, has required any special repairs.

A statement giving the cost of maintenance per mile for each division of the Rajputana Railway is appended, and a comparative statement of cost for this and the former five years is also given.

It is not to be expected that on a line such as this, which extends over so large a tract of country, the maintenance charges of the different districts will be equal. The rates of pay in the North-West Provinces and in Bengal generally are much lower than in the Bombay Presidency; and the climate, upon which the life of the more perishable material much depends, is very different at the northern and southern extremities of the line.

From the statement of cost of maintenance in each division will be seen at a glance the effect of the excessive rainfall between Beawar and Sabarmati; and to the heavy expense so caused is due in a great measure the serious increase in cost of maintenance during this year over the Rajputana Railway.

CONSTRUCTION WORKS.

The line has been relaid between Delhi and Rewari, and 41½ lb. steel substituted for the original 36 lb. iron rails. The Bandikui Division. The fencing of 13 miles of this district has been completed. The Railway bank near Khalilpur, between the 41st and 44th miles

from Delhi, has been raised and strengthened to prevent its being topped and carried away by the Sabi floods.

Quarters for the present use of the Rewari-Ferozepore staff, but which will eventually be occupied by the Station Master and Locomotive Foreman, are being constructed at Rewari. Thirteen new staff quarters, a mail agent's office and quarters, a siding with pit and watering arrangements for engines ready to go out and waiting for their trains, a carriage examiner's shed, and quarters for the cantonment sweepers, have been completed at Bandikui.

The purchase of the Jeypore bazar—long a nuisance to the Railway employes—has been effected, and a 70,000 gallon tank, a set of local engine-repairing shops, and additions to the school, are in progress.

Upon the Agra branch of this Division 4 miles of fencing have been erected, and the necessary gate lodges are being built.

The platelaying of the Achnera-Mutra Railway has been carried out, and the completion of all works on that line has been nearly effected. Junction arrangements at Achnera have been put in, and a turn-table for engines is in progress.

The Fort station building at Agra has been completed by the addition of the rooms for the postal department; and latrines on the narrow gauge side have been built.

Quarters for the staff at Ghosrana station have been constructed, and a new station in Ulwar territory has been interposed at Rampura.

Goods sheds have been constructed at Tilaunia and Kishengarh, quarters for the Station Master and staff have been built at Ladpura, and second water columns have been fixed at various stations. The bulk of the work, however, has been at Ajmere. There numerous quarters for officers, clerks, guards and drivers have been constructed; the locomotive arrangements at Ajmere station have been increased and improved; the masonry of the fine new erecting shops in the locomotive works has been finished; and the completion of the shops only awaits the arrival of the iron work which has been ordered from England.

An extension of the foundry has been carried out, entirely new carriage and wagon shops have been commenced, and the general offices of the Railway are about half finished. The progress upon the general offices has not been so good as could be desired. A quantity of the work is of white marble, which is found in large quantities in the neighbourhood of Ajmere; and want of experience in this stone has caused an under estimate of the cost of working and consequent loss of time. The supply of flooring and of roofing slabs has also been deficient. It was intended to draw largely upon the Bankri quarries in the Jeypore State, and arrangements were made accordingly for a satisfactory supply from quarries which had been made over by the State and had in fact been opened by the Railway. However, the Durbar held that no stone should be taken beyond the limits of Jeypore, and it became necessary, at a great loss of time, to search for quarries from which reliable slabs could be procured.

Upon the Western Section of this Division a new goods yard was constructed at Beawar and the shed lifted over to the new position; the Luni bridge was completed and opened, and sundry works of minor importance were carried out.

Upon this Division the Balaram, Chandawal and Mawal bridges were completed and opened for traffic; an entirely new goods trans-ship station has been constructed and is in use at Sabarmati, and a large quantity of earthwork pitching and completion work of the line, especially upon the Serohi district, has been carried out. A number of additional culverts, where the line was washed away last year, have been sanctioned and put in hand; and all protective works which will probably be required to render the line secure, have been undertaken.

Abu Division.

LOCOMOTIVE DEPARTMENT.

The locomotive stock on the Rajputana-Malwa Railway on the 31st March, 1882, was as shown in the subjoined statement :—

Particulars.	A.		B.		C.		D.		E.				F.		M.	N.	Black Hawthorn and Co. Narora Engine	Double Fairlie Engines.	Total.
	Dubs and Co.	R. W. Hawthorn and Co.	Dubs and Co.	Nasmyth and Co.	Nasmyth and Co.	Sharp, Stewart and Co.	Sharp, Stewart and Co.	Neilson and Co.	Vulcan Foundry.	Dubs and Co.	Dubs and Co.	Yorkshire Engine Co.	Neilson and Co.	Dubs and Co.	Avonside Engine Co.				
Total stock on line on 1st April, 1881,	18	5	14	12	12	1	9	17	18	22	21	6	22	20	..	1	..	198	
Additions during the year,	2	..	1	2	8	..	..	..	..	..	15	20	12	15	3	..	1	79
Total, ..	20	5	15	14	20	1	9	17	18	22	36	26	34	35	3	1	1	277	
Reductions during the year,	5	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	6
Total on line on 31st March, 1882,	15	5	15	13	20	1	9	17	18	22	36	26	34	35	3	1	1	271	

The additional stock was received during the year from the sources shown below :—

Makers.	Class.	No of engines received	Date of receipt	Source of receipt.
Dubs and Co.,	A.	2	1st January, 1882	H. & S.-N. S. R. on amalgamation.
Nasmyth and Co.,	B.	2	"	
"	C.	8	"	H. & S.-N. S. R. on amalgamation.
Dubs and Co.,	F.	12	"	
"	F.	3	February 1882	N. & C.-S. Railway.
Neilson and Co.,	F.	3	"	H. & S.-N. S. R. on amalgamation.
"	F.	9	1st January, 1882	
Yorkshire Engine Co.,	F.	20	"	England <i>vid</i> Bombay.
Dubs and Co.,	M.	9	April 1881	
"	M.	6	May 1881	"
Avonside Engine Co.,	N.	2	October 1881	"
"	N.	1	December 1881	"
Double Fairlie Engines, .. ..	..	1	1st January, 1882	H. & S.-N. S. R. on amalgamation.
Total, ..		78		

The following statement shows transfer of locomotive stock during the official year :—

Makers.	Class.	Number transferred.	Date of transfer.	Line transferred to.
Dubs and Co,	A.	1	January 1882	} Southern Mahratta State Railway.
"	"	1	February "	
"	"	3	March "	

The following engines were taken out of running for heavy boiler repairs during the year 1881 :—

ENGINE.		Makers.	ENGINE.		Makers.	
No.	Class.		No.	Class.		
3	A	Dubs and Co,	17	A	} Dubs and Co.	
4	"	"	91	B		
5	"	"	104	"		
8	"	"	35	"	} Nasmyth and Co.	
16	"	"	54	"		
27	B	Nasmyth and Co.,	209	E	} Vulcan Foundry.	
73	C	"	211	"		
77	"	} Nasmyth and Co.,	232	"	} Dubs and Co.	
85	"		"	237		"
63	E	} Sharp, Stewart and Co.,	243	"		
65	"		"	247		"
127	"	"	250	"		
133	"	"	107	F		
134	"	} Neilson and Co.,	119	"		
140	"		"	123		"
141	"		"	125		"
161	"	"	193	"		} Yorkshire Engine Co.
162	"	"	198	"		
202	"	} Vulcan Foundry,	282	"	} Neilson and Co.	
204	"		"	411		M.
207	"		"			} Dubs and Co.

The following statement shows the total number of locomotive engines repaired during the year 1881, and undergoing repairs on 31st December, 1881, in the Ajmere Central Workshops :—

Particulars.	ENGINES.										Remarks.	
	A.	B.	C.	D.	E.	F.	M.	N.	Narora Engine	Double Fairlie		Total.
In hand on 1st January, 1881, ..	6	5	4	..	14	4	..	..	..	..	33	
Receipts during the year, ..	9	9	5	..	21	6	1	..	..	..	51	
Total, ..	15	14	9	..	35	10	1	..	..	..	84	
Repaired during the year, ..	8	7	6	..	18	8	..	..	..	..	47	
In hand on 31st December, 1881,	7	7	3	..	17	2	1	..	..	..	37	

Comparison between six (calendar) years' expenditure.

Years.	1876.	1877.	1878.	1879.	1880.	1881.
Train miles,	762,835	892,404	1,038,318	1,529,073	1,433,404	2,895,571
Vehicle miles,	16,118,866	19,859,961	21,592,420	23,466,356	32,334,862	57,705,362
Total Locomotive Expenses Rs., }	5,32,364.68	7,03,377.95	7,51,495.34	10,88,145.16	12,04,309.04	21,28,853.27
<i>Expenses per train mile.</i>	As.	As.	As.	As.	As.	As.
1. Running expenses, ..	3.06	3.39	3.05	2.70	3.02	2.39
2. Fuel,	4.95	5.32	4.88	4.83	5.66	4.65
3. Water,	0.26	0.201	.19	.16	.24	.22
4. Oiling, &c., ..	0.47	0.52	.50	.61	.43	.31
5. Maintenance and renewals, ..	1.39	1.94	1.71	1.97	2.82	2.27
Total Locomotive Department Expenses, }	11.16	12.61	11.57	11.38	13.44	11.76

Explanation of Comparison.

1. *Running expenses.*—The cost per train mile is lower than in any previous year.

2. *Fuel.*—This item shows a considerable reduction in consumption with last year, and is lower than in any previous year.

3. *Water.*—Shows about the same; but when the temporary arrangements are superseded by permanent ones, a reduction may be looked for in subsequent years.

4. *Oiling, &c.*—This item shows a considerable reduction. Emulation has been incited among the enginemen by the monthly circulation of the results of their working.

5. *Maintenance and renewals.*—The expenditure under this head compares favorably with 1880. Larger reductions may be looked for in subsequent years. The figures appear high in comparison with previous years (1876-79), but this is owing to want of shop accommodation for heavy repairs in these years.

Total Locomotive Expenses.—Compare favorably with previous years, considering the amount of heavy repairs which had to be carried out on account of bad boilers and a legacy of previous years.

The total number of engines repaired and turned out of the central shops during 1880 was 32; while that of those repaired and turned out during 1881 was 47.

LOCOMOTIVE SHOPS.

The workshops have overhauled the arrears of work: engines are admitted as necessity requires, and they now do their work with few failures on the road. With the longer line and longer runs the running expenses per train mile have become lower; the consumption and cost of fuel and oil have also been brought to a reasonable figure, and the cost per train mile of maintenance and renewals of engines show signs of gradual reduction from the very high figure to which the exceptional repairs of 1880 had raised it.

It will be observed however that while the train mileage run has been 2,895,571 miles in 1881 against 1,433,404 miles in 1880, the number of engines repaired in 1881 was 47 against 32 in 1880; and judged by this the train mileage cost is not a very accurate measure of the relative cost of repairs. But the larger train mileage involves a very large increase of running shed repairs, and statements of the cost per engine of heavy repairs to engines in the central workshops give evidence of satisfactory progress towards cheaper work.

The paragraphs of the Locomotive Superintendent's report dealing with the improvements in the interior economy of the central workshops will be perused with much interest, and the suggestions made for alterations in the plant either have had or will have early attention. Most of them have already been attended to, but there have been unexpected delays in the provision of the water service.

The provision of a better spring testing-machine and the improvement of the blast service for the smithy and cupolas are the chief items that have not yet been taken in hand.

The gradual introduction of piece-work has received prominent though not undue mention in the report, and the general result of the better arrangements has been stated to me in this way—

In former years one rupee's worth of material took two rupees' worth of labour; while now one rupee's worth of labour suffices to turn out the same value of material.

Schools for Apprentices.—During the year, a commencement has been made in the matter of providing night-schools and technical schools for the instruction

of the apprentices. The attendance by apprentices already in the shops was not made compulsory, and there are some complaints of want of appreciation of the privilege of free attendance at the night schools. But for all apprentices joining the shops in future, the attendance at the night school is to be compulsory, until satisfactory progress has been attained.

The drawing class promises to be most useful both to Government and to the pupils.

It is hoped that during the year the proposed classes for instruction of the apprentices in elementary mechanics and mensuration may be opened.

Trip System of Overtime.—Under the orders of Government the system was introduced from January 1881 of paying for overtime worked by drivers by the trip instead of by the extra hours worked. The details were arranged on the best available basis, taking the average time occupied on each trip as a guide.

Owing to a misapprehension of the intention of one of the rules the payments of overtime were made for some time in a far too liberal way; but it was thought better not to upset this interpretation too hurriedly, and after reference to Government the rule was revised so as to leave no room for doubt as to the intention, and the revised rule with some subsidiary rules was introduced with the year 1882.

Native Drivers.—No special measures have been taken to obtain from other Railways more native drivers. Those who have been trained on the line and are now employed on it are doing well, and every encouragement is given to promising men.

CARRIAGE AND WAGON DEPARTMENT.

The expenditure of the department has naturally increased with the large increase of stock and of vehicle mileage, but measured either by train mileage, or by 1,000 vehicle miles run by home vehicles, it is less than it has been in any previous year.

The workshops continue fully employed in the construction of new stock and in the repairs of the existing stock, and the quality of the work continues to be as high as before.

During the past year much attention has been devoted to the provision of an improved arrangement for coupling together the central buffers with which the stock is fitted. After trial of many ingenious improved buffing and coupling inventions of Mr. W. R. S. Jones, it was determined to apply the most suitable of these to the carriages running on the mail trains between Delhi and Ahmedabad; and over 100 coaching vehicles were fitted up for this purpose during the year. A still higher development of the same style of gear was fitted to the Viceregal train, and was found a success.

Further improvements have since been devised, and these will no doubt be again improved upon, until eventually a definite opinion can be formed whether it is better to keep to the central buff and draw gear, or to adopt the double buffer with central draw gear, which latter arrangement has many advantages, particularly for fast passenger trains.

Meantime the increased comfort of the tight-coupled trains is immense, and there can be no doubt of the ultimate economy of an arrangement which prevents or greatly modifies the numerous petty shocks that destroy the rolling stock.

In other respects the alterations during the year have not been numerous or extensive, but many improvements have been suggested, and one of the most important of these has been adopted, viz., the increase of the diameter of the wheel, which is expected to give easier haulage, and to provide room for stronger axles and with these, larger loads.

TRAFFIC DEPARTMENT.

The new trade route opened up by the completion of the Rajputana Railway was not immediately adopted, and the traffic for the first two months of 1881 was below expectations. The busier season of March brought some improvement, but at the end of this month the troubles began at the Western Junction, which culminated in orders for the revision of the arrangements and the construction of a new and adequate trans-shipment station at Sabarmati.

The new trans-ship platforms were completed by December 1881, and they have been used since January 1882, hitherto without any of those difficulties which during last year gave rise to so much trouble.

In the second quarter of 1881 the traffic was moderate, and in July and August it was very low—so low that in the two months the earnings barely covered the working expenses.

With the cessation of the heavy rains, and under the influence of the special monsoon rates for grain from Delhi and Agra to Bombay, the earnings of September improved considerably; while from October the earlier commencement of the salt traffic and the extensive development of traffic in sugar from Bengal and the North-Western Provinces towards Guzerat and Kattiawar, maintained this improvement to the end of the year.

With the exception of a few days when the line was breached in July, the through mail service was maintained with satisfactory punctuality, the performance of the new mail engines having proved satisfactory.

During 1881 an endeavour was made to introduce special rates for grain and similar staples during the monsoon months, when from want of feeder roads and many other causes, the staff and the stock are comparatively idle, and when traffic can therefore be advantageously carried at rates which are inadmissible in ordinary times.

The following tables show the general results in comparison with those of previous years:—

Table of Gross results.

Half-year.	Total Train Mileage	Gross Earnings.	Average Receipt per train mile.	Total Traffic expenses.	Traffic Expenses per train mile.
	Miles.	Rs.	Rs.	Rs.	Annas.
1st half of 1879, ..	769,191	21,72,257	2·82	1,63,633	3 40
2nd „ 1879, ..	702,780	13,73,164	1·95	1,73,948	3·96
1st „ 1880, ..	823,592	21,64,763	2·63	1,84,581	3·59
2nd „ 1880, ..	531,031	15,58,956	2·94	1,65,535	4·99
1st „ 1881, ..	1,421,382	37,19,156	2·47	2,64,519	2·98
2nd „ 1881, ..	1,474,189	35,23,091	2·30	2,97,389	3 24

Table of Coaching results.

Half-year.	Number of Passengers.	Earnings from Passengers.	Average 3rd Class Mileage	3rd Class Vehicle Mileage.	Average contents of 3rd Class Vehicles
	No	Rs.	Miles.	Miles.	
1st half of 1879, ..	802,775	5,10,136	58·10	3,133,130	14·72
2nd „ 1879, ..	672,440	3,73,772	51·29	2,871,542	11·83
1st „ 1880, ..	1,074,921	5,12,783	43·82	3,106,481	14·88
2nd „ 1880, ..	969,911	4,79,821	46·00	2,662,596	16·44
1st „ 1881, ..	1,415,726	9,43,160	57·59	5,429,268	16·97
2nd „ 1881, ..	1,541,582	10,53,136	58·32	6,295,156	15·17

Table of Merchandise results.

Half-year.	Tons carried	Earnings.	Average distance carried,	GOODS VEHICLE MILEAGE.		AVERAGE CONTENTS OF WAGONS.	
				Loaded.	Empty.	Loaded.	Loaded and Empty
				Miles.	Miles.	Tons.	Tons.
1st half of 1879, ..	165,417	15,72,844	159.94	6,995,732	1,544,704	..	3.24
2nd „ 1879, ..	119,252	9,70,733	129.25	5,432,606	2,251,634	..	2.28
1st „ 1880, ..	175,231	15,62,198	155.59	7,503,134	2,968,989	..	2.66
2nd „ 1880, ..	122,888	10,06,917	143.40	5,037,725	2,086,543	..	2.73
1st „ 1881, ..	285,485	26,18,099	192.74	12,966,133	4,975,753	4.24	3.07
2nd „ 1881, ..	300,915	22,80,762	174.31	14,598,610	5,261,553	3.60	2.64

The average mean mileage worked in the year 1880 was 465.70 miles.

The mean mileage worked in the year 1881 was 736.92 miles.

The mileage worked in December 1881 was 829.37 miles.

The mileage now worked since 1st January, 1882, is 1,139½ miles, including the Muttra branch.

The number of stations worked was in 1880, 59; in 1881, 88; in December 1881, 99; since the 1st January, 1882, 145.

The number of passengers of the different classes that were booked during the two years 1880 and 1881, and the earnings from each class are shown in the following table:—

Earnings and numbers of the three Classes of Passengers compared with 1880 and 1881

	1ST CLASS PASSENGERS.		2ND CLASS PASSENGERS.		3RD CLASS MIXED PASSENGERS.	
	No	Amount.	No.	Amount	No	Amount.
1st half of 1880, ..	3,847½	10,101 10 0	16,220½	14,737 10 6	1,054,853½	4,87,944 1 2
2nd „ 1880, ..	3,429	8,113 9 0	14,603	14,687 8 3	951,879½	4,57,019 7 8
Total, ..	7,276½	18,215 3 0	30,823½	29,425 2 9	2,006,733	9,44,963 8 10
1st half of 1881, ..	5,568	34,058 9 9	16,481½	41,274 10 0	1,315,301	7,88,065 15 9
2nd „ 1881, ..	6,203½	44,658 0 1	15,997½	44,468 14 1	1,451,055½	8,81,481 13 1
Total, ..	11,771½	78,716 9 10	32,479	85,743 8 1	2,766,356½	16,69,547 12 10
Increase, ..	4,495	60,501 6 10	1,655½	56,318 5 4	759,623½	7,24,584 4 0

It will be seen from this table to what extent the earnings from 1st and 2nd class passenger traffic have increased in consequence of the longer distance travelled by through passengers travelling between the North-West and Bombay since the opening through of the line between Delhi and Ahmedabad.

Increases in goods traffic—

The chief increases in goods traffic during the year 1881 were as follows:—

Cotton.—11,920 tons, chiefly due to the export of North-Western Provinces' cotton *via* the Rajputana route to Bombay.

Grains.—23,666 tons, of which 15,473 tons were carried at the special reduced rate which was in force between the middle of August and the end of October.

Salt.—14,987 tons, which is due to the increase of production of the Sambhar Lake.

Seeds—22,090 tons, mostly exported from Guzerat to Bombay in the first half of the year

Sugar.—11,915 tons ; this is partly due to the extension of the line, and partly to the demand in Guzerat for sugar from the Bengal Presidency.

Hides and Skins.—347 tons.

The average traffic receipts of the line per mile open per week have been in the first quarter of 1881 Rs. 192, in the first half of 1881 Rs. 197, in the second half of 1881 Rs. 182. It is estimated that for the first quarter of 1882 the traffic receipts per mile per week will average about Rs. 224.

The increase of goods traffic in the first half of 1881 was not as great as might have been expected from the establishment of through connection between Ahmedabad and Delhi. This was partly due to the fact that the new route was to a certain extent discredited by the delays and irregularities which took their rise in the management of Sabarmati Junction. There is every reason to believe that the service of the line is now rising in public estimation.

Rates.—Under the orders of the Government of India the station to station rates which had been in force since the first opening of the line were done away with from the 1st January, 1881, and mileage rates introduced instead.

Coaching Rates.—The old coaching rates were 1st class, annas 8 per station distance ; 2nd class, annas 4 ; and 3rd class, annas 1-6 per station distance.

For these were substituted the following mileage rates :—

1st class,	...	...	...	...	...	12 pies per mile.
2nd „	...	...	...	...	...	8 „ „
3rd „	...	...	...	...	...	2 „ „

A special rate of 4 pies per mile for 3rd class passengers per mail train was also introduced.

As regards 3rd class passengers by ordinary train the change was very slight, as the average distance of stations apart is about 9 miles.

The increase to the 2nd class fare was about $2\frac{1}{2}$ pies per mile, and to the 1st class about $1\frac{1}{3}$ pies per mile.

From the 1st May, as it was found that in consequence of the special rate of 4 pies per mile for 3rd class passengers by mail train the 3rd class carriages on the mail trains were very little used, the following special rates were introduced as an experiment :—

	Rs.	A.	P.
Delhi to Rewari, and Rewari to Delhi,	0	12	0
Delhi to Ulwar, and Ulwar to Delhi,	1	8	0
Delhi to Jeypore, and Jeypore to Delhi,	2	8	0
Delhi to Ajmere, and Ajmere to Delhi,	3	8	0
Delhi to Ahmedabad, and Ahmedabad to Delhi,	7	8	0
Agra Fort to Jeypore, and Jeypore to Agra Fort,	2	4	0
Agra Fort to Ajmere, and Ajmere to Agra Fort,	3	4	0
Agra Fort to Ahmedabad, and Ahmedabad to Agra Fort,	7	4	0
Jeypore to Ajmere, and Ajmere to Jeypore,	1	4	0
Jeypore to Nusseerabad, and Nusseerabad to Jeypore,	1	6	0
Jeypore to Ahmedabad, and Ahmedabad to Jeypore,	5	4	0
Ajmere to Ahmedabad, and Ahmedabad to Ajmere,	4	0	0
Abu Road to Ahmedabad, and Ahmedabad to Abu Road,	1	12	0

From the 1st of January, 1882, the passenger fares were again changed ; the 1st and 2nd class fares were raised to the same rates as prevail on the East Indian Railway. 1st class tickets being charged at 18 pies per mile, and 2nd class at 9 pies per mile. An intermediate class was also introduced at 3 pies per mile.

The fares for 3rd class passengers per mail train were regulated on the following scale :—

For the first 100 miles the charge was $2\frac{2}{3}$ pies per mile, for the second 100 miles $2\frac{1}{2}$ pies per mile, for the next 200 miles $2\frac{1}{3}$ pies per mile, for distances over 400 miles 2 pies per mile.

The ordinary 3rd class fare by mixed train was maintained at 2 pies per mile.

The following table will show the earnings from mail 3rd class passengers, week by week, from the 2nd October, 1881, to the 18th February, 1882.

Last Quarter of 1881.	Amount.	First Quarter of 1882.	Amount.
	Rs. A. P.		Rs. A. P.
Week ending 8th October, 1881, ..	3,116 3 9	Week ending 7th January, 1882, ..	7,373 9 9
" 15th " ..	3,078 3 6	" 14th " ..	5,079 12 6
" 22nd " ..	2,803 10 9	" 21st " ..	4,054 2 6
" 29th " ..	2,612 3 3	" 28th " ..	5,290 13 6
" 5th November, 1881,	4,833 12 0	" 4th February, 1882,	4,785 5 0
" 12th " ..	4,581 10 3	" 11th " ..	3,697 13 3
" 19th " ..	3,839 5 6	" 18th " ..	4,297 12 9
" 26th " ..	3,601 12 3		
" 3rd December, 1881,	4,008 7 0		
" 10th " ..	3,636 8 3		
" 17th " ..	3,101 2 9		
" 24th " ..	3,009 1 3		
" 31st " ..	3,080 13 0		
Supplementary,	3 15 9		
Total,	45,306 13 3	Total,	34,579 5 3

There is very sensible increase in the traffic in the weeks of the current year, but it would not be safe to attribute this entirely to the alteration that has been made in the fares.

Through booking of coaching traffic with foreign lines was arranged to the following extent from the 1st May, 1881, between the principal stations on this Railway and those on the Sind, Punjab and Delhi, the East Indian, and the Bombay, Baroda and Central India Railways; with the Sind, Punjab and Delhi Railway through booking extended to 1st, 2nd and 3rd class passengers, by mail train, passengers' luggage, horses, carriages, dogs and specie. With the East Indian Railway the arrangement was confined to 1st and 2nd class passengers, their servants, luggage, and dogs. With the Bombay, Baroda and Central India Railway it was confined to 1st and 2nd class passengers, their luggage, horses, carriages, dogs and specie.

From the 1st of February, 1882, through booking of all classes of passengers has been established between all stations of this system, and the Great Indian Peninsula, the Sind, Punjab and Delhi, and the Bombay, Baroda and Central India Railways.

The through booking arrangements with the East Indian Railway remain as before, except that carriages can now be booked through. The want of through booking of horses remains a source of great annoyance to the residents of Rajputana, and the subject continues to be pressed on the authorities of the East Indian Railway.

Goods Rates.—For goods also, the station to station rates were abandoned from the 1st January, 1881, and the following mileage rates introduced instead:—

1st class goods,	4 pie per maund per mile.
2nd " "	6 " " "
3rd " "	8 " " "
4th " "	10 " " "
5th " "	12 " " "

The classification of goods in force on the East Indian Railway was adopted at the same time for all goods charged at the regular class rates.

The special low rates of the East Indian Railway were not adopted. It was, however, found desirable in the course of the year to make the following special quotations :—

From the 15th April, 1881, grain and seeds in consignments of 270 maunds and over were charged as follows :—

For the first 100 miles, .4 pie per maund per mile, for the next 350 miles, .2 pie per maund per mile, for distances over 450 miles .15 pie per maund per mile.

This sliding scale was, as regards the distances, adopted from the practice on the East Indian Railway.

At the beginning of June it was notified that grain and common seeds at owner's risk would be carried distances over 400 miles, at the rate of .2 pie per maund per mile. This rate, however, was never actually brought into force in consequence of the subsequent quotation of a lower monsoon rate. From the 18th August to the 31st October a special rate of 12 annas per maund was quoted from Delhi and Agra to Bombay. This was divisible in mileage proportion between the Bombay, Baroda and Central India and this Railway, and the respective shares of the two Railways were 4 annas and 3 pies and 7 annas and 9 pies.

Since the 1st November the rate for grain and seeds from Delhi and Agra to Sabarmati has been fixed at 10 annas per maund; the Bombay, Baroda and Central India Railway charging 5 annas and 5 pies per maund from Sabarmati to Bombay.

Since the 1st February, 1882, the general rate for grain and seeds has been modified by the introduction of a sliding scale differing from that which was adopted from the 15th April, 1881.

Grain and Seeds are now carried over the System at the special class A rate, explained further on.

Sugar.—From the 15th April, 1881, a special rate of .33 pie per maund per mile was quoted for sugar carried over 400 miles.

From the 1st July the same rate was applied to *Jagree* in consignments of 10 tons and over.

From 1st February, 1882, sugar has been charged at special class C rate, explained further on.

Salt.—From the 1st January, 1881, salt from the Sambhar Lake to Agra and Delhi was charged at .33 pie per maund per mile.

The same mileage rate was adopted later on for Pachbadra Salt booked from Erinpura Road and Bitura to and *via* Agra.

Since 1st February salt has been carried over the whole System at the special class A rate, already referred to.

Coal.—From the 1st January, 1881, a .25 pie per maund rate was quoted for coal in consignments of 10 tons and over for distances in excess of 150 miles.

From February 1882 coal is being charged at special class B rate.

Stone.—Stone is also being charged at special class B rate from February 1882.

Hides and Skins.—A .3 pie per maund per mile rate was charged from 1st August, 1881, for consignments of hides pressed to not less than 3 cubic feet per maund.

Pressed hides and skins in consignments of 270 maunds and over are charged at special class A rate from 1st February, 1882.

Oil Cake.—From the 1st November, 1881, the '3 pie per maund per mile rate was brought into force for oil cake; this rate has since been altered to special class A rate from the 1st February, 1882.

Saltpetre.—The grain rate brought into force on the 15th April, 1881, was adopted for saltpetre from 1st November, 1881.

Saltpetre is now being carried at the special class A rate.

The special rates A, B, and C, referred to above, which were introduced from the 1st February, 1882, with the view of simplifying the special rates, are as follow :—

			First 100 Miles.	Next 200 Miles	Further distances over 300 Miles
			Pie per maund per mile	Pie per maund per mile.	Pie per maund per mile.
Class A,	..	..	0·4	0 25	0·15
Class B,	..	..	0·3	0 2	0·15
Class C,	..	..	0·4	0·4	0·25

In addition to the grain rate referred to above, the following special quotations for traffic were made between Delhi and Agra and Bombay.

From the 1st April the piece-goods rates were reduced in consequence of special low rates having been quoted by the Great Indian Peninsula Railway between Bombay and Jubbulpore.

The piece-goods rates were again raised between Agra and Bombay about 7½, and between Delhi and Bombay about 15 per cent. from the 1st January, 1882: it having been agreed with the East Indian Railway that any effort to compete for the traffic by the Jubbulpore route would be abandoned.

From the 1st November, 1881, reduced rates have been charged for all classes of goods between Bombay and Delhi and Bombay and Agra, with the object of diminishing the difference of cost of carriage to Agra and Delhi between the Rajputana-Malwa Railway route from Bombay and the East Indian Railway route from Howrah.

The Rajputana-Malwa Railway had been at a certain disadvantage in consequence of their class rates being higher than those of the East Indian Railway.

Alterations in Time Bills.—Up to the end of 1880 there were two through trains running, which carried passengers of all descriptions.

From the 1st January, 1881, it was arranged to distinguish one of the through trains as the mail, run it at a slightly higher speed and charge 3rd class passengers by it the higher rate of 4 pies.

The mail train was timed at about 17 miles an hour.

From the 1st May the mail service was re-organised with the object of meeting the requirements of the postal department, and the speed was increased to between 20 and 21 miles an hour between stations.

The departure of the down mail was made later from Ahmedabad, and the arrival of the up train at Ahmedabad earlier, so as to admit of trains leaving Bombay later and arriving at Bombay earlier than before.

Similar arrangements were made with the Sind, Punjab and Delhi trains at Delhi, with an interval of about one hour between the mail trains of the two Systems.

From the 1st July, it being considered by the Engineering Department unsafe during the monsoons to run trains at night over the new portion of the line between Sujat and Pahlapur, the through mixed train was altered between Ajmere and Ahmedabad so as to run over the portion of the line in question by daylight.

At the close of the monsoons the old timing of the mixed train was reverted to from the 1st October.

From the 1st December, 1881, the line between Nusseerabad and Neemuch was opened for passenger traffic; and one train was run each way daily, leaving Ajmere in the morning and getting into Neemuch in the evening, and leaving Neemuch in the morning and getting into Ajmere in the evening.

These trains ran in connection with the mail trains of the Holkar and Sindia-Neemuch State Railways.

From the 1st January, 1882, when the amalgamation of the Rajputana-Malwa and Holkar and Sindia-Neemuch State Railways took place, there was no alteration in the bill; the trains on the Holkar State Railway continuing to run to the old timing.

From the 1st March the service on the Holkar State Railway was again changed. Two trains were run between Khandwa and Ajmere in each direction, and a new local train was introduced between Khandwa and Fatehabad.

As it was found that the higher fare for 3rd class tickets by mail train had the effect of very much crowding the through mixed trains, and as in consequence passengers were very frequently left behind for want of room, it was decided from the 1st June, 1881, to introduce local passenger services between Delhi and Agra and Ajmere. These local mixed trains were selected from the goods trains which were arranged to run daily, and a certain number of 3rd class carriages only were attached to them.

These local trains were found to be a great relief and appear to have been appreciated, as they have been, as far as possible, chosen to save passengers from exposure according to the seasons of the year.

Traffic Expenses.—The following are the chief increases and decreases in traffic expenses during the year as compared with the previous year :—

A.

Increase.	Amount.	Decrease.	Amount.
	Rs. A. P.		Rs. A. P.
Office establishment, ...	7,241 0 0	General superintendence, ...	1,382 0 0
Travelling allowance, ...	409 0 0	Contingencies, ...	262 0 0

B.

Increase.	Amount.	Decrease.
	Rs. A. P.	
Station Masters, &c., ...	38,444 0 0	

C.

Increase.	Amount.	Decrease.	Amount.
	Rs.		Rs.
<i>Train Staff.</i>		Wagon covers, &c., ...	5,354
Guards, assistant guards, &c., ...	14,485	Printing and stationery charges, ...	3,408
Overtime allowance, ...	6,201	Miscellaneous expenses, ...	473
Fuel, lights, &c., ...	11,244		
Office furniture, &c., ...	4,992		
Clothing, ...	1,187		
Payment to other railways, ...	20,145		
Carriage of Revenue stores, ...	3,456		

The increase under the heads of "travelling allowance," "station and trains staff" and "clothing" is due to the increased length of line worked.

The increase under the head of "office establishment" is chiefly due to the formation of the new District office at Sabarmati, and to the necessity which was felt for the strengthening of the offices of all the District Traffic Superintendents.

The increase under the head of "fuel, lights, &c.," was caused partly by the opening of the new line between Sujat and Pahlapur, and partly to the very heavy repairs which had to be effected to roof lamps during the year.

The increase under the head of "office furniture" is due to the additional supplies of furniture to the Head and District offices, and for renewals and repairs.

The joint expenses which have been incurred at Delhi, Sabarmati and Ahmedabad account for the increase in payments to other lines.

As regards the "carriage of revenue stores," the system of charging freight on these was introduced only from the 1st of January, 1881.

The decrease under the head of "general superintendence" is chiefly due to the fact that in the year 1880 the salary of the Traffic Superintendent on leave was charged against the line in addition to the pay of the Officiating Traffic Superintendent.

The saving in "wagon covers" was due to the fact that no tarpaulins were supplied in the year 1881.

The saving in "printing and stationery" charges was caused by the ticket printing machines, which had previously been charged against Revenue, being debited against Capital.

Administration.—At the close of the year 1880 the line was divided into two Traffic Districts: the first, the Bandikui District, extending from Delhi to Agra and including Bandikui; and the second, the Ajmere District, extending from Arnau to Sujat. When the line was opened through to Ahmedabad on the 1st January, 1881, a new district—the Ahmedabad district—was opened, including the line from Pindwara to Ahmedabad; and the Ajmere district was extended from Sujat to Nana.

The above three districts have since been altered as follows:—

The line from Nana to Sujat including Sujat was transferred to the Ahmedabad, or as it is now called the Sabarmati District, from the 20th September, 1881: The line from Arnau to Asalpur was transferred to the Bandikui District from the 20th February, 1882; the line from Phalera to Kachawan Road, including Phalera, was transferred to the Bandikui District from the 8th May, 1882.

In December the new line between Nusseerabad and Chitor, *i.e.*, the stations from Bandanwara to Chindaria inclusive, were added to the Ajmere district. The Ajmere district was subsequently, since the 1st January, 1882, extended as far as Kesarpura.

The following statement shows the inferior establishment which was employed on the 31st December, 1880, the 31st December, 1881, and on the 31st March, 1882:—

	31st December, 1880.	31st December, 1881.	31st March, 1882
Station Masters, clerks, inspectors, &c.,	35	33	49
{ Classes D to G, ...			
{ Classes A to C, including probationers, ...	338	589	788
Guards, ...	110	149	225
Menials, ...	626	907	1,469

MEDICAL DEPARTMENT.

The health of the staff has been on the whole good. The only epidemic diseases that broke out were small-pox, measles, and cholera, of which there were 15, 20, and 4 cases respectively. Cholera made its appearance at Ajmere on the 27th August, but all traces of it had disappeared on the 11th September.

Out of the subordinate medical staff, one European Apothecary reverted to Military duty, and one was dismissed during the year.

On the amalgamation of the Rajputana and Malwa Sections, it was proposed in personal communication with the Surgeon General with the Government of India, that the following arrangements should come into force for the medical supervision of the whole System:—

- (1). That the medical charge of the whole System be vested in the Medical Officer Rajputana-Malwa Railway.
- (2). That, with the exception of the allowance paid to the Residency Surgeon, Indore, the allowances hitherto paid to the Staff and Civil Surgeons by the several lines now constituting this Railway System be continued, viz:—

The Agency Surgeon, Ulwar,	...	...	Rs. 100
„ Civil Surgeon, Nimar,	...	...	„ 50
„ Staff Surgeon, Mhow,	...	...	„ 100
„ „ „ Neemuch,	...	...	„ 50

- (3). That any subordinate establishment employed exclusively upon the work of the late Holkar and Sindia-Neemuch State Railways be transferred to the administrative control of the Superintendent General of Dispensaries and Vaccination, Rajputana.

By the arrangement described it is intended that the Medical Officer of the Rajputana-Malwa Railway should exercise direct supervision of all the dispensaries, and be responsible for the supply of all medicines, instruments, &c., and that the position a Civil Medical Officer or Military Medical Officer subsidized by the Railway will hold, will be that of a Consulting Medical Officer, who will visit Railway Dispensaries periodically, and render advice and assistance in cases arising within his Railway district, and who will be referred to by the Medical subordinate in charge of the Railway Dispensary in cases of difficulty.

These arrangements have received the sanction of the Government of India.

STORES DEPARTMENT.

The Chief Storekeeper's offices have been transferred to Ajmere and are already in occupation of a portion of the new general offices.

A new central store-yard is under construction between the new carriage and wagon and the present central shops. The difficulty experienced at Sabar-mati in the want of a commodious store-yard is under consideration.

POLICE DEPARTMENT.

During the year the Police duties were divided between the Police Superintendents, Jeypore and Ahmedabad. The jurisdiction of the former, extending during the whole year from Agra and Delhi to Abu Road and Nusseerabad, and the latter from Ahmedabad to Abu Road, but not including that station.

The sections of line from Nusseerabad to Kesar-pura and Achnera to Muttra were added to the charge of the Police Superintendent, Jeypore, during the year.

The Police Superintendent's report shows that there were numerous robberies and outrages committed by outlaws, chiefly by Bheels, on the line between Sujat and Abu Road; and it is hoped that the vigorous measures taken by the Political Agent, Jodhpore, to prevent such occurrences, will be effectual.

From reports received from the Traffic and Police Superintendents it appears that a considerable amount of friction exists between the two departments. Much of this arises from the separation of the officers, the Police officer being at Jeypore, 90 miles from head-quarters. Personal communication will probably do much to remove these difficulties.

The Sub-Committee of the Railway Police Commission visited the line in

November 1881, and as on that occasion a full report was prepared by the Manager on the working of the Police on the entire Railway, with suggestions for rendering the service more effective.

In that report to the Police Commission, the Manager recorded his opinion that one Superintendent of Police should have the supervision of the whole of this Railway, and that the system of working and discipline should be uniform.

The Manager submitted the following for the consideration of the Police Commission for the future administration of the Police of the Rajputana-Malwa Railway :—

- (1). That a Police Superintendent with head-quarters at Ajmere be in Police charge of the whole length of the Rajputana-Malwa Railway.
- (2). That an Assistant Superintendent be stationed as at present at Indore, and have police charge of the line from Khandwa to the end of the Central India territory at Kesarpura, the station north of Neemuch.
- (3). That on the Railway within the Native States of Rajputana, the Superintendent of Police should exercise such limited magisterial power as the Local Administration might think proper, and that the other magisterial work be carried on as at present by the Political Agents or Magistrates of the Districts, or by the appointment of Honorary Magistrates, when suitable officers can be found, the more important cases being referred to the jurisdiction of a Magistrate at Ajmere.
- (4). That in Central India the present arrangement be continued under which the Assistant Superintendent of Police is also a Railway Magistrate of the 2nd class.

The principal change involved in this proposal is in the western end of the Railway, where at the present time the police and magisterial supervision are exercised by the police and magisterial officers of Ahmedabad. By changing the police supervision no change will be involved in respect of magisterial duties.

The portion of the line south of the Nerbudda to Khandwa, at present supervised by the District Superintendent of Police, Nimar, would, if this arrangement be approved, form part of the charge of the Assistant Superintendent of Police, Indore.

The following table shows the Capital expenditure on the line up to 31st March, 1882 :—

Capital Finance Account for 1881-82.

Main heads of Account.	OFFICIAL YEAR 1881-82.			Net expenditure to end of previous year.	Net expenditure to end of 1881-82.	Sanctioned estimate.
	Outlay.	Deduct receipts on Capital account.	Net expenditure.			
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Preliminary expenses, ..	..	..	..	11,43,564	11,43,565	11,43,565
Land, ..	29,114	..	29,114	6,09,735	6,38,849	6,38,849
Construction of line, ..	3,82,008	..	3,82,008	1,30,82,596	1,34,64,605	1,41,50,405
Ballast and permanent way, ..	82,163	..	82,163	1,66,33,155	1,67,15,319	1,68,67,199
Stations and buildings, ..	5,65,070	..	5,65,070	66,84,898	72,49,968	87,62,168
Total Construction Account,	10,58,355	..	10,58,355	3,81,53,948	3,92,12,306	4,15,62,106
Plant, ..	17,934	..	17,934	10,78,166	10,96,099	12,91,599
Rolling stock, ..	13,44,676	..	13,44,676	79,77,468	93,22,144	1,14,86,338
Establishment, ..	55,116	..	55,116	32,69,732	33,24,847	34,28,097
Total Expenditure on final heads, ..	24,76,081	..	24,76,081	5,04,79,314	5,29,55,396	5,77,68,140
Suspense accounts, ..	7,36,850	..	7,36,850	25,96,581	33,33,431	..
Total Expenditure, ..	32,12,931	..	32,12,931	5,30,75,895	5,62,88,827	..

HOLKAR AND SINDIA-NEEMUCH STATE RAILWAYS.

The progress of works of construction, and of the expenditure on Capital account is reviewed for the financial year 1881-82, and the working of the open line, as well as the accounts of the Revenue expenditure are considered for the calendar year 1881.

Construction and Capital Expenditure.—The following tabulated statement of the total mileage of the Holkar and Sindia-Neemuch State Railways before their amalgamation will show the dates on which they were opened for public traffic. The only addition to the length of open line during the calendar year 1881 was the section Neemuch to Chitor.

Sections of line.				Dates on which opened for public traffic.	
<i>Holkar State Railway Section.</i>					
			Miles		
Khandwa to Sanawad,	..	..	..	33	1st February, 1874.
Sanawad to Mortakka,	..	..	..	3 $\frac{1}{4}$	1st April, 1874.
Mortakka to Choral,	..	..	..	20 $\frac{3}{4}$	2nd January, 1875.
Choral to Mhow,	..	..	..	15 $\frac{1}{2}$	1st January, 1878.
Mhow to Indore,	..	..	..	13	3rd August, 1876.
				Total,	
				85 $\frac{3}{4}$	
<i>Sindia-Neemuch Railway Section.</i>					
Indore to Fatehabad,	..	..	..	24 $\frac{1}{2}$	3rd August, 1876.
Fatehabad to Ujjain,	..	..	..	12 $\frac{1}{4}$	3rd August, 1876.
Fatehabad to Rutlam,	..	..	..	49	11th July, 1878.
Rutlam to Jaora,	..	..	..	20 $\frac{3}{4}$	25th February, 1880.
Jaora to Mandsaur,	..	..	..	31 $\frac{1}{2}$	8th April, 1880.
Mandsaur to Neemuch,	..	..	..	31 $\frac{1}{2}$	2nd July, 1880.
Neemuch to Chitor,	..	..	..	34 $\frac{3}{4}$	10th March, 1881.
				Total,	
				203 $\frac{1}{4}$	
				Total mileage of lines,	
				289	

The total Capital expenditure and Final heads upon the Holkar and Indore-Nusseerabad State Railways up to the 31st March, 1882, was :—

Holkar State Railway,	..	Rs. 1,26,45,685, or Rs. 1,47,472 per mile opened.
Sindia-Neemuch State Railway,	..	1,34,42,035 " " 79,775 " "
Neemuch-Nusseerabad Railway,	..	63,92,917 " " 47,093 " "

During the year 1881-82 the further expenditure on Capital account upon the Holkar and Sindia-Neemuch State Railways was incurred upon the completion of the trans-ship yard and sheds at Khandwa by the Great Indian Peninsula Railway; strengthening the road between Mhow and Barwaha, by the laying in of two additional sleepers per rail (completed as far as Choral); and completion of the coping on the minor bridges, and the decking of large bridges on the Neemuch-Chitor section with corrugated iron.

At Khandwa a new engine erecting shop, and some additional workshop sheds were added during the year.

General results of the working.—The total average Railway mileage open for public traffic throughout the year 1881 was 282 miles against 227 miles during the last year.

The total earnings during the year amount to Rs. 19,49,579, and the expenditure to Rs. 13,47,280 against Rs. 14,01,259, and Rs. 10,47,269 respectively of

the previous year, showing net earnings of Rs. 6,02,298 during 1881 against Rs. 3,53,991 during 1880.

The total train mileage run during the year was 655,623 against 511,718 of the preceding year, the cost per train mile being Rs. 2.06 during 1881 against Rs. 2.05 during 1880. The gross earnings per train mile were Rs. 2.98 and 2.74 during the present and the past years respectively, resulting in a profit of Re. 0.92 per train mile during 1881 against 0.69 during 1880.

The percentage of the total outlay in the various departments and the percentage of expenditure to earnings during the last two years compare as follows:—

	1881.		1880.	
	Rs.		Rs.	
<i>Percentage of the total Revenue outlay.</i>				
Maintenance,	29.22		26.04	
Locomotive and carriage and wagon departments,	43.89		47.69	
Traffic department,	15.82		16.05	
General and miscellaneous,	11.07		10.22	
Total, ..	100.00		100.00	
<i>Percentage of Revenue expenditure to earnings.</i>				
Maintenance,	20.19		19.46	
Locomotive and carriage and wagon departments,	30.33		35.64	
Traffic department,	10.93		12.00	
General and miscellaneous,	7.65		7.64	
Total, ..	69.10		74.74	

The percentage of profits during 1881 on the total Capital expenditure up to the 31st December, 1881, is Rs. 1.90 against Rs. 1.29 during the year 1880.

The earnings and expenses during the past five years are shown in the following table:—

Statement showing the Earnings and Expenses during the past five years.

Years.	Average mileage open for traffic.	EARNINGS.			EXPENSES.		
		Gross.	Per mile per annum.	Per mile per week.	Gross.	Per mile per annum.	Per mile per week.
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1877, ..	107	4,30,128	4,487	86	3,69,047	3,449	66
1878, ..	146	9,29,045	6,363	122	6,27,128	4,295	82
1879, ..	172	11,45,838	6,662	128	8,54,010	4,965	95
1880, ..	228	14,01,259	6,145	118	10,47,268	4,593	88
1881, ..	282	19,49,579	6,913	133	13,47,280	4,777	92

Maintenance of Way.—There has been considerable increase of expenditure on maintenance of way and works due for the most part to the exceptional outlay upon the Holkar Railway, where in the course of strengthening the road (partly at the cost of Capital) Extraordinary Revenue expenditure was also involved.

The extensive and almost universal use of half round crested pine sleepers, moreover, on this part of the System will cause for some time exceptional outlay on materials for maintenance and renewal of permanent way.

LOCOMOTIVE DEPARTMENT.

It appears by comparing the statement of engines running and under repairs on the last day of 1880 and 1881 respectively, that the number of engines under heavy repairs at the end of 1881 was very high. The Locomotive Superintendent explains that these engines could not be repaired before for want of accommo-

dation. Engines have now been for the most part brought to the Ajmere shops for repairs.

Traffic and Working.—The year 1880 commenced with the line open up to Neemuch, a distance from Khandwa of 254 miles. On the 10th March, 1881, it was extended to Chitor, a distance of 35 miles, and on the 1st December following to Nusseerabad, a distance of 101 miles, making in all a total length of line between Khandwa and Nusseerabad of 390 miles, including $12\frac{1}{4}$ miles of the branch line to Ujjain.

Mileage, instead of the station-to-station rates, came into force from 1st January, 1881, for both coaching and goods traffic, and the change has worked satisfactorily.

From the same date, the rule for charging for the carriage of Revenue stores over the home line was introduced, and the receipts from this source for the year amount to

							Rs.
1st half year,	...	...	...	...	...	...	9,198
2nd half year,	...	...	...	...	...	...	16,004
						Total,	25,202

During the year the accounts in the office of the Locomotive Superintendent at Khandwa were, as far as possible, assimilated with the system in force in the central shops at Ajmere; but, owing to the want of printed forms, the change could not be completely carried out.

The fuel contracts were made on a different principle. In previous years the wood was purchased outright from the contractors, it being kept at the different depôts along the line at the Government risk. In 1881, slightly enhanced rates were given, on the condition that the wood was to remain the property of the contractors, and only taken over and paid for as used by the railway; but this was not quite a success. The contractors finding that a large amount of their capital was thus locked up, sought relief, and with the approval of the Bombay Government, it was decided to take over the stock of wood at Neemuch at a reduced rate, in order to afford the contractors pecuniary help.

The travelling inspectors of accounts were deputed during the year to verify the tools and stores in hands of permanent way inspectors, the result being that a good deal of surplus material lying about the line was sent into stores or otherwise disposed of, the accounts concerned receiving the usual credits.

The earnings and expenses for 1881 are as follows :—

					Rs.	Rs.
Earnings—1st half,	...	...	...	...	9,92,633	
2nd half,	...	...	...	...	9,56,946	19,49,579
Expenses—1st half,	...	...	...	...	7,09,726	
2nd half,	...	...	...	...	6,37,554	13,47,280
Net earnings—1st half,	...	...	...	...	2,82,907	
2nd half,	...	...	...	...	3,19,392	6,02,299

and the expenditure to the end of December 1881 being Rs. 2,70,00,000, exclusive of the Chitor-Nusseerabad section, gives a percentage of net earnings for the calendar year of about 2.25.

NAGPUR AND CHHATTISGARH STATE RAILWAY.

Construction.—At the close of the previous year, the construction of the line was completed up to Tirora station in the 63rd mile, with the exception of the large bridge over the Wainganga river.

From Tirora station to Amgaon station in the 95th mile, the line was practically complete with the exception of details of station buildings and a few 40 feet and other bridges near the end of the section.

From Amgaon station to Dongargarh in the 126th mile, all works were in hand and in various stages of progress, but only a few works were actually complete.

On the Wainganga bridge in the 53rd mile, a bridge of 9 spans of 150 feet each, the foundations of the two abutments and four of the piers were practically complete. In two other piers, the heavy wet foundations were nearly to rock, and the remaining two pier foundations were barely commenced. The masonry of one abutment and three piers was about one-third complete.

On the Durrakussa tunnel 278 feet of heading had been driven, out of a total length of 755 feet of tunnel.

During the year under report, the total expenditure under final heads amounted to Rs. 25,14,679. The total expenditure on final heads to the end of the year amounted to Rs. 79,54,539, and the debit to Suspense account stood at Rs. 2,83,815, this head having been reduced during the year by Rs. 1,41,800.

The following statement exhibits the outlay incurred during the year 1881-82:—

Main heads of expenditure,	OFFICIAL YEAR 1881-82.			Net expenditure to end of previous year	Net expenditure to end of 1881-82	Sanctioned estimate.
	Outlay.	Deduct receipts on Capital account	Net expenditure.			
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Preliminary expenses, ...	2,562	...	2,562	2,13,216	2,15,778	2,19,200
Land, ...	4,200	...	4,200	9,201	13,401	35,700
Construction of line, ...	11,26,700	1,065	11,25,635	19,07,685	30,33,320	30,81,890
Ballast and permanent way, ...	8,77,054	76	8,76,978	13,75,802	22,52,780	24,56,530
Stations and buildings, ...	2,62,236	46	2,62,190	5,53,939	8,16,129	10,60,190
Total Construction Accounts, ...	22,72,752	1,187	22,71,565	40,59,843	63,31,408	68,53,510
Plant, ...	90,891	192	90,699	1,96,631	2,87,330	3,88,860
Steam ferries, ...	...	...	...	...	...	...
Rolling stock, ...	—11,578	...	—11,578	7,08,367	6,96,789	11,43,800
Establishment, ...	1,64,079	86	1,63,993	4,75,019	6,39,012	6,48,430
Total expenditure Final Heads,	25,16,144	1,465	25,14,679	54,39,860	79,54,539	90,34,600
Suspense accounts, ...	—1,41,800	...	—1,41,800	4,25,615	2,83,815	...
Grand Total expenditure, ...	23,74,344	1,465	23,72,879	58,65,475	82,38,354	90,34,600

During the year the Abstract of Estimate sanctioned by the Government of India, amounting to Rs. 81,34,600, was increased to Rs. 90,34,600 on account of the extension of the line of 19½ miles to Nandgaon, and the work on this extension was put in hand.

The following is a general account of progress during the year.

Land.—Rs. 4,200 only was expended under this head in accordance with application from Civil Authorities, in whose hands the land compensation entirely rests.

Construction of Line.—Earthwork.—In the 2nd Division about 46 lakhs of cubic feet were carried out chiefly on the heavy approach banks to Wainganga, Pānolee, and other smaller major bridges, and in making up bank settlements.

In the 3rd division about 52 lakhs of cubic feet were carried out, also chiefly in bridge approaches.

This item of work may be said to be practically complete at the end of the year.

Bridgework.—In the 2nd Division. The Wainganga bridge made satisfactory progress. From 1st April, 1881, to the close of the working season at the end of May, the foundation work was much hampered by heavy showers of rain and consequent frequent rising of the water level in the river, so that it was only with much difficulty that the foundations of Nos. 4 and 5 piers were got in before the rains which began unusually early. During the rains little could be done beyond finishing off the masonry of the west abutment, the masonry of the east abutment not being sufficiently out of reach of floods.

In October work was generally resumed in the river bed, and communication was re-opened with the quarries on the 23rd November, enabling masonry to be rapidly pushed forward from that date. A contract for the erection of the iron girder work having been entered into, the erection of stagings in the first span was commenced early in December. From this time work was pushed forward with maximum speed, night as well as day, two electric lights being employed. The foundation of No. 6 pier was got in, in January, at a depth of 23 feet below low water level, and in this month nearly half a lakh of cubic feet of masonry was executed. In February the last foundation, that of No. 7 pier, was got in and about 44,000 cubic feet of masonry executed, a further quantity of 35,000 cubic feet executed in March almost completed the bridge masonry except copings. At the end of March also the superstructure girder work was nearly completed out to No. 6 span.

The following shows the state of the work at the end of the year under report:—

Foundations, complete.

Masonry, 1 abutment and 6 piers, complete.

No. 7 pier completed to within 20 feet of top.

No. 8 pier completed to within 5 feet of top.

2nd abutment completed to within 6 feet of top.

Superstructure.—Spans 1, 2 and 3 completely finished. Spans 4 and 5 practically finished. Span 6, main girders nearly rivetted.

The bridge was fully completed by the end of May, the last rivet being put in on the 28th. The bridge was formally tested and passed on the 5th June, since which date regular traffic has passed over it.

Panolee bridge 2 spans of 60 feet. This bridge was finished off, and passed for traffic in November last.

The Adasee, Baseepar, Jaoree and Moomreteka bridges, all of 40 feet span, were also completed and passed on the same date. The minor bridges in the 2nd Division were completed.

In the 3rd Division, the Bhamni bridge 1-40 feet span, was finished off.

The Bagh river bridge, 7 spans of 60 feet. Good progress was made on this bridge before the rains of 1881 set in. Little work could be done during the rainy season, except on east abutment, but from October the work was rapidly pushed on. In January all the piers were completed; the erection of the iron work was well advanced, and the bridge was finally completed by the end of February. A considerable quantity of river clearance was also carried out.

The Hulbitola, Dhunsooa, Palikussa, Nayatola and Bunjara bridges were completed. The Toormoori bridge 1-60 feet, and the Burwara, Dhardara and Dongargarh 40 feet bridges were completed shortly after the close of the year under report.

The 87 minor bridges in the 3rd Division up to Dongargarh were completed.

During the rains of 1881, all the bridges on the line were severely tested,

and with one exception, proved satisfactory. In this case it was found necessary to substitute a 20 feet girder span for the 10 feet one originally put down.

Tunnels.—Durrakussa.—The progress of the headings in this tunnel during the year 1881-82 has been 433 feet, which added to the 278 feet previously done, gives a total of 711 feet of heading driven up to the end of the year, leaving about 43 feet to complete. The headings were joined on the 29th April, 1882. The tunnel was commenced in October 1879, so that the total time occupied in driving the headings has been 2 years and 7 months. Three shafts in all were sunk to an average depth of 55 feet to the bottom of the heading. The bottoming out to full section was completed to an aggregate length of 475 feet at the end of the year, leaving 280 feet to complete the full length.

The progress on this tunnel has been disappointing, much trouble and difficulty has from the beginning been experienced in carrying out this work, owing to the exceptionally hard and fissured nature of the rock; the difficulty in obtaining supplies of dynamite, and the unhealthy nature of the locality, so that at certain periods of the year, it has been almost impossible to keep the work going.

The kind of work is also of a character unsuited to local workmen, whilst foreign labor cannot be induced to remain during the unhealthy months, especially whilst so much other work of a less dangerous and preferable kind has been necessarily open to them on other parts of the Railway construction. All these causes have combined to injuriously affect progress, and retard the completion of the work, which however will be ready for passing the traffic by the end of the rains or the commencement of the traffic season 1882-83.

Level Crossings.—In the 2nd Division all level crossings with gate lodges and post and chain barriers were finished off. In the 3rd Division out of 29 level crossings 21 were finished off, 2 were in progress and 6 were not yet commenced.

Fencing.—With the exception of the length between Nagpur and Kamptee and in station yards, the line is unfenced. In the 2nd Division the fencing in the three station yards of Tirora, Gondia and Amgaon was completed. In the 3rd Division collection of material only was made.

Ballast.—The ballast collection of the 2nd Division was completed, and the line was transferred to Revenue up to $95\frac{1}{2}$ miles from the 1st January, 1882. In the 3rd Division, the collection of ballast was also practically completed up to Dongargarh.

Permanent Way.—At the commencement of the year the rails were laid as far as the 79th mile; and the road with the necessary sidings was completed into Gondia station, 81st mile, by the 19th April.

A temporary triangle was put down at this place, and the line was opened for traffic in May, and continued working up to the end of the season. By September the rails were laid up to the Bagh river in the 98th mile. At the commencement of the year the length between the Bagh river and Nayatola quarries (mile 93 to 107) was already laid, and by September the railway was carried on a short distance to the uncompleted Nayatola cutting, which for a time prevented further direct progress.

At the close of the year the line was linked into Dongargarh (mile 126) with a break at the tunnel only.

Stations and Offices and Staff Quarters.—Up to Tirora station in the 63rd mile, station accommodation sufficient for all necessities was practically completed at the beginning of the year at Gondia and Amgaon stations. The permanent buildings with exception of goods sheds, (which will only be built when shown to be required,) were finished off. Crossing stations at Gungaghiri in the 71st mile between Tirora and Gondia, and at Goodma in the 88th mile between Gondia and Amgaon, were sanctioned and the work put in hand. These will be in all respects similar to those added last year at Salwa and Khat.

The distances, Tirora-Gondia and Gondia-Amgaon, being 18 and $14\frac{1}{2}$ miles.

respectively, these intervening crossing stations will favorably influence the carrying capacity of the line.

In the 3rd Division up to and including Dongargarh the stations are four in number, viz., Salikussa, Durrakussa, Boretalao and Dongargarh.

At Dongargarh a large traffic is expected; it will also be a changing station, the works at this site therefore are somewhat extensive.

The other stations are simply crossing and watering stations with a minimum of accommodation.

At Salikussa the passenger building and platform were nearly complete, and the porters' quarters of 6 units were finished.

At Durrakussa, the passenger building was in progress, and the porters' quarters of 2 units nearly ready.

At Boretalao, the masonry of the passenger building was completed and the roofing in hand. The platform was complete, and the porters' quarters of 6 units were finished off. A Permanent way Inspector's quarters was also completed.

At Dongargarh station, the passenger platform wall was completed, except coping, and the passenger building masonry finished to floor level only.

The goods shed which is here necessary was commenced as well as a goods platform wall, porters' quarters of 9 units were completed.

Guards' and drivers' running rooms, consisting of four main rooms were commenced and masonry built to floor level.

Police quarters of 6 units were nearly completed. Quarters for native cleaners were also in hand.

The alterations to the building purchased for Railway offices at Nagpur were completed early in the year. The building was temporarily handed over to the Census Commissioner as explained in last year's report, and has since been occupied by the Railway officers.

Workshops, Store Buildings.—The erecting of carriage and boiler shops and store buildings were completed, also enclosure wall and arrangements for water supply to the workshops. Some drainage works were also completed.

Station Machinery.—At Nagpur a carriage examining pit was completed, a carriage weighing bridge was also sanctioned and put in place. Some additions to the engine shed and the erection of well pumping engine was also completed, and a few minor alterations in the station yard were carried out. Fitting pipes for the second water column at Kamptee was completed, and additional ashpits were constructed at Kamptee, Salwa, Bhandara and Tumsar.

Second watering columns having been found necessary, were sanctioned and put down at Tirora and Amgaon stations, completing all present requirements up to the latter place.

In the 3rd Division, or unopened portion of the line, all station machinery including ashpits, watering arrangements, signals, &c., were in hand, and in a few cases completed.

At Dongargarh, an engine shed for 6 engines was commenced, and the masonry brought up to about 6 feet above ground level, the outside ashpits were finished and the engine turntable masonry was in hand.

Engineering Plant.—Most of the expenditure under this head was incurred on account of portable engines, pumps and other machinery required in connection with the Wainganga bridge works.

Locomotive shops.—Nearly all the workshop machinery indented for in previous years was received, and for the most part fixed in place, a few additional machine tools were indented for.

Station and Office Furniture.—The expenditure under this head was small in amount. All stations up to Amgaon were furnished with necessary requirements.

Rolling Stock—The following additional stock was fitted up during the year in the workshop of the line, viz. :—

Engines,	...	...	...	...	...	4
Coaching vehicles including brakes,	...	...	...	...	...	22
Goods vehicles,	...	...	...	...	...	17

The complete stock for work, now in hand, is as follows :—

Engines,	...	...	...	...	...	16
Coaching vehicles including 13 brakes,	...	...	...	...	...	63
Goods vehicles,	...	...	...	...	...	370

Six engines were transferred to the Rajputana-Malwa Railway at the urgent request of the Director General.

Establishment.—The charges for establishments during the year amount to about 7.95 per cent. on the net Indian outlay. The percentage on the total expenditure to end of year being about 9.75 per cent.

The works carried out during the year have, it is believed, been executed substantially and well and with reasonable economy.

The total charges on account of Interest to the end of the year amount to Rs. 6,73,587, and the receipts from Revenue, up to the same date, amount to Rs. 2,17,376.

The Stores Division was worked satisfactorily. At the commencement of the year the debits amounted to Rs. 2,84,330, and at the end to Rs. 1,95,405. During the year the debits and credits amounted to Rs. 18,25,630 and Rs. 19,14,555 respectively.

The State Railway Stock Verifier inspected the stores towards the end of the year, and the results were in all respects satisfactory.

Lines open for traffic.—At the close of the last official year the line was open to Tirora, at mile 36, with a total mileage including the Tumsar branch of 65½ miles.

On the 19th April the Tirora-Gondia section, mile 63 to 81, was inspected and passed, and was opened for passenger traffic on the 19th May.

The traffic on the line east of Wainganga river was suspended from 1st June to 25th November, owing to the flood season, and the consequent removal of the temporary diversion across that river. The Gondia-Amgaon section of the line had in the meantime been inspected and passed, so that on the above date, when communication over the Wainganga was restored, passenger traffic commenced running up to Amgaon station at mile 95, giving a total open mileage of 97½ miles from this date to the end of the official year.

The grain traffic from Amgaon station has been considerably in excess of that estimated, and Gondia, Tumsar, and Kamptee each despatched considerably more goods than during the corresponding period of the previous year. The passenger traffic, especially between Nagpur and Kamptee, also largely developed during the year.

The following statement shows the results of the working of the line, or a net profit of Rs. 1,60,679, being close on 3 per cent. on cost of the portion of line opened :—

Heads.								Actuals 1881-82.
I.—EARNINGS.								Rs.
Coaching traffic,	...	...	...	...	...	...	...	1,01,659
Goods	...	...	...	...	...	...	...	3,12,524
Electric telegraph earnings,	...	...	...	...	...	...	...	1,339
Sundries,	...	...	...	...	...	...	...	4,723
Total Earnings,							...	4,20,245

Heads.							Actuals 1881-82.	
II.—EXPENDITURE.							Rs.	
Maintenance of way, works and stations,	...	...	...	...	...	...	51,382
Locomotive expenses,	...	...	...	...	...	...	85,097
Carriage and wagon expenses,	...	...	...	...	...	...	18,911
Traffic expenses,	...	...	...	...	...	...	57,895
General charges,	...	...	...	...	...	...	45,810
Special and miscellaneous,	...	...	...	...	...	...	471
Total Working Expenses,							...	2,59,566
III.								
Net Earnings,	...	...	...	...	...	...	1,60,679

The working charges in proportion to receipts are still high, being $61\frac{1}{2}$ per cent. as against $75\frac{1}{3}$ per cent. in the previous year. Taking into account, however, the exceptional circumstances of the line during the year, the total result may be considered as satisfactory, and encouraging, for the future prospects of the Railway.

The maintenance of the line up to mile 52 was defrayed by Revenue during the whole year, and up to mile $97\frac{1}{2}$ from the 1st January, 1882.

The terminals on through booking, referred to in the last report as then being charged by the Great Indian Peninsula Railway on certain articles booked through Nagpur junction were kept up during the year, but have since been discontinued.

The trans-shipping arrangements under agreement were carried out satisfactorily by the Great Indian Peninsula Railway, delay to State Railway vehicles being very slight.

Extension.—Sanction having been obtained for the extension of 19 miles from Dongargarh to Nandgaon, the final estimates amounting to 9 lakhs for this length were submitted to the Government of India and sanctioned, and an additional grant of $2\frac{1}{2}$ lakhs was given to admit of work being commenced.

Preliminary operations were commenced in May 1881.

Land.—The land required for the extension is entirely in the Feudatory States of Khyragarh and Nandgaon, and has been presented to Government without charge.

Earthworks.—The earthworks were practically finished off with exception of gaps near uncompleted bridges, about 120 lakhs of cubic feet having been executed.

Bridgework.—Jhoora Bridge 13-40 feet. The masonry was about half finished.

Kalari Bridge.—1-40 feet was ready for the girders at the close of the year.

Cheepa Bridge.—4-40 feet was well advanced, the masonry being more than two-thirds done.

The minor bridges, 12 in number, with the exception of 2, were all in hand.

At the date of writing all bridgework on the extension is practically complete.

Level crossings.— } No work was commenced under these heads.
Fencing.— }

Ballast.—Work was confined to the collection of 6 cubic feet per foot run, together with moorum ballast for consolidating the surface of banks.

Permanent Way.—Forwarding of material only was carried out.

Stations and Offices and Staff Quarters.—The stations on the extension are two only, viz., Moosra and Nandgaon. At the close of the year the foundations of passenger building at Moosra were completed, and a small porters' quarters of 2 units was finished. At Nandgaon, foundations of necessary station buildings were got in, including a porters' quarters of 9 units.

Station machinery at Moosra and Nandgaon.—Ashpit foundations were completed, and at the latter place the tank house masonry was commenced.

The station well was in hand and nearly ready for steining.

All necessary works for opening the line up to Nandgaon station will be completed by September 1882.

RANGOON AND IRRAWADDY VALLEY STATE RAILWAY.

The capital expenditure during the year has been Rs. 2,51,905.

Preliminary Remarks. The main portion of the capital grant was expended on the renewal of the wooden bridges which are being gradually re-built in brick and iron. It will be necessary to proceed with this work on a much more extensive scale in future years, as many of the wooden bridges are showing signs of decay, and need a very heavy expenditure for repairs which will increase progressively. A yearly allotment of about Rs. 1,00,000 will be required to complete the renewals in four years.

The inefficiency of a great portion of the wooden fencing necessitated a large expenditure on additions and improvements. An estimate for Rs. 63,831 has been sanctioned, which provides for 10 miles of new wire fencing, and for the improvement of about 100 miles of wooden fencing, by the addition of a barbed steel or a telegraph wire between the fence rail and the earth bank. When this work is completed, the fence will, it is hoped, be in a tolerably efficient state for some years, but the repairs will always be heavy until the decay of the wooden posts necessitates a renewal throughout, and the substitution of a good wire fence such as that being got out for the Sittang Valley Railway.

The floods in the monsoon of 1881 did not rise as high as usual. There were no breaches or damage, and little trouble except at the Beeling and Kanta streams, miles 78 and 128 respectively. The Beeling bridge (120 feet waterway) was raised bodily one foot to take the girders out of the water which used to come over the tie-beams in high floods. In re-building this bridge the opportunity will be taken to raise the formation 2 feet further still.

A great number of the larger streams between miles 70 and 130 are silting up their beds and spilling over the country on each side in a manner which often endangers the railway bank, and will require additions to the existing drainage openings unless some extensive remedial measures are taken. The regulations of these streams is a large and important question which has been gone into by the Provincial Public Works, and is likely to be taken in hand in a thorough manner by the Local Government.

The expenditure on renewals of permanent way has increased slightly owing to the more frequent renewals of rails. These are still, however, comparatively small (three rails per mile), and the sleepers are in very good condition. A few of the teak sleepers show signs of decay, but the great bulk which are of pyngado (Iron wood, *Inga xylocarpa*) are after 6 years' wear, as good as the day they were put in.

Two steam saw mills for the conversion of pyngado sleepers for the Sittang Valley Railway have been set up at Tike-kyee and Phalone, and have on the whole worked very satisfactorily, turning out the sleepers at an average rate of less than Rs. 1-4-0 each.

The quarry at Wanetchoung was worked very successfully till December, when work was almost entirely stopped owing to a great mortality from malarious fever amongst the coolies who all deserted in a body. This is always a very unwholesome locality, and the traffic staff stationed there have suffered so severely, that special measures had to be taken to improve the state of things. A great portion of the surrounding jungle has been cleared departmentally and (chiefly) by a colony of Shans who have been persuaded to settle on a plot of land taken up for them by the Railway. A new station house has also been built with the living rooms raised 18 feet off the ground, (and it is hoped) well above the reach of the malarious atmosphere. The health of the staff has been somewhat better since, but it will take time to show whether these measures are really effective.

The working expenses for the last two months of the year have been considerably increased by the grant to the Revenue staff of the Burma allowance sanctioned in the first instance for the Capital staff employed on the construction of the Sittang valley line. As the Revenue staff are mostly men engaged in Burma for permanent service in the province on much higher pay than is given for similar work in India, this matter will probably require to be reconsidered.

The general store has hitherto been at Insein, but this arrangement was inconvenient and expensive at all times, and became quite unworkable when the opening of the Sittang Valley works gave the Storekeeper constant employment in Rangoon. The bulk of the stores have therefore been removed to a building prepared for them in Rangoon, the articles required for use in the workshops being left at Insein as a sub-store in charge of the Locomotive Superintendent.

Large additions to station accommodation have been found necessary, especially at Letpadan the half way station, where the siding room has proved very insufficient for the requirements of the busy season.

A length of 3,000 feet of new sidings has been laid and a new passenger platform constructed, also a new waiting shed and oil room. The running room has been enlarged to double its former size, painted, and improved in every respect. Quarters for the officer in charge of the railway police and for the permanent way inspector have been built at this station, also for the locomotive firemen. A steam pump has been erected over the well, it supplies an urgent want and has resulted in a considerable economy.

At Kemmendine it has been necessary to provide additional accommodation for the laterite traffic. A large piece of ground at the south-west end has been taken up and fenced off as a laterite yard with a blind siding 1,000 feet long leading into it. A goods shed 120' x 30' has been erected on the new goods platform, and the greater portion of the yard metalled. This was found necessary to provide shelter for the paddy received after the rains begin, and it is intended to extend the shed along the whole length of the goods platform (600 feet) as money is available. Waiting sheds for 3rd class passengers have been erected at Rangoon and Kemmendine and supply a much felt want. Rest houses corresponding (on a small scale) to the serais of Northern India have been built near all stations by the Local Department Public Works, and are of great convenience to passengers.

At Pougdeh a new open goods shed has been constructed, and at Prome a siding laid to the steamer landing to facilitate trans-shipment of troops and their baggage.

New station houses have been built at North Pazondoung and Padeegon, and other smaller works, a detailed list of which is given below. Extensive additions and alterations are being made at the Rangoon terminus to adapt it as the junction station for the Sittang Valley line now under construction. Large additions are also in progress to the Insein workshops for similar reasons. As these works are charged to the Sittang Valley line no further mention of them is necessary here.

The heavy Capital expenditure on the works briefly described above has

been rendered necessary chiefly by the rapid increase of the goods traffic. Nearly all urgent requirements have, however, now been provided for.

More station accommodation is required at Latter Street, and it will be advisable probably to build station houses with platforms, &c., at the pick-up stations of Tharrawaddy and Othegon. Goods sheds are required at Gyobingouk, and perhaps at two or three of the other paddy stations, also a steam pump at Tike-kyee. These works will be arranged for in 1882-83 or 1883-84, and once they are completed very little more Capital expenditure will be necessary, except for the renewals of the wooden bridges and fencing.

Land.—A square mile of waste land has been taken up at the Wanetchoung quarries without cost, also 8 acres for the station yard at that station, and 50 acres round it for the Shan settlers.

At Kemmendine station 2 acres of land was taken up at a very heavy expense to make room for a new laterite siding and yard.

Construction of Line.—The quantity of earthwork shown below was executed during the year:—

25,400	cubic feet	at Kemmendine	for laterite siding.
204,000	„ „	Letpadan	for new siding, &c.
49,950	„ „	Padeegon	for new siding, &c.
584,000	„ „	in diversions	for new bridges.

Minor Bridges.—The following lists show in detail the work done in renewing the wooden bridges:—

No.	Mile.	Span of old bridges.	Replaced by iron bridge.	Remarks.
		Ft.	Ft.	
80	32	1 of 40	1 of 40	Laterite masonry.
104	40½	1 of 15	1 of 6½	Arched culvert with invert.
141	53½	1 of 10	1 of 10	For a double road, Phalone station yard.
188	70½	1 of 10	1 of 6½	Arched culvert with invert.
209	76½	1 of 10	1 of 6½	Open „ „
211	76½	1 of 10	1 of 40	Waterway enlarged to take increased spill from Beeling River.
213	77	1 of 10	1 of 6½	Open culvert with invert.
219	79½	1 of 30	1 of 12	„ waterway decreased.
256	90½	1 of 40 and 1 of 20	3 of 40	Screw pile abutments brick piers.
305	105	1 of 40	1 of 30	Girder bridge on brick abutments.
314	107½	1 of 30	1 of 20	„ „ „
317	108½	1 of 30	1 of 20	„ „ „
337	114½	1 of 30	1 of 20	„ „ „
340	114½	1 of 30	1 of 20	„ „ „
365	121½	1 of 30	1 of 20	„ „ „
367	121½	1 of 30	1 of 20	„ „ „
273	94½	1 of 40	1 of 20	„ „ „
371	122½	1 of 30	1 of 20	„ „ „
372	123½	1 of 30	1 of 20	„ „ „
373	123½	1 of 30	1 of 20	„ „ „
381	126½	1 of 30	1 of 20	„ „ „

No.	Mile.	Span of old wood bridge.	New bridge to be substituted.	Remarks.
		Ft.	Ft.	
78	31 $\frac{1}{2}$	1 of 40	1 of 40	Laterite masonry half done.
89	34 $\frac{1}{4}$	1 of 40	1 of 40	Laterite and cement being collected.
...	35 $\frac{1}{4}$	1 of 10	1 of 20	" " " "
...	35 $\frac{3}{8}$	1 of 40	1 of 40	" " " "
...	70 $\frac{1}{2}$	1 of 20	1 of 40	" " a quarter done.
...	73 $\frac{1}{8}$	1 of 10	1 of 6 $\frac{1}{2}$	Arched culvert with invert three-quarters done.
...	73 $\frac{3}{8}$	1 of 10	1 of 6 $\frac{1}{2}$	" " " quarter done.
...	73 $\frac{5}{8}$	1 of 10	1 of 6 $\frac{1}{2}$	" " foundations in progress.
...	73 $\frac{7}{8}$	1 of 10	1 of 6 $\frac{1}{2}$	" " " "
...	76 $\frac{1}{4}$	1 of 30	1 of 20	In progress half done.
...	78	2 of 40	2 of 60	Material being collected.
258	91 $\frac{1}{4}$	1 of 10	1 of 6 $\frac{1}{2}$	Arched culvert with invert half done.
272	94 $\frac{3}{4}$	1 of 30	1 of 20	Materials being collected.
286	100 $\frac{3}{8}$	2 of 10	1 of 40	In progress half done.
294	102 $\frac{1}{8}$	2 of 10	1 of 12	" "
300	103 $\frac{3}{8}$	1 of 10	1 of 6 $\frac{1}{2}$	" "
327	111 $\frac{1}{4}$	1 of 10	1 of 6 $\frac{1}{2}$	" "
330	112 $\frac{1}{4}$	1 of 30	1 of 20	" "
332	113 $\frac{1}{4}$	1 of 30	1 of 40	" "
334	113 $\frac{3}{4}$	1 of 20	1 of 12	" "
344	115 $\frac{3}{4}$	1 of 10	1 of 6 $\frac{1}{2}$	" "
365	121 $\frac{1}{4}$	1 of 30	1 of 20	" "
366	121 $\frac{3}{8}$	1 of 20	1 of 12	" "
369	121 $\frac{1}{2}$	1 of 30	1 of 20	" "
376	124 $\frac{1}{4}$	1 of 10	1 of 6 $\frac{1}{2}$	" "
377	125 $\frac{1}{4}$	1 of 10	1 of 6 $\frac{1}{2}$	" "
381	126 $\frac{3}{4}$	1 of 30	1 of 20	" "
	130 $\frac{1}{2}$	1 of 40	1 of 40	" "
		and	and	" "
		2 of 20	2 of 20	" "

The wooden girders on six small open culverts of 6 $\frac{1}{2}$ feet span were changed for iron ones.

Beeling bridge (120 feet waterway) was raised bodily one foot (with screw jacks) to take it out of reach of the flood water.

Floorings and aprons of laterite blocks were laid in several bridges that showed signs of scour, with satisfactory results.

A bridge at Mokka Choung (90 $\frac{3}{4}$ miles) was rebuilt with iron screw pile abutments experimentally. This mode of construction allows of the new abutments and piers being put in without diversions or other interruptions to traffic, but the cost of the screw piles was found to be excessively high, and it was decided on considerations of economy to use brickwork in all cases.

Two openings of 10 feet span (Nos. 326 and 328) have been permanently closed as they were found to be unnecessary.

Level crossings, &c.—The level crossings at Letpadan and Gyobingouk stations were moved a short distance to new sites. No new crossings were opened, nor were any of the old ones closed.

Fencing.—1,200 feet new fencing constructed at Kemmendine station to enclose new ground.

1,000 feet new fencing constructed at Wanetchoung.

3,000 feet old fence moved at Wanetchoung to new limits of yard.

1,200 feet new fence erected at Letpadan to enclose Police Inspector's quarters and rest houses.

On line one mile of wooden fencing was taken up and replaced by an iron wire fence. 20 miles of wooden fence were improved by adding a telegraph wire below the top rail, and 18 miles of barbed steel wire were used for the same purpose; 11 miles of fence bank were raised and improved.

Ballast—Laterite ballast from the Wanetchoung quarry was issued to the following capital works:—

31,800	cubic feet to	Kemmendine goods yards sidings	} completed.
240	"	Insein shop yard	
4,440	"	Phalone station	
8,520	"	Duneeaw extension	
24,840	"	Letpadan new sidings half completed.	
16,560	"	Bridge renewals.	

Besides this 681,420 cubic feet was quarried, of which

518,720 cubic feet was issued to the Department Public Works, the Municipality, and Port Commissioners, Rangoon.

58,560 " issued to works on Sittang Valley Railway.

126,720 " was issued to maintenance of way and other Revenue works and including balance from last year.

208,940 " was left on hand at quarry.

There was an unlimited demand for the laterite in Rangoon, and a much larger quantity would have been issued if more open trucks had been available. This laterite makes a very fair ballast and is being used in squared blocks for the renewal of bridges and other masonry work. It has, however, proved quite unfit for metalling roads with heavy traffic, and though the demand in Rangoon still continues, it cannot be depended upon to last more than another year or two till arrangements are made for the supply of some better material.

Permanent Way.—1,600 feet of new sidings at Wanetchoung station begun in 1880-81 were completed.

New sidings to increase accommodation were laid at Kemmendine, Letpadan, Pongdeh and Prome. Aggregate length 5,800 feet.

A new siding 500 feet long at Tike-kyee for loading logs was put in hand and large additions made (with old changed rails) to the quarry sidings.

Stations and Buildings.—New station houses were built at North Pazondoung (Mahloagone), Wanetchoung and Padeegon.

3rd Class waiting sheds erected at Rangoon, Kemmendine, Letpadan, and Prome, and a goods office at Kemmendine.

Open goods sheds 120' × 30' were constructed at Kemmendine and Pongdeh.

Three drinking water wells at Wanetchoung and platelayers' huts near that station begun in 1880-81, were completed and two more built at Insein.

Fenced platforms were put in hand at Wanetchoung and Padeegon.

An oil room and a new latrine were constructed at Letpadan and the old latrine dismantled and re-erected on new site.

A new passenger platform wall of squared laterite, 600 feet long, was built at Letpadan. The station palisading was dismantled and re-erected on new site, and a length of 1,000 feet of new palisading put up.

The metalling of the yard and platform was put in hand at Letpadan, and the station booking offices and quarters altered and improved. The floors of goods sheds at Zeegone, Pongdeh, Thehgone and Sinmeezweh were relaid in concrete and brick-on-edge, to secure the contents from damage by rats.

Workshops and Stores.—The coal shed at Botatoung landing begun in 1880-81 was completed (and largely extended at the cost of the Sittang Valley Railway).

It was found necessary to move the general stores from Insein to Rangoon. One of the reserve carriage sheds was paved and altered to a store building with accommodation for the Storekeeper's office.

Staff Quarters.—At Kemmendine 2 units new porters' quarters were constructed.

At Wanetchoung 8 units cooly huts were built for quarry workmen.

At Phalone quarters with out-offices complete, were erected for the Assistant Permanent Way Inspector.

At Letpadan quarters with out-offices complete for Police Inspector.

„ quarters with out-offices complete for Assistant Permanent Way Inspector.

„ the running room was enlarged to double its original size, the verandahs paved and all the rooms painted.

„ a 6 unit cooly hut was erected for the locomotive firemen.

At Gyobingouk quarters with out-offices complete were built for the Traffic Inspector.

At Pougdeh quarters were built for Permanent Way Inspector.

Station Machinery.—At Rangoon a steam pump was erected on the well to replace two hand pumps.

At Kemmendine one set of new points and crossings was put in for laterite siding, and three of the old crossings moved and relaid. A new buffer bank was built at end of laterite siding.

At Wanetchoung three sets of points and crossings were put in for new sidings in yard.

At Letpadan two new sets points and crossings were put in for additional sidings, and two of the old ones taken up and relaid. Two buffer banks were built at ends of blind sidings. A steam pump was erected over the well, replacing a hand pump. A ladder and water gauge were fixed on tank house.

Workshop Plant.—The following machines arrived and were being erected in Workshops:—

A wheel lathe,	..	} erected and working.
A 12-inch centre surfacing lathe, ..	..
A screw cutting lathe,	..	
A shaping machine,	..	
A spring testing machine,	..	
A plate bending „	..	
Two steam hammers,	..	one erected.
A cornish boiler.		

Revenue.—

	Rs.
The earnings for the year 1881 amounted to	15,43,622
And the expenses to	8,98,545
Leaving a net profit of	6,45,077

The net earnings were 5·16 per cent. on the Capital of Rs. 1,24,92,079 expended, and the working expenses 58·21 per cent. of the gross receipts.

The passenger traffic shows an increase at the rate of 9·04 per cent., and the goods traffic at 28·19 per cent. over that of the year 1880.

The paddy crop of the season on the outturn of which the goods receipts mainly depend, was a fair one on the whole, but on the upper portion of the line between Nathalin and Thehgone there was a short crop, and the exports from Pongdeh and other stations on that length were much smaller than in previous years. This accounts in great measure for the comparatively small increase in goods receipts. Apart from the paddy traffic there has been an increase of 11·10 per cent. in receipts for carriage of other goods which is satisfactory.

The proportion of working expenses to gross receipts would have been better but for,—

- (1), the grant of Burma allowance to Revenue staff as before alluded to.
- (2), the extra expense of staff kept up for an additional night passenger train that was run till 30th June, 1881. It was a popular train with through passengers, but did not bring any appreciable increase of coaching traffic.
- (3), the rapidly increasing cost of maintenance and repairs to the wooden bridges and fencing.
- (4), the comparatively low rate of 3rd class passenger fares. These are the same as in India, notwithstanding the very different value of money in the province and the very much higher rate of wages paid to all the Railway staff. As the present profits cover the Interest charges on Capital, there is no adequate object to be gained by raising the rates, but this fact has to be taken into account in comparing the results of working with those of Indian Railways.

The suburban line local passenger trains are becoming popular, and the traffic has been much increased by the opening of a pick-up station at Godwin's Road to serve the Lammadaw quarter. These trains now pay more than their working expenses.

The goods traffic on the suburban lines has been less than half that of the preceding season. This is owing chiefly to the exceptionally low prices of paddy this year, which leave the margin of profit so small that consignors will not pay the extra freight beyond the first station at which they can dispose of the paddy. Nearly all is therefore unloaded at Kemmendine.

The question of completing the circuit of the suburban lines by a line from Kemmendine to the terminus at the Commissariat wharf has been raised and will be duly considered.

NORTHERN BENGAL STATE RAILWAY.

The result of the year's working has been eminently satisfactory, a great improvement having been effected on that of any previous year. The total earnings were Rs. 18,43,890, while the expenditure was Rs. 9,44,574, or Rs. 51·23 per cent. of the gross amount earned.

The following table gives the financial results of working since the opening of the railway :—

Year.	Miles open.	Gross earnings.	Expenditure.	Percentage of expenses to earnings.	FINANCIAL RESULTS.	
					Net profit or loss.	Per cent. on capital outlay.
		Rs.	Rs.		Rs.	
1878, ...	*232	8,87,471	6,30,642	71	2,56,829	1·52
1879, ...	244	12,52,311	11,51,317	92	1,00,994	0·53
1880, ...	244	14,49,296	8,54,386	58	5,94,910	3·02
1881, ...	244	18,43,890	9,44,574	51	8,99,316	4·41

* Including 13 miles broad gauge worked by the Eastern Bengal Railway.

The steady improvement of the traffic year by year as shown by the above figures is most encouraging, the earnings having more than doubled in four years, —a result due to the introduction of low rates, and to the skilful management of the line by its officers.

The railway at present, however, carries but a fraction of the produce of the districts through which it passes, on account of the absence of feeder roads; until a comprehensive system of communications has been completed, the earnings must remain comparatively small.

The gross amount paid for claims for property lost or damaged has been Rs. 3,252, of which Rs. 2,706 have been recovered from the persons responsible, or from the sale of the damaged articles, leaving a net loss of Rs. 546 only. This result, considering the extent of the traffic and the difficulties in working the ferry, is creditable to the traffic department.

Subordinate employes are still obtained locally, and the school at Saidpur turns out sufficient Station Masters and Signallers for the requirements of the line. Great difficulty is, however, experienced in obtaining artificers and labourers for the workshops. The mechanics employed on the line train up their sons as English clerks, and the question of the future supply of skilled labour for workshops calls for serious consideration. Some progress has been made in training natives as drivers, and there are now five native drivers and eight native shunters on the line. Want of education among men suitable for the work is the great obstacle to be overcome, as it is hard to induce those who are able to read and write to undertake the duties of firemen. The night school, which has been opened at Saidpur, will, it is hoped, lessen this difficulty in time.

The European and Eurasian staff has decreased from 79 to 68, the native staff from 2,061 to 2,014, on account of reductions in establishments; the conduct of all the employes has been very good.

The Provident Institution has been established since April 1880, and has now become most prosperous. At the commencement of 1881-82 there were 390 depositors, and the total of the voluntary and compulsory contributions amounted to Rs. 10,873-5-9 and Rs. 17,056-12 respectively. The employes fully appreciate the benefits offered by the Institution.

The Railway School at Kurseong has been conducted to the satisfaction of the parents of the children attending it, and the native middle class school at Saidpur has been managed with much energy and success. A day school at Saidpur has also been opened for the children of European and Eurasian employes on small pay, but the result so far is not encouraging.

The offer of prizes to Station Masters for the best average load per wagon during the season, and for the largest increase of traffic brought to stations, has had the effect of stimulating the staff and bringing about a healthy competition which will tend to the benefit of the railway; the prizes for the best kept station gardens are also having an appreciable effect on the appearance of the platforms.

The quality of the coal supplied has been good, and the arrangements for procuring it have continued to be satisfactory, the price having been further reduced. The trip system, and premia offered for saving coal and oil have worked satisfactorily throughout the year.

Attention has also been devoted to the oil supply, kerosine having been substituted for vegetable oil in all fixed lamps and signals at stations. Efforts are also being made to improve the lighting of the carriages, but a better and more economical roof lamp is greatly needed.

The extension of the line at Sara has given serious trouble on account of the erosion of the river, and arrangements have therefore been made, in the event of the river continuing to cut away the bank, to revert to the ghat selected when the line was first opened; this will add considerably to the length of the steamer trip, and consequently increase the time occupied in the journey between Calcutta and Darjeeling.

As stated in the last report, the capital expenditure was small; partly on this account and partly in consequence of the credits from the sale of surplus stores, steamers, &c., having been realized, the Capital account has been reduced. The principal works carried out were the completion of the workshops and fencing, and the building of quarters for the staff. An Institute for the employes was built at Saidpur, which is said to meet all requirements. The particulars of the Capital expenditure up to 31st March, 1882, will be found in the detailed report.

The Darjeeling Steam Tramway, now known as the Darjeeling-Himalayan Railway, was completed during the year, and has no doubt added to the traffic on this railway; the increased number of first and second class passengers is probably almost altogether due to the facilities now offered to the public travelling between Siliguri and Darjeeling. A large amount of work has been done by the staff of this railway in auditing and collecting the earnings of the Company, for which no remuneration has been given; gratuitous assistance has also been afforded in repairing rolling stock and conducting the work at Siliguri station.

There were no accidents or collisions of a serious nature during the year.

ENGINEERING DEPARTMENT.

The following works were completed and in progress during the year:—

Main and Branch Line. *Ballasting.*—330,000 cubic feet of shingle and sand ballast were carried from the bed of the Mahanuddy river and spread in the Julpigoree sub-division.

Stations and Offices.—The two corrugated iron goods sheds at Domer were joined, which added 91 lineal feet to the existing goods shed accommodation at that station, and the corrugated iron goods shed at Parbatipur was extended 58 feet.

The pukka brick goods shed at Hilli was completed.

The pukka stations at Chillahati and Siliguri were completed, and that at Shikarpur was nearly finished.

The platform at Nattore station was extended 100 feet to enable the trains to water at both ends of the station, and to avoid the inconvenience of the engine leaving the train for that purpose.

A third class waiting shed was built at Parbatipur for the accommodation of the Dinageporé and Rungpur passengers.

At Saidpur a lamp room for the traffic department and a store room for carriage and wagon department were completed; three pukka 3-roomed pointsmen's houses, a pukka pointsman's sentry box, a 6-roomed peons' house for the Manager's office, and a verandah to Locomotive Superintendent's office were built. The permanent Institute for Europeans was also completed, and the Examiner's stationery office was extended 15 feet. A new road, 5,000 feet long, behind the goods shed, was constructed.

Staff Quarters.—Better accommodations for the traffic menial staff, as well as police, with brick walls and corrugated iron roofs, have been provided at Madhunagar, Raninagar, Parbatipur, Nelphamari, Domer, Chillahati, Haldibari and Shikarpur, and for the signallers at Parbatipur, Hilli, Birampore, Chillahati, Haldibari, Shikarpur, Badargunge and Shampur, and at the following stations the buildings for signallers, &c., were almost ready for occupation:—

Gopalpur, Malanchi, Nattore, Madhunagar, Raninagar, Jeypore Rungpur, Kaunia, Daruani, Nelphamari, Domer and Siliguri.

Permanent way Sub-Inspectors quarters have been built at Phulbari. The third class bungalow at Phulbari and the first class bungalow at Badargunge were dismantled. The quarters for the police Sub-Inspectors at Bamungaon were completed, and those at Parbatipur and Saidpur were half finished.

At Saidpur the three bungalows which were commenced last year are now

occupied. The old Station Master's quarters have been dismantled and rebuilt with corrugated iron roof. Fencing round the subordinates' bungalows, Nos. 20, 21, 33 and 34, was completed. A 12-roomed house for the traffic reserve force, and four additional servants' houses, to bungalows Nos. 1, 3, 4, and 30, as also four 18-roomed houses, three for the workshops native staff and one for the native fireman were built.

Station Machinery.—Sheds for pumping engines at Sara, Nattore, Jeypore and Siliguri were built.

The engine shed at Kaunia was altered and raised, and a store room and an office were provided in it for the locomotive department.

It was found necessary to re-open Julpigoree as a watering station, the necessary arrangements were accordingly made, and a pulsometer put up at Haldibari station in place of the hand pump previously in use there.

Fencing.—A four-wire fence has been practically finished throughout the line. Wooden posts have been used from miles 133 to 169, and on 11 miles of the Rungpur branch. Of the remainder, 26 miles consist of iron standards, with four strands of wire, and the balance stone posts.

Post office.—The post office at Parbatipur was completed and made over to the postal authorities.

Workshops at Saidpur.—All the blocks were completed except verandah to block No. 8, the total expenditure having been Rs. 4,58,855.

The following temporary corrugated iron sheds were dismantled, being no longer required, and the materials in them utilized in other buildings:—

1. Workshops.
2. Stores shed.
3. Carriage sheds Nos. 1 and 2.
4. Saw-bench shed.

Damukdia Temporary Extension.—The fair-weather line was taken up and the materials were transferred to the Calcutta and South-Eastern State Railway.

Sara Ghaut Extension.—The Sara ghaut line being extended 3 miles southward, the station being removed to Ruppore. Temporary staff quarters, with mat walls, and offices for Station Master and Telegraphs, third class waiting shed, &c., were built there at a cost of Rs. 13,832.

The corrugated iron goods shed at Sara ghaut was removed to Ruppore and re-erected there.

The sidings at old Sara ghaut were dismantled.

General.

A pukka gate lodge has been built on mile 120.

Four hundred and twenty-two rails out of 119,144 laid in road, and 11,364 timber and two iron sleepers out of 509,954 and 19,517 respectively, have been renewed during the year.

LOCOMOTIVE DEPARTMENT.

Running Engines.—The total number of engines working was 40 up to 21st June, 1881, when four engines, Nos. 149, 150, 151 and 152, were transferred to the Tirhoot State Railway, leaving 36 on the line.

Engine failures.—The number of failures of engines working trains have been nine, of which four were owing to the valves slipping, one through the regulator spindle breaking, one owing to the gudgeon pin of the cross-head coming out, and the other three to mismanagement on the part of the drivers.

Accidents.—There were no accidents or collisions of a serious nature.

The percentage of working expenses to gross earnings compare favourably with previous years.

Locomotive.—

							Rs.
1879	1st half,	...	...	...	...	...	22·68
	2nd ,,	...	...	...	...	...	22 24
1880	1st half,	...	...	...	...	...	18·28
	2nd ,,	...	...	...	...	...	13 93
1881	1st half,	...	...	...	...	...	15 67
	2nd ,,	...	...	...	...	...	13·68

Coal.—The consumption has fallen steadily in spite of the introduction of the F. class engines in 1881, which haul a greater load and necessarily consume more coal per train mile. The following figures will show this :—

Year.				Cost per ton.	Consumption per train mile.	Cost per train mile.
				Rs.	lbs.	Annas.
1879-80,	...	...	...	13·07	37·31	3·48
1880-81,	...	...	...	12·72	32 88	2 98
1881-82,	...	...	...	11·95	32 01	2·72

The price of the coal was also less than that paid in previous years.

The coal and oil premium system is now in good working order, and the drivers are taking an interest in the publication of the monthly sheets, which tends to stimulate competition.

The trip system is working very satisfactorily, as it prevents what was evidently sometimes the case under the time system—namely, the want of push on the part of a driver to get through the run to time, as the longer he was out under the old system, the more overtime he drew ; whereas under the trip system, no matter how long he is on the road, he draws the same amount, he therefore naturally strives to get through the work as soon as possible.

Repairs of Engine.—The mileage run per engine and the cost of repairs per engine per year compare as follows :—

Year		Number of engines on line.	Total miles run.	Total cost of repairs.	Cost of repairs per engine.	Miles run per engine.	Cost of repairs per engine per mile.
				Rs.	Rs.		As.
1879	1st half, ...	40	314,500	11,087	277·17	7,862	0·56
	2nd ,, ...	33	309,461	21,028	637·23	9,365	1·08
1880	1st half, ...	36	317,770	10,917	323·25	8,827	0 58
	2nd ,, ...	40	298,774	7,463	186·57	7,469	0·39
1881	1st half, ...	40	277,066	7,887	197·17	6,751	0·46
	2nd ,, ...	36	310,793	14,253	390·63	8,733	0·71

It will be remarked that the cost of repairs per engine per mile is on the increase, showing that the repairs are not being neglected.

The number of engines repaired, and the average cost of each repair, are as follows :—

Year.		Number of engines repaired.	Total cost.	Average cost per engine.
			Rs.	Rs.
1879-80,	...	35	22,792	656
1880-81,	...	39	13,485	346
1881-82,	...	36	19,108	530

In the last report it was stated that the cost of repairs in 1879-80 stood at a high figure owing to certain alterations in the engines; and it was also observed that the expenditure on this item during this year would exceed that of 1880-81, as the re-tying of the wheels had commenced. This has proved to be the case.

The F. class engines still continue to give great satisfaction.

The conduct of the staff has been most satisfactory, and the health of the Europeans has been good. A great deal of sickness has been reported among the native workshop staff, but this should diminish now that good quarters have been provided for them at moderate rents.

CARRIAGE AND WAGON DEPARTMENT.

There was only one third class carriage built during the year to replace a brake-van which was accidentally destroyed by fire. There were a few minor alterations made to stock, and eight brake-vans were transferred to the Tirhoot State Railway.

The cost of repairs, however, has greatly increased, as will be seen from the following table:—

					Cost of Repairs.		
					Rs.	A.	P.
1879-80,	...	...	...	...	18,843	15	0
1880-81,	...	...	...	...	13,383	15	0
1881-82,	...	...	...	...	19,952	0	0

The percentage of expenses to gross earnings is here given:—

Year.					Total gross earnings.			Total expenditure.			Percentage of expenditure on total gross receipts.
					Rs.	A.	P.	Rs.	A.	P.	
1879,	1st half,	...	...	...	6,39,722	6	0	19,043	14	0	2.97
	2nd ,,	...	...	...	7,44,538	2	0	22,636	9	0	3.04
1880,	1st half,	...	...	...	7,76,632	3	0	22,026	9	0	2.83
	2nd ,,	...	...	...	8,36,169	0	0	15,533	6	0	1.85
1881,	1st half,	...	...	...	8,18,343	2	2	19,014	8	3	2.32
	2nd ,,	...	...	...	10,25,546	13	3	21,489	4	2	2.09

Arrangements have been made for all the stock to be thoroughly repaired at certain fixed periods, which will, it is hoped to a certain extent equalize expenditure.

Great difficulty is still experienced owing to the rapid end wear of the carriage axle-brasses (caused by the high speed of the trains), as well as of the tyres, and it has been found necessary to lift all the carriages once every six months in order to change the wheels and brasses. This is a source of great trouble and expense.

Carriage Stock.—Another great obstacle which has to be contended with in keeping the carriage stock in good order, is the difficulty of placing the vehicles under adequate cover and cleaning them properly at Sara, where of course the greater part of the spare stock must be kept. The Sara terminus is a temporary one liable to be shifted at any moment, so that permanent arrangements are out of the question, and the temporary accommodation supplied, though good of its kind, is not altogether satisfactory.

The screw couplings designed by Mr. Rendell have continued to give entire satisfaction.

Workshops.—These are nearly completed, but a few minor works still remain to be done before they are brought into a thorough state of order.

The overhead cranes and boilers for driving the engines of the machine shop have not yet arrived, and consequently the locomotive laid down for working the

shops is still employed on that duty, although it is a very expensive form of boiler, and might be more usefully employed on the line. The labour for lifting engines with screw-jacks is also increased by the absence of the cranes, more specially in the case of F. class engines. There have been two machines put down during the year—namely, a general joiner and slot drill. The latter is a first class machine, and the amount of work of all kinds turned out by it, and the manner in which the work is done, are most satisfactory.

Emery buffing wheels and two grindstones have also been laid down, and a spring furnace has been erected.

As soon as the boilers and overhead cranes are received and erected, the shops will be virtually complete.

The value of work done in the shops in 1881-82 has amounted to Rs. 1,11,408, as compared with Rs. 1,12,678 in 1880-81, and the labour expended on the different jobs was Rs. 44,736 in 1881-82 as compared with Rs. 40,588 in 1880-81, so that there has been actually more work done in the past year although the out-turn has not been quite so valuable.

The work done was as follows:—

	1880-81.		1881-82.	
	Rs.	A. P.	Rs.	A. P.
Capital,	51,837	2 0	18,356	14 9
Plant,	589	9 1	435	7 4
Locomotive,	14,704	4 7	24,223	5 3
Carrriage and wagon,	9,437	2 1	16,809	7 6
Engineering,	7,989	2 6	9,665	5 10
Other departments,	23,718	13 2	31,205	15 6
Private,	1,782	6 9	3,825	15 1
Total,	1,10,058	8 2	1,04,322	7 3
Amount of uncompleted orders on the last day of the official year carried forward to next year,	2,619	6 10	7,085	8 2
Grand Total,	1,12,677	15 0	1,11,407	15 5

Capital Works.—It will be noted that work on Capital account has fallen considerably, and that the shop is gradually settling down to its normal work of repairs and erection of stock.

Labour.—There is still much trouble experienced in procuring labour and training it, and the demand for skilled workmen all over India appears to greatly exceed the supply. It is with extreme difficulty that men are found willing to be trained as mechanics, and but few of them when taught put their sons to the trade. The country here is so rich in produce, and the population so universally employed in agriculture, that it seems hopeless to expect to draw much labour from the district, and although a few lads belonging to the place are employed, they are frequently withdrawn for field-work by their friends. It is to be hoped that when the line is connected with the poorer districts, a more active immigration will set in.

STORE DEPARTMENT.

This department remained under the charge of the Locomotive Superintendent. The work was carried on efficiently throughout the year. The monthly cost of the establishment was Rs. 340 only.

All local purchases in Calcutta were obtained through the Port Storekeeper. It has, however, been decided to follow in future the course laid down in Government of India, Public Works Department Resolution No. 174RS, dated 6th September, 1881, and as soon as the stores at present arranged for by the Port Storekeeper have been used up, advertisements for tenders will be issued, and all indigenous productions and local manufactures will be procured direct from the vendors. This procedure will, it is thought, be more satisfactory to all than the one now in vogue.

The stores balance has been considerably reduced during the year by sales and transfers.

TRAFFIC DEPARTMENT.

The following statement gives the gross traffic receipts as compared with those of the previous year:—

Traffic Earnings.				1880-81.	1881-82.	Increase in 1881-82.	Decrease in 1881-82.
				Rs.	Rs.	Rs.	Rs.
Coaching traffic,	...	...	...	5,17,951	5,49,154	31,203	...
Goods,	...	...	...	8,45,320	10,90,112	2,44,792	...
Telegraph,	...	...	...	6,254	6,010	...	244
Sundries,	...	...	...	95,840	80,890	...	14,950
Total,				14,65,365	17,26,166	2,75,995	15,194

These figures show a considerable increase under all heads of traffic, the net result being an increase in amount earned of Rs. 2,60,801, or 17.79 per cent.

The details of the coaching earnings are as under—

Description of Traffic.	1880-81.		1881-82.		INCREASE.		DECREASE.	
	No.	Amount.	No.	Amount.	No.	Amount.	No.	Amount.
		Rs.		Rs.		Rs.		Rs.
First class,	3,183	37,490	2,991½	47,992	..	10,502	191½	..
Second class,	5,031	25,370	5,500	34,177	469	8,807	..	..
Intermediate,	16,323	35,403	14,238	36,695	..	1,292	2,085	..
Third class,	649,674	3,74,463	656,348½	3,71,015	6,674½	..	..	3,448
Luggage and parcel,	..	25,923	..	33,026	..	7,103	..	..
Horses, carriages, and dogs,	..	7,909	..	8,362	..	453	..	..
Special trains,	..	2,352	..	3,003	..	651	..	..
Miscellaneous,	..	9,041	..	14,884	..	5,843	..	..
Total,	674,211	5,17,951	679,075	5,49,154	7,143½	34,651	2,276½	3,448

These, as will be seen, exhibit an increase in amount earned under all heads, except third class passengers. The falling off in this traffic commenced early in the year, and continued steadily till the month of August, when a revival took place, and from that time to the present there has been a marked improvement both in number of passengers carried and amount earned. Enquiry was made at the time in every conceivable direction with a view of ascertaining the cause for this traffic so suddenly leaving the line, but no reliable explanation could be obtained out of the many put forward.

The details of goods earnings are—

Details of Goods Traffic.	1880-81.		1881-82.		INCREASE IN 1881-82.		DECREASE IN 1881-82.	
	Tons.	Rs.	Tons.	Rs.	Tons.	Rs.	Tons.	Rs.
Merchandise, general,	118,510.65	8,41,641	165,671.23	10,87,843	47,160.58	2,46,202	..	..
Live stock,	..	790	..	..	..	..	..	790
Demurrage,	..	2,282	..	1,650	..	..	..	632
Miscellaneous,	..	607	..	619	..	12	..	..
Total,	118,510.65	8,45,320	165,671.23	10,90,112	47,160.58	2,46,214	..	1,422

and show a net increase of 47,160.58 tons in weight carried and Rs. 2,44,792 in amount earned.

The following statement gives the weight of the principal commodities which have passed over the line for the period under review, with the increase and decrease under each head :—

Commodities.	1880-81.	1881-82.	Increase in 1881-82.	Decrease in 1881-82.
	Tons.	Tons.	Tons.	Tons.
Ale,	380.30	569.69	189.39	..
Food grain,	39,134.35	36,057.79	..	3,076.56
Ginger,	404.96	861.76	456.80	..
Gunny-bags,	2,369.95	5,986.73	3,616.78	..
Jute,	24,797.06	44,987.11	20,190.05	..
Piece-goods,	5,190.56	4,506.14	..	684.42
Railway material,	4,551.87	2,668.07	..	1,883.80
Salt,	11,246.66	16,045.33	4,798.67	..
Sugar,	1,079.47	1,437.11	339.64	..
Tea,	4,297.28	4,345.41	66.13	..
Tobacco,	10,158.30	9,274.32	..	833.98
All other goods,	14,899.89	38,931.79	24,031.88	..
Total,	118,510.65	165,671.23	53,689.34	6,528.76

The monthly traffic reports have given full details of the causes for the increases and decreases, the principal of which may be here briefly summarised

Decreases.

Food grain, 3,076.56 tons.

The generally good crops throughout the country have seriously affected the traffic in this staple. The stocks of rice and paddy held in the district are very large indeed, but as it is difficult to find a market even at the low prices quoted, it is not a matter for surprise that there has been a falling off under this head, but rather that, under such adverse conditions, so large a quantity has been carried.

Increases.

Gunny bags, 3,616.78 tons.

A great impetus has been given to the traffic in this staple by the low price of the raw material, and by the brisk demand that has sprung up for hand-made bags for shipment to America.

Jute, 20,190.05 tons.

During the year 1880-81, 21,640.70 tons of jute were carried against 45,000.49 tons during the year under review, being an increase of 23,359.79 tons, or 107.94 per cent.

When it is remembered that the price of jute at the port has been steadily on the decrease during the season under review, the very large increase in the weight carried shows that the present low rate is fully appreciated and is being taken advantage of by despatchers.

Salt, 4,798.67 tons.

The low rate introduced in October 1878 continues to divert this traffic from the rivers to the railway.

All other goods, 24,031.88 tons.

The increase in the weight carried under this head, which comprises all the numerous commodities passing over the line not given in the foregoing headings, is a good sign, tending, as it does, to show a steady development of traffic.

Changes in Rates, &c.—(1). On and from 1st April, 1881, Chaitangram station was re-opened for passenger traffic only, and was again closed on and from 15th October, 1881.

(2). On and from 25th June, 1881, Bamungaon station was opened for both goods and coaching traffic.

(3). On and from 1st July, 1881, the rate for tea was reduced from one to five-sixth pie per maund per mile, and a through rate of 15 annas per maund (instead of Rs. 1-2) from Siliguri to Damukdia was sanctioned and introduced; tea being also carried from this date without restriction as to weight.

(4). On and from 1st July, 1881, the rate for jute was reduced from half to two-fifth pie per maund per mile, and the restriction of one maund five seers on weight of drums removed.

(5). On and from 1st July, 1881, the rate for *bishpat* tobacco was reduced from half to one-third pie per maund per mile, and the rate for all other tobacco was increased from half to two-third pie per maund per mile.

(6). On and from 1st July, 1881, the rate for ice was altered, and charges were made in accordance with the quantity sent and distance carried on the railway, ferry mileage being fixed as 20 miles in calculation.

(7). On and from 5th July, 1881, the increased rate for all other tobacco, excepting *bishpat*, was withdrawn, and the old half pie rate reverted to.

(8). On and from 11th July, 1881, the rate for plants in consignments not exceeding one maund, when carried by passenger train, was fixed at parcel rate at owner's risk.

(9). On and from 12th July, 1881, the rate for *dhunnia* was reduced from 3rd to 1st class, and the following articles were added to the classification issued on 15th June, 1881, and 1st January, 1882 :—

Kaphur, Kacharee,	...	...	...	...	2nd class.
Nagpur, Lucknow, and Poonat oy figures,	...	...	...	...	at owner's risk.
Dog biscuits,	...	...	...	...	1st class.
Pholea,	...	...	...	...	2nd "
Tricycles,	...	...	...	...	3rd "
Electric light candles,	...	...	...	...	" "
Telephone instruments,	...	...	...	...	" "
" materials,	...	...	...	...	2nd "
Cotton rope,	...	...	...	...	" "
Calcutta matting,	...	...	...	...	3rd "

(10). On and from 1st August, 1881, the Kaunia and Dhurla Railway was opened for traffic.

(11). On and from 1st September, 1881, the reduced rate of two-fifth pie for jute was withdrawn and the old half pie rate reverted to.

(12). On and from 10th October, 1881, the half pie rate for jute was again withdrawn and three-fifth pie rate reverted to.

(13). On and from 15th November, 1881, the timing of mixed service was altered as under—

3 Up-mixed to run from Sara to Saidpur.

9 Up-mixed to run from Kaunia to Siliguri.

4 Down-mixed to run from Saidpur to Sara.

10 Down-mixed to run from Siliguri to Kaunia.

(14). On and from 3rd November, 1881, through booking with Rampore Bauleah was introduced.

(15). On and from 1st December, 1881, the rate for specie was increased to 4 pie per maund per mile.

(16). On and from 6th February, 1882, Mogul Hât branch of the Kaunia-Dhurla Railway was opened for traffic.

(17). On and from 1st March, 1882, sugar, irrespective of quality, was reduced to 1st class rate when sent in double bags, and 2nd class in single bags.

(18). On and from 1st March, 1882, the rate for *bishpat* tobacco was reduced from one-third to quarter pie per maund per mile.

The traffic, both goods and coaching, has been carried over the line during the year under review without a hitch as far as the Traffic Department is concerned, but serious blocks have occurred at Siliguri owing to the inability of the Darjeeling-Himalayan Railway to cope with the through traffic offering, and consequently through booking was suspended on several occasions. These repeated stoppages in through booking gave rise to serious complaints, especially from our rice-despatching stations, where contracts had been entered into to supply tea gardens with given quantities of that staple within a specified time.

The ferry, too, partially failed to meet the traffic during one of the busiest months (October 1881), owing to the difficulty in obtaining a sufficient supply of labour.

The system introduced on this line, of training lads fresh from school for telegraph and traffic duties, continues to work most satisfactorily. Applications for admittance are now so numerous that only men of a much higher standard of education are accepted; and a more severe test examination has been put in force, consequently the men, when passed, are of a better style all round, and when posted for duty at stations, give less trouble to supervise, and more satisfaction to the public in the performance of their duties.

The matter of lighting station platforms and semaphore signals has received much attention during the year, and kerosine oil has, with considerable benefit, both in the way of improved lighting and saving in expense, been introduced in place of castor oil.

The description of burners used for the semaphore signals is one which does not require a chimney, and is a decided success. Complaints from drivers, of not being able to discover signals (which used to be an every-day occurrence), are now almost unknown.

The question of improving the lighting of carriages has also been gone carefully into, and various experiments made, which will, it is hoped, eventually result in the present very unsatisfactory style of roof lamp being replaced with a much more economical and better carriage light. The present castor oil burners used in the roof lamps (Deffries) are extremely unsatisfactory, and in spite of all the precautions taken, complaints of the lamps being out, are still frequent.

POLICE.

The Police employed at the stations both law and order, and watch and ward, continued to be under the control of the Superintendents of the various districts through which the line passes, and the cash guards at Saidpur were placed under the same supervision during the year.

The system does not work satisfactorily, and although it is perhaps desirable for the constables employed on law and order to be under the authority of the Police Department, it would be convenient and economical if the men employed on watch and ward were made subordinate to the Railway officials.

Three Sub-Inspectors have been posted to the Railway in place of the responsible Police officer, whose appointment was referred to in the report for last year. These Sub-Inspectors are practically of but very little use. It is, however, expected that the Railway Police generally will become much more efficient when the recommendations of the Railway Police Committee have received due attention.

MEDICAL DEPARTMENT.

The strength of the department was as follows :—

1 Medical Officer, 1 Assistant Surgeon, 5 Hospital Assistants.

The number of dispensaries was the same as in the previous year, namely four—at Sara, Kaunia, Saidpur and Siliguri; they continued to be sufficient for the requirements of the line, sickness being less prevalent, although the work of the department was increased by the opening of the Kaunia-Dhurla Railway, and the commencement of the construction of the Dinagepore extension.

The Darjeeling febrifuge was again prescribed during the year, but there is still a considerable amount of prejudice against its use.

The health of the employés generally has been much better than in previous years, which is probably attributable to the improved accommodation supplied to the staff, and the attention paid to drainage at the various stations.

The sanitary arrangements of Saidpur and Sara were efficiently carried out under the direction of the medical officer.

STEAM BOAT SERVICE.

The following steamers and flats were employed during the year :—

Name or distinguishing mark of vessels.	HORSE-POWER.		Registered tonnage.	Remarks.
	Nominal.	Actual.		
<i>Steamers and Tugs.</i>				
<i>Osprey</i> , paddle steamer,	93	...	367·5 B.O.M.	
<i>Vampire</i> , " " " " " " " "	93	...	367·5 B.O.M.	
<i>Condor</i>, " " " " " " " "	...	...	85 Register.	Arrived on 6th March, 1882. Employed on Rampur-Bauleah service.
<i>Lilly</i> , screw launch,	20	...	18 Register.	Employed on Rampur-Bauleah service until relieved by the <i>Condor</i> , when she started for Jatrapore as relief boat on Kaunia-Dhurla service.
<i>The Isla</i> , flat, ... ..	...	...
A class flats, ... ..	...	...
B " " " " " " " "	...	...
C " " " " " " " "	...	...

The ferry run was altered three times during the year, the erosion and silting up of the river Pudma necessitating an abandonment of the successive ghauts selected.

The earnings of the service have increased from Rs. 1,69,223 in 1880-81 to Rs. 2,02,515, in the year under review, while the expenditure has decreased by Rs. 11,535; but no reliable comparison can be made with the results attained in former years, as the conditions were not similar. The steamers now employed were specially designed for the work to be done, while in previous years the vessels available were expensive to work and ill-adapted for the service, and in addition the steamer journey has been much shortened.

The small workshop at Sara for the ferry has continued to give satisfactory results; by its means repairs to the vessels have been attended to thoroughly and with despatch, while it has been also found possible to effect considerable improvements in the flats and steamers at a very moderate cost. No accident of any importance occurred to the steamers or flats.

On the 1st April, 1881, the Northern Bengal and Eastern Bengal Railway work at Sara and Damukdia was combined and placed under a Joint Agent for the two undertakings. The altered system has worked with but fair success, and there has been a considerable amount of friction in the dealings between the Joint Agent and the Eastern Bengal Railway officials. The benefit of the double independent check over consignments at Sara and Damukdia is also lost by the new arrangement, but there has been no increase in claims in consequence. There were great difficulties with respect to the labour supply at Sara during the months of October and November owing to the desertion of coolies during harvest operations; this caused considerable inconvenience and delay to goods. Endeavours, however, are being made to overcome such difficulties in future.

The claims paid, were small in comparison with the traffic, and their value was, in the majority of cases, recovered from the individuals in fault or realized by the sale of the damaged articles. The net amount paid was Rs. 150-9 only.

TIRHOOT STATE RAILWAY.

The results of the working since 1876 have been—

Year.	Miles open.	Gross earnings.	Expenditure.	Percentage of expenses to earnings.	FINANCIAL RESULTS.	
					Net profit or loss.	Per cent. on Capital outlay.
		Rs.	Rs.		Rs.	
1876, ...	46	1,79,414	1,23,196	68	56,218	2·41
1877, ...	76	2,83,922	1,93,620	68	90,302	2·03
1878, ...	82	4,41,308	3,32,500	75	1,08,808	2·23
1879, ...	82	4,58,733	3,50,914	76	1,07,819	2·16
1880, ...	85	4,52,924	2,62,199	57	1,90,725	3·70
1881, ...	85	5,84,254	3,48,054	59	2,36,200	3·70

The year under review was a prosperous one, yet the results were not so satisfactory as might have been expected. The net revenue earnings were Rs. 2,36,200, or 3·70 per cent. on the Capital outlay, as against 3·70 of the previous year; but the working expenses amounted to Rs. 3,48,054 against Rs. 2,62,199 of the previous year, and it is manifest that the line requires to be worked with greater economy.

The coaching traffic remained almost stationary; but in goods there was a steady increase, especially in seeds, tobacco and indigo, due mainly to the introduction of low rates for carriage. It is anticipated that on completion of the extension to Bettiah and the Kosi, a still further impetus will be given to traffic in these staples.

The total Capital expended to the 31st March, 1882, was Rs. 61,08,037, or, if the suspense account, Rs. 5,15,436, debited to the extensions by the Government of India, are excluded, Rs. 55,94,391. The outlay during the year was Rs. 1,72,289, by which many important additions have been made to the line, including an overbridge at Somastipur, the completion of the central workshops, the Institute, and extra quarters for the staff.

The head-quarters of the Traffic and Locomotive departments are at Somastipur, the Manager's office at Mozufferpore, while the Examiner's and Engineer's offices are at Durbhunga. This scattering of the head offices of the departments is found to cause great delay and inconvenience in the transaction of business; it has therefore been proposed to locate the offices of the Manager, Examiner, Executive Engineer, and Traffic Superintendent at Mozufferpore, in one central building, for which designs and estimates are now being prepared. Ten engines, 40 carriages, and 136 wagons have been ordered from England, and it is hoped that, with this additional stock, the difficulties at present experienced in meeting the requirements of the traffic may be overcome.

The additional steamer and flats ordered from the Marine Department have made but little progress, and although they were promised during 1882-83, it is feared that they cannot be delivered till some time after the end of the year. Arrangements have been made for the temporary loan of a steamer from the Chief Commissioner, British Burma.

Extension from Dulsingserai to Semureea.—Great difficulties have been experienced at the crossing of the Ganges, opposite Barrh, in consequence of the shifting character of the banks and river bed, and on several occasions it has been found necessary to change the site of the Ghaut station, with the result of almost complete cessation of traffic, a serious block of goods, and heavy expenditure. It has consequently been decided to move the ferry to Semureea, opposite Mokameh, where the channel of the river, so far as is known, is permanent and well defined. This change has necessitated the construction of a new line, 23 miles long, from Dulsingserai to Semureea at a cost of Rs. 7,69,430, but there will be the compensating advantages of an increased lead of 7 miles for all goods, a reliable crossing, and greater economy in working. The earthwork is nearly finished, and as, with the exception of the bridge over the Bolan, which is being transferred from the existing line, there is no work of importance, the line should be ready for traffic in November.

The branch on the right bank of the Ganges, in connection with the East Indian Railway, will run from the village of Autah to Mokameh, a distance of about 4 miles: this will be constructed and worked as a part of the East Indian Railway, Government leasing the land at a nominal rental.

Extension to Bettiah and Pipra Ghaut.—This extension runs west from Mozufferpore to Bettiah, a distance of 78 miles. The estimated cost is Rs. 43,86,301. It was commenced in April, but progress during the year has not been altogether as satisfactory as it might have been; more energy is, however, being now shown by the contractors, and as the earthwork is practically finished, and the bridges fairly forward, the line should be ready to open throughout for traffic by the end of the year, although there may be some subsequent delay in fully completing the ballasting.

The eastern line proceeds from Durbhunga towards the Kosi river, and will terminate for the present at Jhinjharpur (Pipra Ghaut), on one of the Bolan rivers, the length being 24 miles. This is also being constructed nominally by contract, but owing to the inability of the contractor to carry out the work, it has practically been taken over by the Executive Engineer. Very heavy floods during the last rains showed that the waterway originally allowed was insufficient, and it has in consequence been largely increased to the extent of nearly doubling it in the first 6 miles. This additional work may possibly delay the completion of the line, but it should be ready for opening by the spring of 1883. The estimated cost, including the extra bridging, is Rs. 15,80,353.

Extension to Bullooah and Seetamurhee.—It is proposed to carry on the eastern extension from Pipra Ghaut to Bullooah Ghaut on the Kosi, near the Nepal frontier, a distance of 50 miles, and a location survey, in continuation of the preliminary one made in 1876, is now being undertaken. A considerable increase of traffic may be expected from this extension, as the country traversed by the line is a great rice-producing district, and there is a thriving trade with Nepal through Bullooah, which no doubt will take to the railway and desert the Kosi, the navigation of which is most dangerous and uncertain.

Owing to the lateness of the season when work was commenced, and the want of sufficient staff, it is not probable that more than 25 miles will be located this season, but it will form a second section of the extension, and too great stress cannot be laid on the importance of early construction of this line, which is all that is now required to render the Tirhoot a really paying railway.

Seetamurhee Extension.—Opinions are divided with respect to the route by which the line to Seetamurhee should be taken, the following having been proposed:—

						Miles.
Durbhunga to Seetamurhee,	...	...	...	...	...	41
Mozufferpore "	...	...	...	...	...	34
Kanti "	...	...	...	...	...	31

The Collector of Durbhunga is in favour of the eastern route, while the Collector of Tirhoot advocates the line to Mozufferpore. Until the several routes have been surveyed and reported on, no decided opinion can be given which should be adopted; but it is believed that the line from Durbhunga will be the least expensive and intercept the most traffic.

A third branch is strongly recommended by Mr. Edgar, the late Collector of Chumparun, viz., from Motiharee northwards to the Nepal frontier. The Chief Engineer lately visited this country, and testifies to the enormous traffic on this line of road. In any case it seems to be most important that the Sikrana should be bridged, where the main roads from Nepal cross it. This river is navigable to the Ganges, and it is believed that much of the traffic which is now carried down by boats, would, if the river were bridged, find its way to the railway.

ENGINEERING.

In consequence of the screw-pile bridge over the Bolan nallah being requir-

ed for the new crossing of that stream on the Mokameh extension, a temporary wooden bridge of 10 spans of 12 feet was commenced in February, and was nearly complete at the close of the financial year. This bridge, which is about 200 feet south of the present bridge, will carry the traffic of the line, and it has been made sufficiently high to be above the reach of the highest flood.

The permanent way was kept in good order throughout the year, considerable renewals of both sleepers and rails having been made. As far as can be seen at present the three varieties of the Denham sleepers laid experimentally in the last year gave satisfactory results. None of the parts have worked loose, and the plates do not require more boxing up than is the case with wooden sleepers.

In consequence of the difficulties experienced with the Dearah line this year, it was found necessary to increase the permanent way gangs from 12 to 20. The Dearah line has this year been exceptionally difficult to manage; in fact, it is in consequence of the uncertain approach to the Ganges in the Barrh direction that the abandonment of the Dulsingserai-Bazidpur line has been determined upon in favour of the Dulsingserai-Semureea ghaut route. When the water of the Ganges began to fall last October, it was found that a line, entirely differing from that of the previous year, had to be selected from Bazidpur to opposite Barrh ghaut. The first line chosen left the old Dearah line at the 5th mile from Bazidpur and ran for another 6 miles to a point opposite the town of Barrh, and considerably above Barrh ghaut. This necessitated the purchase of three more miles of permanent way materials at the cost of Capital, and also entailed heavy expenditure on compensation for crops and earthwork at the expense of Revenue. This line was scarcely laid 3 miles when the river between the ghaut and Barrh began to shoal, and a new ghaut had to be immediately determined upon. The ghaut chosen was exactly opposite Barrh ghaut station, on a sand bank which had been newly formed during the previous rains; and to get on this sand bank a cutting, 1,400 feet long by an average of 14 feet deep, had to be made from the higher to the lower bank. This ghaut is a convenient one, but its situation is very precarious, as the rails are liable to be cut off at a low point of the sand bank, a mile from the ghaut, which will necessitate an early retirement to the high ground when the river commences to rise, and it is uncertain whether the steamer will be able to reach the permanent bank at the time when this retirement is made,—a combination of circumstances which may make it impossible to gain access to the river at all for the space of a week or two. It will not be difficult to understand how impossible it is to keep down the working expenses of this department as long as the present crossing of the Ganges is adhered to.

A siding to the river Gandak from Somastipur, half mile in length, was laid down and completed.

No serious accidents affecting the permanent way occurred during the year.

The new carriage shed at Somastipur was completed during the year; also a new platform, overbridge, and carriage inspection pit at the same station.

The Institute.—Both central portion and wing were completed, except the tiled roofing, which was delayed in consequence of non-receipt of the tiles from Ranigunge, where they are being made.

A new office for the storekeeper at Somastipur was commenced and finished during the year.

In addition to ordinary works of maintenance and repair, the following additional works and buildings are in hand:—

CHARGEABLE TO CAPITAL.

Completion of works commenced in previous year.

1. Commander's quarters at Barrh Ghaut.
2. Out-houses to " "
3. Goods shed doors at Bazidpur.
4. " " Dulsingserai.
5. " " Durbhunga.
6. New carriage shed at Somastipur.

7. Addition to locomotive smithy.
8. Store-room to " "
9. Cook-houses and servants' houses to two sets of new married quarters.

Works commenced in current year and completed.

1. Store-room to Kali Kothi.
2. Addition to " "
3. Gandak siding.
4. Storekeeper's office at Somastipur.
5. Platform and overbridge " "
6. Platform railings (all not fixed).
7. Carriage inspection pit No. 1.
8. Barrh Ghaut siding.
9. Dearah extension.

Works commenced in current year and not completed.

1. Bolan temporary wooden bridge.
2. Institute (two wings).
3. Carriage inspection pit No. 2.
4. Waiting shed at Somastipur.

CHARGEABLE TO REVENUE.

Works commenced and completed during the year.

1. Latrine to staff quarters at Durbhunga.
2. West verandahs to Examiner's office, ditto.
3. Compound fence to Commander's quarters at Barrh Ghaut.
4. Sub-Storekeeper's office at ditto.
5. Extension of Bilaspur protective bund.
6. Shed over locomotive water pump at Bazidpur.

TRAFFIC.

The results of the year's working are summarized as follows:—

				Number of weights.	Earnings. Rs.
Coaching, .. .. .	..	..	..	469,664	2,41,590
				Maunds.	
Goods, .. .. .	..	..	..	3,213,667	2,52,890
Sundries, .. .. .	..	..	..	..	18,729
Steam-boat, .. .. .	..	..	..	..	95,374
Gross earnings, ..					6,08,583

being an increase of 50,930, or 9 per cent. over the receipts of 1880-81.

The percentages of increase under different heads are—

				Number.	Receipts.
Coaching, .. .. .	..	..	..	.. 7	9
Goods, .. .. .	..	..	..	.. 48.0	20
Sundries, .. .. .	..	..	..	.. ..	-18
Steam-boat, .. .. .	..	..	..	.. ..	-7

The coaching traffic, divided into classes, shows the following results:—

				In number.	Receipts. Rs.
First class, .. .. .	..	..	..	3,236	2,542
Second " .. .. .	..	..	..	3,692	7,512
Third " .. .. .	..	..	..	462,736	2,02,181

Under goods traffic the quantities of the principal commodities carried over the line as compared with the previous year are—

			1880-81.	1881-82.	Percentage of increase and decrease.
			Mds.	Mds.	
Seeds, .. .. .	..	..	344,402	363,551	5
Hides, .. .. .	..	..	54,025	50,570	-6
Saltpetre, .. .. .	..	..	89,291	110,346	24
Food grain and pulses, .. .. .	..	..	409,612	365,257	-10
Salt, .. .. .	..	..	302,874	378,946	24
Piece-goods, .. .. .	..	..	120,424	116,113	-3
Tobacco, .. .. .	..	..	124,093	150,284	21
Indigo, .. .. .	..	..	37,792	53,342	41
Other goods, .. .. .	..	..	550,996	4,625,258	195

Of total through goods carried, 794,150 maunds were outwards, and 883,144 maunds inwards, and the proportion of empty to full running 34·50 per cent. This increase being due to the large amount of material for extensions, the vehicles carrying them not being able to bring down return loads.

The earnings per train mile were 3·27.

The chief alterations in the rates have been—

(1). Rate for the carriage of all special class goods over the ferry during the short ferry season reduced to 6 pies per maund, including handling.

(2). Rates for both coaching and goods altered from station to station to mileage.

(3). Rates for the carriage of minerals over the Gandak ghaut siding fixed as follows:—

Special and first class, .. at 8 annas per 100 maunds.

Second and third class, .. „ 1 rupee „ 100 „

(4). Rate for reserved family carriage reduced from ten to six full fares.

(5). Rates for the carriage of railway materials and stores fixed as follows:—

(a). Coal for the locomotive or any other department, 28 pies per wagon per mile.

(b). Materials and stores of all kinds, whether for “construction,” “maintenance,” or “stock,” a quarter pie per maund per mile.

(c). Stores carried in store delivery vans, 28 pies per vehicle per mile.

(d). Engineering stores and materials carried by ballast trains, Rs. 25 per day of 8 hours for engine power, plus Re. 1 per day of 24 hours for each truck or wagon lent by the Traffic Department, in addition to the cost of any extra establishment specially employed in connection with the work, and subject to a minimum charge as for five hours, or five-eighths the above rate for engine power and 8 annas per truck lent.

(e). The ferry rate of all stores, including locomotive coal, will be 4 pies per maund for the whole distance. The handling to be done by the Ferry Department, and the cost included in its working expenses.

(f). The minimum charge on all consignments will be 8 annas.

(6). The maximum weights of consignments of plants and shrubs carried by passenger train, increased to 5 maunds per consignment to be conveyed at owner's risk at half parcel rate, plus 3 annas for each parcel as a ferry charge.

(7). The issue of return tickets introduced at the rate of two single fares.

LOCOMOTIVE AND CARRIAGE AND WAGON DEPARTMENTS.

Locomotive.—There are one A. class, nine D. class, and four E. class engines on the line.

The four E. class engines were brought from the Northern Bengal State Railway—two in July and two in October 1881.

There have been many failures of engines, caused mostly by the carelessness of the staff.

Five engines have had heavy repairs done to them.

The average consumption of coal was 26·9 lbs. per train mile, and of oil 6·8 pints per 100 miles.

Carriage and Wagon.—There are 69 carriages and 307 wagons on the line, and the stock is being added to for the use of the extensions when they are opened. Forty-four ballast wagons and three pairs of timber trucks were completed in

November last, and 25 (18-feet) covered goods wagons are now building in the workshops; 70 more will be built on receipt of ironwork from England; five mail vans will be commenced at once, and one horse-box is nearly completed. When all the stock ordered has arrived, there will be—

Engines, 34; Carriages, 109; Wagons 447.

During the year four ballast wagons and two brake-vans have been re-built, and 200 vehicles have had ordinary repairs done to them.

The addition to the machine shops has been completed and the iron foundry has been built. The cupola has been erected and is ready for work. A locomotive store and tin-smiths' shops have also been built, the workshops are therefore nearly completed.

The new carriage shops have been completed, and a circular saw and general joiner have been erected are now working.

STEAM FERRY.

There are four steamers belonging to the flotilla,—two paddle-wheels (the *Eagle* and *Barrh*) and two screw (the *Phlox* and *Sylph*).

The *Eagle* has done her work very well during the year.

The *Barrh* has been hired out to the Road Cess Committee of Sarun for the past year, but she has now been returned to the Railway, as the Road Cess have no further need of her.

The launch *Sylph* has been thoroughly overhauled and repaired, and is now in first class order.

There are seven flats at work; the seventh was purchased from the Northern Bengal State Railway in July last, and has proved of great service, as it carries much more cargo than the others.

CAWNPORE-FARUKHABAD STATE RAILWAY.

This line, 86½ miles in length, constructed as a Productive Public Work on the metre gauge, was opened for traffic throughout on the 1st February, 1881, and at the close of 1881-82 had been working for a little over a year.

The total Capital expenditure to the 31st March, 1882, amounted to Rs. 31,98,888, or Rs. 36,981 per mile of open line, of which Rs. 1,53,140 were expended during the year 1881-82 in completing works unfinished at the close of the previous year. The original estimate, amounting to Rs. 32,23,021, was closed on the 31st March, 1881, and the works during 1881-82 were carried out on supplementary sanctions accorded by the Local Government, aggregating Rs. 61,860. This amount does not, however, include the cost of rolling stock under erection by the Oudh and Rohilkhand Railway Company.

The principal works executed by the line staff during the year was the completion of the Kali nadi bridge and approaches, which was opened for traffic on the 30th June, 1881, up to which time trains ran over a temporary bridge and diversion. This and the other Capital works executed under the Engineer-in-Chief and Manager cost during the year Rs. 1,03,695. The supply of the remainder of the carriage and wagon stock, the erection of which had been commenced in previous years by the Oudh and Rohilkhand Railway Company, was completed at their shops in Lucknow.

The capital expended on this line to date has been obtained as follows:—

	Rs.
Subscribed by shareholders,	4,51,200
Contribution from Provincial Revenues,	5,50,000
From Imperial Productive Public Works grant;	21,97,688
Total,	31,98,888

The financial results of this, the first full year's working of this Railway, may be regarded as decidedly favourable, the percentage of net earnings to Capital expended being 3·3. There can be little doubt that the financial results will be much improved by the extension of the line from Farukhabad to Hathras road, when through traffic with the Rajputana system will be established.

The earnings and expenses for the year 1881 are shown in the following table :—

Traffic earnings—				Rs.
Coaching,	...	...	...	1,72,101
Goods,	...	...	...	1,62,326
Telegraph,	...	...	...	1,673
Sundries,	...	...	...	1,104
				3,37,204
Gross earnings,				...
Deduct working expenses,				...
				2,30,187
Net earnings,				...
				1,07,017

or Rs. 74·9 per mile per week.

the proportion of working expenses to gross earnings being 68·3 per cent.

The financial condition of the undertaking at close of 1881-82 is represented in the following table :—

Expenses.	Rs.	Earnings.	Rs.
Interest on capital outlay to end of 1880-81, ...	1,78,172	Gross earnings to end of 1880-81, ...	49,467
Interest on " " for 1881-82, ...	1,24,893	" " for 1881-28, ...	3,37,203
Total, ...	3,03,065	Total, ...	3,86,670
Working expenses to end of 1880-81, ...	36,638	Short earned to end of 1881-82, ...	1,83,220
" for 1881-82, ...	2,30,187		
	2,66,825		
Grand Total, ...	5,69,890	Grand Total, ...	5,69,890

Thus after paying the interest on Subscribers' Capital and the Imperial grant and the working expenses, there is a deficit of Rs. 1,83,220 to Provincial funds on account of unrealized interest.

The interest account stands as follows on the total Capital outlay :—

				Rs.
From shareholders' subscriptions,	...	...	...	4,51,200
" Provincial contributions,	...	...	...	5,10,000
" Imperial grant,	...	...	...	21,97,688
Total,				31,98,888
				Rs.
Paid to shareholders,	...	...	...	42,320
" Government of India,	...	...	...	2,26,370
Due to Provincial funds,	...	...	...	34,375
				3,03,065

MUTTRA-ACHNERA RAILWAY.

This line, 22 $\frac{3}{4}$ miles in length, on the metre gauge, was sanctioned by the Secretary of State as a Productive Public Work for Rs. 9,08,000. It was opened for traffic on the 7th November, 1881, and has since been worked by the Rajputana-Malwa State Railway, which system it joins at Achnera.

The sanctioned construction estimate amounted to Rs. 7,03,360, against which the total Capital expenditure to the 31st March, 1882, was Rs. 6,42,369. Rs.

1,80,563 were spent during the year 1881-82, principally in laying the permanent way and completing the other works unfinished at the close of 1880-81. The line might have been opened earlier in the year, but for the great delay which occurred in delivery of the permanent way materials from Bombay. The cost per mile amounts, so far, to Rs. 28,326, excluding rolling stock, which with other arrangements for working is supplied for the present by the Rajputana-Malwa State Railway.

The whole of the capital expended to date has been provided from the Imperial grant for Productive Public Works, there have been no contributions from Shareholders or from Provincial revenues towards the Capital construction of this line as on the other open Provincial lines.

The line is worked by the Rajputana-Malwa Railway system, but this arrangement will cease and the management be vested in the Provincial officers on the completion of the Muttra-Jumna bridge and the establishment of through traffic to Cawnpore. The arrangement under which the Rajputana-Malwa Railway finds rolling stock, and works this isolated line is similar to that entered into with the East Indian Railway Company for the Ghazipur-Dildarnagar branch line; excepting that the remuneration for working the Muttra-Achnera Railway is calculated at only one-fifth of the net earnings.

The earnings and expenses for 1881 are shown in the following table:—

<i>Traffic earnings—</i>						Rs.
Coaching,	...	...	...	...	...	20,244
Goods,	...	...	...	...	...	2,164
Telegraph,	...	...	...	...	...	148
Sundries,	...	...	...	...	...	...
Gross earnings,						22,556
or Rs. 47·2 per mile per week, and on a train mileage of 14,463 miles, Rs. 1·56 per train mile.						
Deduct working expenses,	...	...	...	...	...	20,831
Net earnings,						1,725

The proportion of working expenses to gross earnings are 92·3 per cent., and of net earnings to Capital expended 0·27 per cent.

As the line was only opened for traffic in November 1881, no conclusions as to its financial prospects can be drawn. When the Muttra-Jumna bridge is completed, and through traffic established under Provincial management from Cawnpore to the Rajputana-Malwa system at Achnera, no doubt as good results will be obtained from this as from any other portion of the line. Under present conditions, no material improvement in the working results can be expected.

The detailed project for the Muttra-Jumna bridge referred to was prepared and submitted to the Government of India, for orders, during the year, after amendment in accordance with the instructions received. It provides for a metre gauge iron girder bridge of seven spans of 150 each, or a total lineal waterway of 1,050 feet, with the necessary approaches; the estimated cost is Rs. 8,76,340.

BHAVNAGAR-GONDAL RAILWAY.

Very satisfactory progress has been made with the bridging during the year 1881-82. The bridges in the Bhavnagar, Dhola and Dhola-Dhoraji sections were so near completion before the monsoon of 1881 set in, that it was found feasible to keep this section open for traffic, and it was only seriously interrupted on three occasions, viz., 11th to 14th and 18th and 19th July, and 4th to 9th August, 1881.

The Dhola-Wadhwan section had to be closed on the 30th June, and was not

re-opened till 1st October, but the bridges, with the exception of that over the Wadhwan-Bhojawa, will all be completed before the monsoon of 1882, and it is hoped that traffic will not be much interrupted at the crossing, floods being rare and of short duration. This bridge also has been begun, and will be finished next season.

The following vehicles were added to the stock during the year :—

Twenty third class carriages and 50 low-sided wagons ;

and the Gadechī shops were completed by the addition of coal shed, boiler house, and boiler workshop gatehouse, fencing around workshops, latrine in workshop yards, and draining and metalling workshop yard.

Traffic.—The total earnings and expenditure during the year 1881 amounted to Rs. 6,88,385 and Rs. 4,83,131 respectively. The net profit, Rs. 2,05,254, yielding a return at the rate of 2·75 per cent. per annum on capital expended, up to 31st December, 1881. The traffic appears to be steadily improving.

MUTTRA-HATHRAS RAILWAY.

At the close of the financial year 1881-82, this line, 29 miles long, sanctioned by the Secretary of State as a Productive Public Work on the metre (3 feet 3 $\frac{3}{8}$ inch) gauge, had been working for about 6 $\frac{1}{2}$ years, having been opened for traffic on the 19th October, 1875.

The capital expenditure to the 31st March, 1882, amounted to Rs. 10,83,958 ; or, for 29 miles of open line, Rs. 37,378 per mile, against a sanction of Rs. 12 $\frac{1}{2}$ lakhs by the Secretary of State. The original construction estimate for Rs. 10,59,361 was closed on the 31st March, 1881, and the capital works required during 1881-82 were carried out on supplementary estimates sanctioned by the Local Government, aggregating Rs. 6,538. The actual expenditure on construction was Rs. 6,074 for certain unimportant new works chargeable to capital. Owing, however, to adjustments and refunds in accounts, the capital outlay for the year 1881-82 finally shows a net saving of Rs. 2,512, reducing the total expenditure from Rs. 10,86,470 up to the end of 1880-81 to Rs. 10,83,958 at the close of 1881-82.

Of this total capital outlay Rs. 3,24,100 has been subscribed by shareholders, and Rs. 7,59,858 provided by contributions from Provincial revenues.

This Railway was originally laid with 30 lb. iron rails and supplied with A. class engines, this light equipment being considered sufficient to provide for the local traffic on a short, isolated, and independent line. As the programme of Provincial Railways expanded, it became apparent that on the completion of the proposed extension of the Cawnpore-Farukhabad Railway from Farukhabad to Hathras road, and of the Jumna bridge at Muttra, arrangements which were sufficient for the local requirements of the short independent Muttra-Hathras line might prove inadequate to carry the heavier through traffic which must pass over it, as a section of a through Provincial Railway from Cawnpore to Achnera. It was therefore proposed to relay the Muttra-Hathras line throughout with 41 $\frac{1}{2}$ lb. steel rails and to provide E. class engines, and so to assimilate this section to the rest of the Provincial system of which it would form a part. Provision was made for commencing the renewals of permanent way in 1881-82, but the capital grant (Rs. 60,000) was subsequently withdrawn and utilised elsewhere, pending the final orders of the Government of India on the subject.

The results of the revenue working of this line in 1881 are not so favorable as in the preceding year, the working expenses being more by Rs. 23,568, and the gross earnings less by Rs. 9,410, causing a difference less in the net earnings of Rs. 32,978.

The following table shows the earnings and expenses for 1881 as compared with those for 1880, the net earnings being only 2·39 per cent. on the capital expended :—

	1880.	1881.	DIFFERENCE 1881.	
			More.	Less.
<i>Traffic earnings.</i>				
	Rs.	Rs.	Rs.	Rs.
Coaching, ...	90,724	89,685	...	1,039
Goods, ...	47,452	40,051	...	7,401
Telegraph, ...	1,175	1,953	778	...
Sundries, ...	2,143	395	...	1,748
			778	10,188
Gross earnings, ...	1,41,494	1,32,084	...	9,410
Deduct working expenses, ...	83,423	1,06,991	23,568	...
Net earnings, ...	58,071	25,093	...	...
Net decrease, ...	...	...	...	32,978

The proportion of working expenses to gross earnings in these years was respectively 58·96 and 81·00 per cent., an increase in 1881 of about 22·04 per cent.

It seems improbable that much improvement in the traffic of this line can be expected until the Jumna bridge at Muttra is opened, and through booking arrangements can be made with the Rajputana-Malwa system. In the meantime traffic has to be trans-shipped across the Jumna, and the Manager of the Rajputana-Malwa Railway has been consulted as to the best *ad interim* arrangements for traffic in the interests both of the Government and of the public.

The financial condition of the undertaking, up to the close of 1881-82, is represented in the following balance sheet:—

Expenses.	Amount.	Receipts.	Amount.
	Rs.		Rs.
Accumulated interest to end of 1880-81,	2,55,019	To 31st March, 1881, ...	5,89,892
„ „ for 1881-82,	43,357	For 1881-82, ...	1,32,084
Total, ...	2,98,376	Total, ...	7,21,976
Working expenses to end of	Rs.		
1880-81, ...	3,30,192		
„ for 1881-82, ...	1,06,991		
	4,37,183		
Indirect establishment charges, ...	75	Balance loss on working to date, ...	13,658
Grand Total, ...	7,35,634	Grand Total, ...	7,35,634

Hence at the close of 1881-82 there is no surplus profit to be divided as was the case in the previous year, but on the contrary the year's working shows a loss of Rs. 18,339, which has to be made good before surplus profits can be again distributed.

For the capital expended to the 31st March, 1882, the liability is:—

	Rs.
To shareholders for Capital expended, ...	3,24,100
To Provincial funds, ...	7,59,858
Total, ..	10,83,958

For this outlay, Provincial funds receive the gross earnings of the undertaking, viz., to 31st March, 1882, Rs. 7,21,976; from which the following charges for working expenses and for interest and surplus profits payable to shareholders amounting to Rs. 5,36,294 have to be deducted.

			Rs.
Working expenses to 31st March, 1882, ...	...	...	4,37,183
Interest to shareholders to end of 1880-81, ...	...	Rs. 84,751	
" " in 1881-82, ...	...	12,964	97,715
Share of surplus profits divisible to shareholders for 1880-81, ...	...		1,396
	Total, ...		5,36,294

There is therefore a gross surplus to date to Provincial revenues of Rs. 1,85,682 for a Capital investment of Rs. 7,59,858, or about 24½ per cent.

MYSORE STATE RAILWAY.

During the year under notice, 28 miles have been added to the open mileage, the section between Mandya and Mysore having been completed. The line was opened through to Mysore on 25th February, 1882.

Land.—Some additional land required at the Pettah Station for the construction of staff quarters and for other purposes was taken up. Land was also taken up at Closepet and Mysore Stations and paid for during the year.

Earthwork.—All the earthwork was completed in previous years with the exception of the Naganhalli tank bund, the cuttings at Lokani and Bedarhalli (68th mile) and filling in gaps at bridges, all of which were completed during the year. Some of the curves of small radius were eased.

Minor Bridges.—In some instances rail and sleeper openings were converted into slab drains, and masonry arches were substituted for rail girders.

Large Bridges.—The only bridges of any importance which call for any remarks are the following :—

		ft.		ft.	
Cauvery, No. I,	9-30	arches and	24-27½	arches,	} Completed and opened to traffic in March 1882.
" No. II,	13-30	"	16-27½	"	
" No. III,	4-27½	"	2-25	"	
Mallur bridge, ..	2-25	"	4-27½	"	Do. October 1881.
Lokani bridge, ..	4-30	"	4-27½	"	Do. March 1882.
Konahali bridge, ..	5-24				Do. May 1882.

The original design showed girders for all these bridges, but stone being plentiful in the vicinity of the works it was considered desirable both for the sake of economy and stability to substitute masonry arches.

Hebhalla Bridge.—The old road bridge at Hebhalla not being suitable for permanent use, it was considered advisable to construct a new bridge, and part of the foundations were put in during the year.

Level Crossings.—All gates put up, but crossing roads have to be completed.

Fencing.—The live fence planted during previous years has on the whole thriven well, and will in course of time prove an effective barrier.

Ballasting—Practically completed during the year.

Stations and Offices.—All nearly completed with the exception of goods sheds at Mysore, Seringapatam and Bangalore.

Rolling Stock.—All the carriages and wagons received under the first indent were constructed and made over to the Traffic Department with the exception of a first class carriage which is being converted into a saloon carriage for His Highness the Maharaja of Mysore.

Ten of the low-sided wagons received under the second indent were also completed during the year. Four of the 10 N. class engines indented for were received during the year, but only one of them was fitted up and worked.

Two engines purchased from the South Indian Railway were sold to the Southern Mahratta Railway, the engines having been found unsuitable for the heavy grades and sharp curves of the Mysore line.

Thirty low-sided wagons and two brake-vans were also sold to the Southern Mahratta Railway on demand, and provision has been made for 30 covered goods wagons in the indent shortly to be submitted for the Tumkur line.

Traffic.—The total earnings and expenditure during the year were Rs. 1,73,987, and Rs. 1,03,352 respectively. The train mileage run was 98,328, which gives the cost per train mile Re. 1-0-10.

The average earnings per train mile amount to Re. 1-12-4, and considering that the line is still in its infancy, and that the earnings above recorded are chiefly from passenger traffic, the result is satisfactory.

For want of sufficient rolling stock, separate goods trains were not run, and the revenue earned from this source is therefore nominal, the little that was earned being chiefly from carriage of construction materials.

The line has not been working sufficiently long to permit of final conclusions being drawn from the financial results above indicated.

Train Service.—The train service during the whole year consisted of one passenger train both ways with special trains as required.

Two minor stations, Mudagere and Honnakere, were temporarily closed during the year.

There were no accidents of a serious nature during the year, and the failures of engines were due entirely to the heavy grades and curves of the line.

Rigid economy was exercised in all the departments and establishment reduced to the lowest possible limit.

Statement showing expenditure during the year 1881-82.

Details.						Total for 1881-82.	Total to end of 1881-82.
BROAD GAUGE.						Rs.	Rs.
Preliminary expenses, ...	...	...	...	...	...	...	328
Land, ...	...	...	...	...	...	1,854	10,257
Construction of line, ...	...	...	...	...	...	...	40,407
Ballast and permanent way, ...	...	...	...	...	...	5,593	5,593
Stations and buildings, ...	...	...	...	...	...	...	...
Plant, ...	...	...	...	...	...	...	500
Steam ferries, ...	...	...	...	...	...	...	...
Rolling stock, ...	...	...	...	...	...	...	...
Establishment, ...	...	...	...	...	...	...	4,026
Total, ...						3,739	61,111
NARROW GAUGE.						Rs.	Rs.
Preliminary expenses, ...	...	...	...	...	...	...	93,939
Land, ...	...	...	...	...	...	7,574	59,215
Construction of line, ...	...	...	...	...	...	2,97,018	9,24,728
Ballast and permanent way, ...	...	...	...	...	...	5,88,667	14,69,257
Stations and buildings, ...	...	...	...	...	...	1,06,471	2,97,649
Plant, ...	...	...	...	...	...	18,378	67,926
Steam ferries, ...	...	...	...	...	...	...	...
Rolling stock, ...	...	...	...	...	...	73,591	2,48,287
Establishment, ...	...	...	...	...	...	82,186	3,29,785
Total, ...						11,73,885	34,90,786

NALHATI STATE RAILWAY.

Since this line was taken over and worked by the Government, the financial results have been as follows :—

Year.	Miles open.	Gross earnings.	Expenditure.	Percentage of expenses to earnings.	FINANCIAL RESULTS.	
					Net profit or loss.	Per cent on Capital expenditure.
		Rs.	Rs.	Rs.	Rs.	Rs.
1873,	27½	84,453	50,724	60	33,729	11·24
1874,	27½	85,122	57,220	67	27,902	10·21
1875,	27½	80,098	61,144	76	18,954	6·98
1876,	27½	75,199	83,585	14	-8,386	-3·08
1877,	27½	89,454	89,875	101	-421	-0·16
1878,	27½	90,261	71,677	79	18,584	6·46
1879,	27½	91,779	62,009	67	29,770	9·39
1880,	27½	69,925	73,653	105	-3,728	-1·15
1881,	27½	67,005	53,070	79	13,935	4·52

The causes of the serious falling off in the traffic were noticed in the last report; since then the establishment of the steamer service from Rampur-Baulleah in connection with the Northern Bengal Railway has further withdrawn traffic from this railway. During the year under review there has, however, been a slight improvement, and the result of the year's working, instead of showing a deficiency, gives a net profit of Rs. 13,935, or 4·52 per cent. on the Capital outlay, the working expenses being 79 per cent. of the receipts. This more satisfactory result has only been obtained by exercising the strictest economy; the system of working has been re-organized, many advantageous changes have been made in the staff, and the management, which at one time gave cause for dissatisfaction, has improved. The line was maintained in good order, and many useful additions made to the way and works, including a joint waiting shed for passengers at Nalhati station. The rolling stock is old and shaky, and although it is being maintained in an efficient order as possible, new carriages and wagons will shortly be required, unless the Bengal Central Railway is constructed to Bhagwangola, in which case the Nalhati line may with advantage be abandoned.

ENGINEERING DEPARTMENT.

During the year the bridges, culverts, stations, and permanent way were maintained in good working order. The renewal of sleepers was not very heavy, as the sal sleepers ordered from the Forest Department did not arrive till the latter end of the year.

Half a mile of iron 40 lb. rails were received and laid on the line on the 4th mile, and the old ones taken out were used in other parts in place of those worn-out; 32,500 cubic feet of ballast was also laid, and the packing of the sleepers was attended to.

Scotch blocks were fitted up at all stations during the year, and the erection of a third class waiting shed at the joint expense of the Nalhati State Railway and East Indian Railway was commenced on the Nalhati Railway station platform. Attempts were made at planting trees, but they have not proved successful.

LOCOMOTIVE DEPARTMENT.

There are now four engines on the line, and these have been maintained in

fair order. The miles run by each engine and the total cost of repairs are shown below :—

Engine number.	1880-81.		1881-82.	
	Number of miles run.	Cost of repairs.	Number of miles run.	Cost of repairs.
		Rs.		Rs.
1	Inefficient.	1,373	8,679	439
4	6,734	240	11,283	994
5	7,334	705	11,392	538
6	8,215	279	12,563	1,076

which gives the following average mileage and cost of repairs per engine mile :—

Year.	Miles run by each engine.	Cost of repairs to each engine.	Cost of repairs per engine per mile.
		Rs.	As.
1880-81,	4,913	521	1·60
1881-82,	10,979	774	1·12

The coal consumed by each engine and the cost is as follows :—

Year.	Total coal consumed.	Cost per ton.	Consumption per train mile.	Cost per train mile.
	Tons.	Rs.	lbs.	As.
1880-81,	365	8·35	27·89	1·66
1881-82,	493	8·23	27·33	1·60

showing a slight reduction in both consumption and cost.

The cost of working has fallen considerably, as will be seen from the following table :—

Year.	Gross earnings.	Expenditure.	Percentage of expenses to earnings.	Cost per train mile.
	Rs.	Rs.		As.
1880 { 1st half,	41,128	10,674	28·17	8·13
{ 2nd ,,	35,762	7,075	19·78	5·98
1881 { 1st half,	34,816	6,582	18·90	5·84
{ 2nd ,,	32,189	5,827	18·10	4·61

There were no engine failures nor any accidents of a serious nature.

CARRIAGE AND WAGON DEPARTMENT.

The stock is now very old, but as it is not considered advisable to replace any of it owing to the probable future abandonment of the line, efforts are being made to keep it in as efficient working order as possible, but of course at an enhanced rate.

The expenses of this department stand as follows :—

Year.					Gross earnings.	Expenditure.	Percentage of expenses to earnings.	Cost per train mile.
					Rs.	Rs.		As.
1880	{ 1st half,	...	...	...	41,128	3,994	10.64	3.04
	{ 2nd "	...	...	...	35,762	1,861	5.21	1.57
1881	{ 1st half,	...	...	...	34,816	1,639	4.67	1.44
	{ 2nd "	...	...	...	32,189	1,658	5.15	0.65

TRAFFIC DEPARTMENT.

There has been very marked improvement in the working of this department, and it has been carried on throughout the year without interruption. The following shows the results :—

					Number or weight.	Receipts.
						Rs.
Coaching,	...	...	...	...	116,375	46,131
Goods,	...	...	...	...	10,326	19,682
Sundries,	...	...	...	...	...	1,190
Total,					...	67,003

The percentages of increase and decrease as compared with the previous year are—

Coaching,	...	...	...	...	...	...	...	- 7
Goods,	...	...	...	...	...	...	...	+ 1
Sundries,	...	...	...	...	...	...	...	- 3
Total,								- 4

The chief staples carried were :—

					1880.	1881.	Percentage of increase and decrease.
					Tons.	Tons.	
Edible or other grains,	...	...	...	...	2,698	2,443	- 9
Silk,	...	...	...	...	314	363	13
Metals,	...	...	...	...	205	199	- 2
Sugar,	...	...	...	...	321	352	8
Piece-goods,	...	...	...	...	796	913	12
Cotton,	...	...	...	...	227	233	2
Seeds,	...	...	...	...	437	1,344	67
Coal,	...	...	...	...	2,439	1,749	- 28
Salt,	...	...	...	...	591	280	- 52
Sundries,	...	...	...	...	1,628	3,343	51

GAEKWAR OF BARODA'S RAILWAY.

The expenses of maintenance were considerable during the year, as it was found necessary to re-build several of the bridges and culverts on the Dabhoi-Miyagam section. Expenses were also higher than in the year 1880 under other heads, and the traffic did not come up to expectation :—

					Rs.
Gross earnings,	...	...	...	...	1,41,293
Expenses,	...	...	...	...	92,384
Profit,					48,849

being at the rate of 3.95 per cent. for the year 1881, as compared with 7.31 per cent. in 1880.

No further extensions of their Railway system have been undertaken by the Darbar, but a proposal that the British Government and the Government of His Highness the Gaekwar should join in promoting the construction of a line from Surat to Bardoli and Songad has been under discussion, and the line has been surveyed at their joint expense by the Bombay, Baroda and Central India Railway Company. The project is again referred to in Chapter V., which see.

KAUNIA, DHURLA AND MOGAL HAT RAILWAY.

A description of this railway was given in the last Administration Report, but as the system has since been completed, a brief account of the journey from Kaunia to Dhubri, as now performed, may not be out of place. At Kaunia, the terminal station of the Rungpur branch of the Northern Bengal Railway, the Teesta is crossed by a steam ferry; from this river to Kurigram, on the right bank of the Dhurla, a distance of 21 miles, there is a 2½ feet gauge railway; Dhurla to Jatrapur, a steam ferry, distance 5 miles; Jatrapur to Dhubri, a steam ferry, distance 28 miles. There is also a narrow strip of land three-quarters of a mile in width between the Dhurla and Brahmaputra rivers at Jatrapur, which is crossed by trolly on a narrow gauge line.

A branch railway, 12½ miles in length, has also been constructed to Mogal Hât on the Cooch Behar road; it leaves the main line about one mile from the river Teesta, and runs almost due north to Mogal Hât on the Dhurla. By this extension, which was opened in February 1882, the railway has been brought to within 22 miles of the civil station of Cooch Behar, and it is believed the Maharajah contemplates completing the link.

The expenditure on the Kurigram Railway was, to the end of the year, Rs. 5,16,720, that on the Mogal Hât line Rs. 1,92,551; and as both are now complete, with the exception of a small quantity of additional rolling stock and fencing, the further capital outlay will be trifling. The cost of the flotilla has been Rs. 1,21,235; the total capital cost of the complete undertaking has therefore been Rs. 8,30,506.

The small cost per mile of the Mogal Hât Railway, as compared with that of the Kurigram line, is chiefly accounted for by the fact that the bank on which the former is laid was aligned for a railway, while the latter has been debited with the cost of all the rolling stock.

The gross earnings during the year were Rs. 73,761, the expenditure Rs. 70,068, the net result being a profit of Rs. 3,693, or .40 per cent. only on the Capital outlay. This result does not appear at first sight to be promising, but it must be remembered that, prior to the opening of the tramway, the *tonga* and steamer despatch service was carried on at a loss, and that since the opening of the railway there has been scarcely sufficient time for the development of the traffic. The passenger traffic has been most satisfactory and encouraging, a large number of local passengers having taken to the line, in addition to coolies and others travelling to Assam from distant parts of the country; the goods traffic has not, however, come up to the expectations formed, but it is scarcely fair to gauge the ultimate success of the service by the results hitherto attained, and it is believed that there will be eventually a large goods traffic which will yield a handsome return on the Capital outlay.

One great drawback to the success of the service is the number of breaks on the route, which cause great delay and inconvenience in the transport of goods; it is, however, hoped the principal difficulty in this respect may be obviated by the erection of a wire tramway, or a temporary bridge over the river Teesta, now under consideration.

A proposal has been made to extend the Mogal Hât line to Dhubri, but great difficulties exist in the way of crossing the large rivers Dhurla, Sunkos, and Gungadhur.

ENGINEERING DEPARTMENT.

The line from the left bank of the Teesta to Kurigram, and the branch to Mogal Hât, were completed during the year, and opened for traffic.

Station houses at Mogal Hât and Lalmoni Hât were completed, and that at Togra Hât was three-quarters done. Pointsmen's huts at Mogal Hât and Lalmoni Hât have been built. The goods shed at Togra Hât was three-quarters done.

A permanent way khalassie's hut was built at Borobari Hât, and the guards' and drivers' huts at Mogal Hât were almost ready.

One main signal at Mogal Hât, and one main and two distant signals at Teesta, were put up.

The watering arrangements at Mogal Hât and Kurigram, and the engine shed at Teesta, were completed, except the office and godown to the latter.

Timber bridges Nos. 4, 5, 6, 7, 8, 9, 11, 12, and 13, on the Mogal Hât line, were strengthened.

Two thousand five hundred lineal feet of spur works were done in the river Teesta, and 1,500 lineal feet in the river Dhurla, to keep the channels open for navigation.

LOCOMOTIVE DEPARTMENT.

This department was under the supervision of the Northern Bengal State Railway. All the staff employed are Natives, with the exception of the foreman, who is a European.

The following engines have been employed :—

Two running trains.

One spare.

One under repair.

It has been found necessary to make extensive alterations in the engines owing to the unworkmanlike design on which they have been built, the eccentric sheaves and motion being arranged to give a diminishing instead of an increasing lead, contrary to all received locomotive practice; besides this, other alterations have been found necessary, entailing a considerable amount of work.

The engines in their present condition burn an amount of coal utterly out of proportion to the work done; but it is trusted that the alterations in progress will give better results.

There have been two engine failures due to the slide-valves sticking on the buckle.

The coal consumed and its cost are given in the following table :—

Quantity of coal consumed.	Cost of coal per ton.	Consumption per train mile.	Cost per train-mile.
Tons.	Rs.	lbs.	Annas.
161.25	19 95	25.86	3.69

The miles run per engine since the opening of the line for traffic have averaged 12 per day on the entire stock.

CARRIAGE AND WAGON DEPARTMENT.

The stock sent out from home for this line will, it is feared, give a good deal of trouble and cost a great deal in repairs, as the carriages and wagons are built

to a great extent of pine, and the tenons and joints are very slack, and the planks much warped.

Two third class carriages on the tramway principle, weighing 2 tons 9 cwt., and carrying 40 passengers, have been built in the shops here, which give great satisfaction, and are much appreciated by the passengers. Four more are under construction, and will be completed shortly. Twelve of the low-sided wagons have been altered to carry jute, which it is hoped will be the main staple of traffic, and a design has been prepared for a new form of wagon.

Watering arrangements and Shed.—The watering arrangements and the shed at Teesta bank are not complete, but they will be so shortly.

FERRIES.

The Teesta ferry is worked during the rains by the steamer *Marion*, but when the river falls, she is put out of commission. The *Marion* is not suited to the work, as she draws too much water. A steamer drawing about nine inches is what is required on this river.

The Dhurla ferry has been worked by the *Lynx*, and the Brahmputra ferry by the *Fox*. Both steamers have given great satisfaction, and the only failure which has occurred was due to the carelessness of the serang in charge of the *Fox*, who ran her into the bank, and carried away part of the feathering gear of the starboard paddle-wheel.

The following is the list of steamers and flats employed on the ferries :—

Names of vessels.	Tonnage.	Horse-power.	Cost.	Remarks.
<i>Teesta Ferry.</i>				
Paddle steamer <i>Marion</i> ,	O. B. M. 20 tons	12	7,500*	
Flat C. I.,	37 "	12	3,500	
<i>Dhurla Ferry.</i>				
Paddle steamer <i>Lynx</i> , '	40 "	100 I. H.-P.	53,100	
<i>Brahmaputra Ferry.</i>				
Paddle steamer <i>Fox</i> ,	40 "	100 "	53,100	

The consumption of coal per hour for the steamers *Lynx* and *Fox* has averaged 3.50 cwt.

The amount of coal consumed per month and the cost is as follows :—

Name of Steamer.	Total coal consumed.	Cost.		Consumption.	Cost per hour.
		Rs.	A.	P.	Rs.
	Tons cwt. qr. lb.			Cwt.	
<i>Lynx</i> ,	113 9 1 16	2,366	15	3	1.28
<i>Fox</i> ,	576 3 3 6	12,022	12	10	5.49

TRAFFIC DEPARTMENT.

The officers in charge of this department were the same as those in charge on the Northern Bengal State Railway.

The line was opened under circumstances anything but favourable to its success from a financial point of view, inasmuch as the rolling stock available at the time consisted of two first and two second class carriages, and 12 low-sided

* Approximate cost not known.

trucks only, which had to be utilized for third class passengers and coolies. In spite, however, of the scant and uncomfortable accommodation provided for third class passengers, a brisk traffic sprung up directly the line was opened, and all the available stock (goods and coaching) had often to be used to meet it. It was at first supposed that the novelty of the thing had attracted the large number of passengers travelling, and that when this had worn off, the coaching traffic would settle down to something like the normal traffic, which had been passing over the road before the line was opened, specially when the fare for the class in which the greatest increase appeared was raised from 4 to 9 annas; but on the contrary the coaching earnings continued steadily to increase. The following statement shows the gross traffic receipts from the date of opening (already stated) to 31st March, 1882 :—

Traffic Earnings.				1880-81.	1881-82.	Increase in 1881-82.	Decrease in 1881-82.
				Rs.	Rs.	Rs.	Rs.
Coaching traffic, ...	...	...	...	} 37,983 }	23,564		
Goods, ...	...	...	...		3,644		
Steam boat, ...	...	...	...		46,454		
Telegraph, ...	...	...	...		7		
Sundries, ...	...	...	...		92		
Total, ...				37,983	73,761	35,778	

The passenger traffic, which is not effected to the same extent as the goods traffic by the many breaks and shifts in the crossing of the Teesta and Dhurla rivers, has been worked smoothly and without complaint from the public, and the steady way in which the passenger receipts have kept up speaks well for the future of the line as far as coaching is concerned.

The details of the coaching traffic carried are as under :—

Description of Traffic.	1880-81.		1881-82.		Increase.		Decrease.	
	No.	Amount	No.	Amount	No.	Amount	No.	Amount
		Rs.		Rs.		Rs.		Rs.
First class,	714	3,164				
Second class,	791	1,409				
Third class,	30,258	13,161				
Luggage and parcel,	1,717	1,207				
Special train,	204				
Postal subsidy,	4,419				
Total, ...				...	23,564			

which analyzed gives the following percentage :—

1st class, ...	...	...	...	2'25
2nd ,, ...	...	...	...	2'50
3rd ,, ...	...	...	...	95'25

The following statement gives the details of the goods earnings :—

Details of Goods Traffic.				1880-81.		1881-82.		Increase.		Decrease.	
				Rs.	Rs.	Tons.	Rs.	Rs.	Rs.	Rs.	
Merchandise, general,	910'99	3,640				
Demurrage,	4				
Total,	910'99	3,644				

and shows anything but a satisfactory result. The fact is the goods traffic is, and always will be, with the present arrangement, heavily handicapped by the many handlings it is subjected to in crossing the Teesta and Dhurla rivers, broken as they are into several channels with stretches of sand between.

The goods traffic for the period under review cannot, however, be taken as a criterion of what it may ultimately develop into, as the line is in its infancy; moreover, the season for the main staple (jute) of the district had passed before the line was in a position (owing to want of stock) to canvass for this traffic. It is quite possible that next season may see more goods brought to the line for despatch than can be conveniently dealt with, for with the constant breaks and shifts it is subjected to, rapid despatch is impossible.

The weight of the principal commodities that has passed over the line is as under—

Commodities.	1880-81.	1881-82.	Increase.	Decrease.
	Tons.	Tons.	Tons.	Tons.
Jute,		243·23		
Piece-goods,		79·31		
Rice,		11·30		
Sugar,		7·00		
Tobacco,		6·11		
Tea,		3·63		
All other goods,		560·41		
Total,		910·99		

On and from 15th October, 1881, the following stations on the Kaunia and Dhurla Railway were opened for traffic:—

Sangairdobry Hât.
Rajar Hât.

Togra Hât.
Dhurla Ghaut.

On and from 6th February, 1882, Mogal Hât branch was opened.

The following changes in rates have taken place during the period under review:—

Through and local passenger fares were altered. Through luggage rate was reduced from Rs. 1-8 to Re. 1; goods rate between Kaunia and Dhurla was also reduced from Rs. 1-8 to Re. 1.

Rate for specie was also altered.

On and from 1st January, 1882, through luggage rate between Kaunia and Dhurla was increased from Re. 1 to Rs. 1-8 per maund.

Local luggage rate for Kaunia and Dhurla Railway was increased from two pies to three pies per maund per mile.

On and from 1st March, 1882, the rate for *bishpat* tobacco was reduced over Kaunia and Dhurla Railway from two to half pie per maund per mile, and from two annas to one anna per maund across the Teesta ferry.

On and from the above date the extra charge of eight annas per maund for handling heavy packages (over five maunds) over Kaunia and Dhurla Railway, has been fixed only on the weight above the limit.

CHAPTER III.

PRINCIPAL EVENTS ON GUARANTEED RAILWAYS OPEN TO TRAFFIC DURING 1881.

CONTENTS.—Great Indian Peninsula—Sind, Punjab and Delhi—Madras—Bombay, Baroda and Central India—Eastern Bengal—Oudh and Rohilkhand—South Indian Railways.

GREAT INDIAN PENINSULA RAILWAY.

The principal works carried on during the year 1881-82 on Capital Account were:—

Bori Bandar Terminal station and offices.—The Government of India having withdrawn their order restricting work in the Administrative offices to the first floor, a contract was in November 1881 made with Messrs. Burjorji Rustomji Maistry and Luximan Gunesh for the completion of the entire building by the end of 1884. Progress has since been satisfactory. Temporary offices were put up on the central platform, and the station was brought into use on the 1st January, 1882.

New Stores Depôt at Parel.—The tender of Jewanji Cawasji Maistry for this work was accepted in January 1882, and it is making rapid progress.

Wadi Bandar goods terminus.—The Merchants' waiting-room and offices were completed. The level crossing connecting the Frere Road with Lawrence DeLima Street was opened for traffic. The old carriage shed known as the Rohilla shed was shifted to a position parallel to the goods shed and adapted for goods traffic. Sanction was obtained to its being lengthened to correspond with the other sheds. The complete estimate for this work at Wadi Bandar, which it is proposed to carry out at once, including additional goods sheds and sidings, roads and boundary wall, was sanctioned by the Government of India, and the work of filling, levelling and ballasting the yard was put in hand.

Quadrupling line.—Work has not yet been commenced north of Nesbit Lane Crossing, and is incomplete between Nesbit Lane and Bori Bandar. Reference has already been made to the projected overbridge between Nesbit Lane and Hancock bridge to carry the up-passenger line across the goods lines. The designs for the Byculla overbridge and Byculla new station have not yet been submitted for sanction. The Bombay, Baroda and Central India Railway will not be in a position to vacate the goods premises they rent from the Port Trust north of Carnac bridge till next season, when their new Mody Bay goods terminus will be ready.

Carnac overbridge.—The roadway is being widened at the cost of the Tramway Company.

Clearing slopes of Bhor Ghaut between Tunnels Nos. 24 and 25. The retaining walls have still to be built. The rest of the work may be said to have been finished.

Platform roof, Poona Station.—This has been extended for the better protection of trains and passengers.

Junction Station at Khandwa.—The works are nearly completed at the new trans-ship yard, which was brought into use in January.

Additional sidings at Bhusaval.—Progress has been slow, but the sidings will shortly be ready for use.

Junction at Itarsi with the Bhopal line.—Plans have been submitted for sanction by the Great Indian Peninsula Railway Company. The first section of the Itarsi-Bhopal line to Hosangabad will probably be opened for traffic in May.

Among *Minor Works* sanctioned may be mentioned—

- Railway siding for salt traffic, Chendni Bandar.
- Billiard and reading room at Harda.
- Additional sidings at Harda.
- District Engineer's bungalow, Jubbulpore.
- Police quarters at stations in the Central Provinces.
- Overbridge, Wardha station.

Re-construction works.—Eleven were in hand on the north-east line, including the Nagpur branch, and 42 on the south-east line. The land arches of the Munneir bridge were removed and girders substituted at the cost of Revenue.

Additional engines.—In November 1881 the Great Indian Peninsula Railway Company applied for sanction to obtain 47 new locomotive engines as addition to stock. The Government of India sanctioned 12 only, expressing the opinion that more work could be got out of the locomotives already on the line.

Post Office vans.—Five additional post office vans were built, a corresponding number of old vans being adapted for ordinary coaching traffic.

Warora coal.—Deliveries have amounted to 28,088 tons during the year.

Mopani coal.—Deliveries have amounted to 12,837 tons during the year.

Ghaut working.—The new system described in last year's report is now in force.

The Campuli branch which it had been intended to keep open throughout the year was closed on 30th July, 1881, owing to there being no traffic during the monsoon.

Capital.—The Company's Capital Account at the close of 1881 stood as under :—

			£	Rs.
Capital authorised,	...	...	27,595,466	30,10,41,447
Capital subscribed,	...	...	23,707,021	25,86,22,043
Capital expended—				
		£		
(a). Final heads,	...	23,610,649		
(b). Suspense,	...	1,410		
		—————	23,612,059	25,75,86,095
Balance available of—				
Capital authorised,	...	...	3,983,407	4,34,55,352
Capital subscribed,	...	...	94,962	10,35,948
Amount expended on way and works,	...	...	19,613,321	21,39,63,502
Rolling stock,	...	...	3,402,887	3,71,22,404
Cost of way and works per mile,*	...	...	15,228	1,66,121
Cost of rolling stock	„*	...	2,624	28,822

Excepting the change occasioned by the normal progress of expenditure on works, &c., during the year, the state of the Company's capital remained unaltered.

The outlay on way, works, and rolling stock during the year amounted to Rs. 11,08,708, and was incurred principally on the following :—

* Exclusive of State Lines.

Name of Work.	EXPENDED DURING 1881.		
	1st half.	2nd half.	Total.
<i>Engineers' Department.</i>			
	Rs.	Rs.	Rs.
Bori Bandar passenger terminus,	11,275	93,617	1,04,892
" general offices,	92,798	66,839	1,59,637
Wari Bandar works,	44,963	35,893	80,856
Parel workshops,	18,845	78,460	97,305
Khandwa junction works,	87,376	32,369	1,19,745
Borghaut, flattening slopes,	60,557	10,395	70,952
Additional (8th) sleeper under every 24 feet rail,	29,010	...	29,010
Nagpur junction works,	10,932	2,019	12,951
Suki Nala, additional waterway,	6,347	998	7,345
Bhusaval, additional sidings,	73	23,849	23,922
" accommodation for employés,	853	14,552	15,405
<i>Locomotive Department.</i>			
Erection of 100 brake-vans,	25,297	1,31,501	1,56,798
Renewing 1,000 open wagons as covered vehicles,	39,270	35,224	74,494
Construction of 5 postal vans,	17,340	9,460	26,800
<i>Establishments.</i>			
Of all departments,	52,661	19,135	71,796

In addition to the above the expenditure of the year includes the following two special transactions, viz., (1), a payment of Rs. 9,413 to the Nizam's State Railway, being half the cost of the junction station buildings at Wadi, and originally paid by that line. This is in accordance with a revised agreement with the Nizam's State Railway for joint-working, under which the Company become the sole possessors of the junction, and charge the State line with an annual rental for joint occupation; and (2), a credit of Rs. 1,50,000, the amount received from the Director General of Railways as compensation to the Company in the exchange of the State Railway store depôt at Parel for the Great Indian Peninsula Railway locomotive and stores depôt at Byculla. The Bori Bandar passenger terminus is practically complete, except in regard to decoration and lighting, and has been in use since the 1st January, 1882; but its accounts have not yet been finally closed. At the end of 1881 a sum of Rs. 8,80,452 had been expended out of a sanctioned estimate of Rs. 10,17,822. As regards the new general administrative offices, the accounts show that during the year upwards of 1½ lakhs of rupees have been expended. At its close a total of Rs. 3,51,147 had been booked against a sanction of Rs. 15,13,143. The expenditure on the Parel workshops was mainly on their extension by 72 bays. The work of laying an additional (8th) sleeper under every 24 feet rail on certain sections of the line which was sanctioned in 1874 and has been in progress since, appears to have been finished during the year, no expenditure having been booked since June 1881. A balance of Rs. 36,660 remained unexpended on that date out of a sanction for Rs. 12,09,389. The charge against Capital represents the value of the sleepers and their carriage, the labour of laying having been borne by Revenue. The renewal of 1,000 open as covered goods wagons was taken in hand during the year at an estimated cost of Rs. 2,38,000. At its close 313 of them were so completed. The five new postal sorting vans which were under construction were rendered necessary by the new working agreement between the Postal Department and the Company, the five old vehicles which were thus replaced having been absorbed into the general coaching stock and converted into passenger carriages at the cost of Revenue. The other Capital works in progress during the year do not appear to call for special notice.

The balance of stores in stock at the beginning of the year, as exhibited in the accounts, was Rs. 59,02,910, and at its close Rs. 61,18,146, an apparent increase of Rs. 2,15,236 having thus occurred during the 12 months. But it must

be noted that the opening balance of the year included stores in transit between England and India to the value of Rs. 4,99,831, while nothing is shown on that account at its close. This omission is being dealt with by the Examiner of Railway Accounts; but as the value of such stores on 31st December, 1881, was Rs. 3,66,655, it will be seen that the real increase during the year was Rs. 5,81,891. Much of this was due to a change in the system of accounting for old stores returned from works, which was adopted under instructions from the Government of India. These were formerly taken into stock without any money value, the adjustment of the latter having been made when the stores were actually sold or otherwise disposed of. Under this system a large accumulation of unvalued stores had taken place up to the close of 1880. These were priced during the year and provisionally brought on to the books at the nominal value of Rs. 20 per ton, which tended to swell the stores balance and accounts to a great extent, for the increase of Rs. 5,81,891, just alluded to. The balance at the close of the year was, however, still below the provisional limit of Capital assigned by the Government of India to be locked up in stores, which was fixed at Rs. 63 lakhs; but as that Government has recently expressed a wish that this balance should be reduced to Rs. 52 lakhs by the end of 1882-83, every effort towards the attainment of this end is being made, and it may be noted that at the close of the official year 1881-82 the balance had fallen to Rs. 52,85,868. The removal of the stores from Byculla to Parel is expected to afford a better opportunity than has yet presented itself of examining and sorting the stores on hand, and may, it is hoped, assist in the endeavours to reduce the Capital locked up in stores.

The amount of Guaranteed Interest paid to the Company during the year was the same as for 1880, viz., Rs. 1,24,93,200, of which Rs. 43,023 was paid in India and Rs. 1,24,50,177 to Shareholders in England. The satisfactory feature in the year's transactions under this head is that the net earnings which accrued to the Company in each of the two half-years was not only sufficient to cover the Guaranteed Interest for the respective periods, but yielded a surplus of Rs. 37,26,288 on the working of the year taken as a whole; thereby reducing the cumulative net deficit to date for interest made good by Government to Rs. 7,19,78,238 after allowing for all re-payments to the Company on account of moiety of surplus profits.

Revenue.—The financial results for the past official year compare favorably with those for the previous corresponding period, and may be briefly summarised as follows:—

Main Heads.				1881-82.	1880-81.	Increase in 1881-82.	Decrease in 1881-82.
				Rs.	Rs.	Rs.	Rs.
Gross earnings,	...	...	...	3,57,07,387	2,58,87,607	98,19,780	...
Gross expenses,	...	...	...	1,72,62,354	1,41,17,512	31,44,842	...
Net earnings,	...	...	...	1,84,45,033	1,17,70,095	66,74,938	...
Total increase in 1881-82, ...						66,74,938	...

The further analysis of these comparative figures in their more important details is impracticable for reasons previously explained.

Adopting now the usual plan of reviewing the combined transactions of the two halves of 1881, and their relation to those of the twelve months preceding, the comparative statement of working will appear as under:—

Main Heads.				1881.	1880.	Increase in 1881.	Decrease in 1881.
				Rs.	Rs.	Rs.	Rs.
Gross earnings,	...	...	...	3,20,56,823	2,49,53,253	71,03,570	...
Gross expenses,	...	...	...	1,58,37,335	1,38,47,702	19,89,633	...
Net earnings,	...	...	...	1,62,19,488	1,11,05,551	51,13,937	...

The results of the past year are thus shown to have been considerably in advance of those obtained in the former period, the improvement being represented by the substantial increase of 46 per cent. in the net earnings. The above position has been reached by a steady accession of traffic extending uniformly over the entire period which yielded an equal increase in the two half-years, viz., Rs. 25,68,298 in the first and Rs. 25,45,639 in the second, or 50·2 and 49·8 per cent. of the total gain. The main factors contributing to these results, and the special features in the transactions themselves, will be more conveniently considered farther on under appropriate headings ; meanwhile the general results may be still further indicated by the figures in the table subjoined :—

	1881.	1880.	Increase in 1881.	Decrease in 1881.
Percentage of expenses to earnings, ..	49	55	..	6
Tonnage of goods hauled (paying weight), ..	1,534,400	1,112,766	421,634	..
Number of passengers carried, ..	5,538,311	4,751,944	786,367	..
Train mileage worked (excluding light running), ..	7,463,305	5,866,644	1,596,661	..
	Rs.	Rs.	Rs.	
Net earnings per train mile, ..	2·17	1·89	0·28	..
Net earnings per mile open, ..	11,264	8,705	2,559	..

The same satisfactory improvement in the operations during the period under notice is thus observed from all the different positions above assumed.

The average rate of Guaranteed Interest paid by Government during 1881 was 4·85 per cent. on the interest bearing Capital, compared with which the net earnings of the year averaged 6·29 per cent., the surplus being 1·44 per cent., and equivalent to 29 per cent. of the interest guaranteed.

Earnings.—The five main sources of revenue contributed to the gross income of the year in the following proportions :—

Main Heads	1st half.	2nd half.	Total.	Percentage to Total.
	Rs.	Rs.	Rs.	
Coaching, ..	35,68,973	27,99,446	63,68,419	20
Goods traffic, ..	1,41,77,687	1,10,63,754	2,52,41,441	79
Telegraph earnings, ..	27,804	21,416	49,220	..
Steam boat service, ..	..	..	..	..
Sundries, ..	2,17,179	1,80,564	3,97,743	1
Total, ..	1,79,91,643	1,40,65,180	3,20,56,823	100

A comparison of the above results with those recorded for 1880 is made in the following abstract :—

Main Heads.	1881.	1880.	Increase in 1881.	Decrease in 1881.
	Rs.	Rs.	Rs.	Rs.
Coaching traffic, ..	63,68,419	61,30,904	2,37,515	..
Goods traffic, ..	2,52,41,441	1,83,14,144	69,27,297	..
Telegraph earnings, ..	49,220	54,900	..	5,680
Steam boat service, ..	..	..	..	..
Sundries, ..	3,97,743	4,53,306	..	55,563
Total, ..	3,20,56,823	2,49,53,254	71,64,812	61,243
			Net increase in 1881, ..	..
			71,03,569	..

The falling off in the 1st and 2nd class passenger traffic is due to a great extent to the smaller movement of troops in 1881, as compared with that in 1880, when the forces engaged in Afghanistan returned to India on the cessation of hostilities.

Excluding "Troops and Police," under which the loss amounts to 26,727 and Rs. 1,18,211 in numbers and earnings respectively, the total ordinary passenger traffic during the period under notice shows an advance on the results recorded in 1880, as exhibited in the following table :—

Class.	1881.		1880.		1881.			
					Increase		Decrease.	
	No.	Rs.	No.	Rs.	No.	Rs.	No.	Rs.
First class,	29,197	3,18,334	27,510	3,39,190	1,687	..	..	20,856
Second class,	78,759	2,60,790	74,316	2,71,954	4,443	..	..	11,164
Third class,	446,525	8,23,955	393,394	7,95,032	53,131	28,923	..	..
Coolie class,	4,738,874	31,84,988	4,126,602	28,82,319	612,272	3,02,669	..	..
	5,293,355	45,88,067	4,621,822	42,88,495	671,533	3,31,592	..	32,020
	Net increase in 1881, ..				671,533	2,99,572	..	..

The decline in the receipts from the first two classes, while the numbers carried have slightly increased is owing to the establishment of the shorter line of communication with Delhi by the opening of the Rajputana-Malwa State Railway, which has diverted to a considerable extent the through passenger traffic between Bombay and Northern India. This is borne out by the following table of coaching traffic interchanged with foreign lines during the year as compared with 1880 :—

Foreign Railways.	1881.		1880.		1881.	
					Increase	
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Bombay, Baroda and Central India, ..	13,327	11,827	1,500	..	..	..
Madras,	2,67,171	1,97,302	69,869	..	..	..
East Indian Railway, &c.,	5,09,977	7,36,895	..	2,26,918	..	..
Holkar and Sindia-Neemuch,	1,07,543	92,356	15,187	..	..	..
Wardha Valley,	3,509	2,292	1,217	..	..	..
Nizam's,	2,37,173	1,70,359	66,814	..	..	..
Chhattisgarh,	1,168	..	1,168	..	..	..
State lines now worked by the Great Indian Peninsula Railway, .. ..	..	69,231	..	69,231	..	..
Total,	11,39,868	12,80,262	1,55,755	2,96,149	..	..
	Net decrease on 1881, ..				..	1,40,394

The above figures may also serve to explain the decrease in the average coaching receipts per train mile earned in 1881 as compared with the results obtained in the previous year, while the service performed was greater in the former by an increase of 281,918 in the coaching train miles run, as shown below :—

Half-year ending	1881.	1880.	1881.	
			Increase.	Decrease.
30th June,	1,102,948	984,624	118,324	...
31st December,	1,175,873	1,012,279	163,594	...
Total, ...	2,278,821	1,996,903	281,918	...
	Rs. A. P.	Rs. A. P.		Rs. A. P.
Average coaching receipts per train mile,	2 12 9	3 1 1	...	0 4 4

This appreciable increase in the train mileage is due to 3,691 more passenger and mixed trains having been run in the past year than in 1880.

The following table shows the percentage of passengers conveyed to the number of seats provided :—

Class.	No. of Passengers carried one mile, 1881.	No. of Seats per carrying capacity hauled one mile, 1881.	Percentage of Passengers to Seats.
First,	5,268,202	115,618,606	4·6
Second,	29,873,811	179,102,525	16·7
Third,	51,689,406	376,604,289	13·7
Coolie,	246,458,340	382,022,950	64·5

The proportion of passengers to seats of all classes was below one-third.

The following abstract showing the profit accruing to the Company in respect of the working of its coaching service for the past year, as set forth in the Government analyses of the half-yearly Revenue Accounts will conclude the review under this head :—

Class.	Earnings per Passenger per mile.	Average cost per Passenger per mile.	Average profit per Passenger per mile.
	Pies.	Pies.	Pies.
First,	29 26	} 2 59	3·65
Second,	10·38		
Third,	7·79		
Coolie,	4·96		
Average of all classes, ...	6·24	2·59	3·65

Goods traffic.—As stated in the general remarks above, the increase in the goods traffic is represented by Rs. 69,27,297, from which, however, must be deducted the sum of Rs. 8,44,821 credited as earnings in the past year, by a countervailing charge to the working expenses, for "Carriage of Revenue Stores." By this method the receipts and expenditure of the past year have been exaggerated *pro tanto*, as compared with those for 1881, when no account was taken of such work. For purposes, therefore, of the comparison now instituted these items will be eliminated wherever they appear. The advance in 1881 over the previous year as regards the goods traffic will then stand at Rs. 60,82,476, the particulars of which are as follows :—

Main Heads.	1881.	1880.	1881.		
			Increase.	Decrease.	
			Rs.	Rs.	
Merchandise, general,	2,39,26,168	1,77,45,723	61,80,445	...	
Military stores,	1,70,809	2,01,187	...	30,378	
Railway materials for construction,	64,525	29,209	35,316	...	
Coal,	61,922	1,14,555	...	52,633	
Live stock, public,	97,528	86,861	10,667	...	
" military,	9	195	...	186	
Rents, demurrage, &c.,... ..	35,645	30,287	5,358	...	
Miscellaneous,	40,014	1,06,127	...	66,113	
	2,43,96,620	1,83,14,144	62,81,786	1,49,310	
			Net increase in 1881, ...	60,82,476	...

The total paying weight lifted during the year under notice was 1,534,400 tons, being 421,634 in excess of the freight carried in 1880, and represents the work done for the large revenue that the past year has yielded. The increase in the earnings as shown above is 33·2 per cent. of the entire receipts for 1880.

Analysing the merchandise traffic, it is seen that the leading element in the successful results above-noted was the exceptionally heavy traffic in wheat. The large dimensions to which this traffic suddenly grew in 1881, as compared with the previous year, will be appreciated when it is stated that the increase alone in the receipts from this source amounted to 52½ lakhs, the tonnage lifted rising from 162,112 in 1880 to 504,707 in 1881. The immediate cause of this remarkable accession of traffic was the brisk export trade in this commodity which was carried on with Europe during the past year, occasioned by the partial failure of American harvests and the consequent demands on other wheat-producing countries.

As the traffic under consideration has exercised such an important influence on the financial results attained by this line during the past year, it may be interesting to examine it in greater detail than heretofore. The following table traces its progress during the past four years prior to which the particulars were included under the traffic in "food grains."

Year.	Tons lifted.	Rs.	Percentage of each to Earnings in 1881.
During 1878,	99,010	14,51,690	19 0
" 1879,	102,424	14,59,586	19·1
" 1880,	162,112	23,30,854	30·6
" 1881,	504,707	76,04,989	100 0

The foreign lines with which there is usually an interchange of traffic in this article are the East Indian and the Holkar and Sindia-Neemuch State Railways. From these sources; however, there has been a diminution of Rs. 41,313 in the receipts for the past year, owing to smaller bookings on the former line. The improvement has thus taken place in the indigenous traffic of the country served by this railway, from whence the accumulated stock of previous seasons has been moved to this city for exportation. The rise in the rates for grain carriage, and the increased facilities offered for ready shipment at the Prince's Dock have not been without their due influence on the traffic in question. It is, however, ques-

tionable whether any further development in this direction may be immediately expected; for notwithstanding the greater area that is being rapidly brought under cultivation, it will need a combination of favorable circumstances, such as super-abundant harvests, active Home markets and favorable rates of exchange, &c., to maintain the position now reached.

The other principal sources from which the Revenue of the past year was realised were:—Cotton, food grain, linseed, piece-goods, and salt, as brought out more particularly in the following table showing the fluctuations in the principal commodities as compared with the record of 1880:—

Particulars.	1881.	1880.	1881.	
			Increase.	Decrease.
	Rs.	Rs.	Rs.	Rs.
Bagging,	2,84,626	1,74,739	1,09,887	..
Cocoanuts,	3,52,575	3,88,887	..	36,312
Cotton,	34,15,371	29,11,698	5,03,673	..
Dye roots and colour,	1,55,893	1,45,849	10,044	..
Food grain,	15,45,378	21,39,709	..	5,94,331
Fruits, dried,	3,96,140	3,99,932	..	3,792
" green,	1,74,212	1,78,578	..	4,366
Ghee,	1,45,860	77,733	68,127	..
Grocery,	2,01,639	1,98,209	3,430	..
Ground-nuts,	2,75,042	48,837	2,26,205	..
Hides and horns,	3,06,225	2,38,058	68,167	..
Linseed,	16,19,865	13,38,754	2,81,111	..
Metals and hardware,	4,15,872	3,81,288	34,584	..
Moha flowers and seeds,	1,02,327	77,193	25,134	..
Oil,	2,58,976	2,32,391	26,585	..
Opium,	2,14,781	1,80,862	33,919	..
Piece-goods,	10,60,549	12,07,521	..	1,46,972
Railway materials,	4,68,560	5,54,256	..	85,696
Salt,	12,03,830	14,38,971	..	2,35,141
Spice seeds,	3,10,885	1,21,390	1,89,495	..
Sugar and jagree,	6,14,356	5,48,775	65,581	..
Til seed,	8,34,779	5,44,114	2,90,665	..
Twist,	2,49,480	2,29,090	20,390	..
Wheat,	76,04,989	23,30,854	52,74,135	..

The increase of Rs. 5,03,673 in the earnings from cotton, taken in connection with the favorable reports regarding the Berar crops of the present season, may be looked upon as an earnest of a very considerable accession to the traffic of the

current year. The quantities conveyed during 1880 and 1881 are compared below :—

	1881.	1880.	1881.	
			Increase.	Decrease.
			Mds.	Mds.
Unpressed,	709,191	640,930	68,261	..
Half-pressed,	6,246	..	6,246	..
Full pressed,	2,358,724	2,075,225	283,499	..
Total,	3,074,161	2,716,155	358,006	..

The bulk of this increase is in the Berars traffic and that originating on the south-east section of this railway, the imports from foreign stations being but slightly in advance of 1880.

The revival in the linseed traffic noticed in the report for 1880 continues, and the trade may be said to have recovered from the depression that marked it in 1878 and 1879. The receipts for the past five years were :—

	Rs.
1877,	16,12,215
1878,	4,16,749
1879,	3,44,446
1880,	13,38,754
1881,	16,19,865

Important decreases appear in the foregoing statement under "Food grains," "Piece-goods" and "Salt." For the first of these no explanation can be offered, except perhaps that plentiful harvests throughout the country generally have rendered unnecessary any large transport of food grain for local consumption, such as the past few years have noticed. The lesser receipts under "Piece-goods" is attributed partly to the establishment of mills up-country and partly to the attraction of traffic to the shorter route *via* Rajputana, notwithstanding a reduction in through rates between Bombay and stations beyond Agra; while the falling off in the salt traffic is due in some measure to the opening of the Rajputana State Railway and, perhaps, in a greater degree to short outturn of Kharaghoda salt.

The following table traces the progress of the traffic in the above-mentioned and a few other commodities carried by this railway during the past five years :—

Year.	Food grains. Includes traffic in wheat.	Piece-goods	Salt.	Spice seeds	Teel seed.	Ground-nuts.
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1877, .. .. .	..	7,71,862	11,27,535	2,98,003	5,16,211	9,574
1878,	53,77,148	8,41,518	12,90,776	5,15,043	6,34,167	13,663
1879,	42,31,410	10,65,743	14,09,668	1,88,304	6,81,908	39,650
1880,	21,39,709	12,07,521	14,37,971	1,21,390	5,44,114	48,837
1881,	15,45,378	10,60,549	12,03,830	3,10,885	8,34,779	2,75,042

The traffic in ground-nuts has risen into importance during the year under notice.

The following table of variations in the goods traffic interchanged with foreign lines indicates an improvement in the trade with Central India and the Central Provinces :—

Traffic interchanged with the	Increase.	Decrease.
	Rs.	Rs.
East Indian Railway, .. .. .	..	6,19,132
Madras " .. .. .	..	8,179
Bombay, Baroda and Central India Railway, Holkar and Sindia-Neemuch State Railway,	..	2,64,434
Wardha Coal State Railway,	6,01,468	..
Nizam's State Railway,	96,308	..
Nagpur and Chhattisgarh State Railway, ..	62,715	..
	5,75,940	..

while the northern trade has naturally been diverted to the more direct route through the province of Rajputana.

The total tonnage of goods moved during the year as compared with 1880 was 1,534,400 tons against 1,098,953, omitting the weight of stores carried on Revenue account, which aggregated 208,312 and 378,915 tons in 1880 and 1881 respectively.

The average rates per ton per mile obtained in the two halves of the past year compare as under with those for 1880 :—

	1881.	1880.	Decrease in 1881.
	Pies.	Pies.	Pies.
1st half,	9·10	9·76	0·66
2nd "	8·90	9·92	1·02

There was an increase in the total mileage run for the goods train service in 1881 which, including its proportion of the mixed train mileage, was as follows :—

Half-year ending	1881.	1880.	1881.	
			Increase.	Decrease.
30th June,	2,811,671	2,296,927	514,744	..
31st December,	2,223,317	1,590,606	632,711	..
	5,034,988	3,887,533	1,147,455	..
	Net increase in 1881, ..		1,147,455	..

The extra mileage run resulted to some extent from the additional length of line worked during the past year; the Dhond and Manmad chord line having been placed under this Company's management from 1st January, 1881, while the Berars branches were so placed in the previous November.

Telegraph traffic.—Under this head the receipts during 1881 show a falling off to the extent of Rs. 5,681, the number of paid messages transmitted during the two periods being 53,583 in 1881 and 60,549 in the previous year.

Sundries.—The miscellaneous receipts during the past year have decreased, being Rs. 55,533 less than in 1880. The following table shows that this is due to a falling off in the receipts from hire of locomotives and vehicles, and mileage and demurrage of vehicles on foreign lines. The first of these is explained by the return of the engines hired to the Punjab Northern State Railway, and the discontinuance of the special arrangements for the supply of vehicles to the Wardha

The net decrease of Rs. 1,51,886 under "Maintenance of Way, Works and Stations," the only main head on which a smaller outlay appears in the above statement, is the result of the several variations shown below:—

Abstract A.	1881.	1880.	1881.	
			Increase.	Decrease.
	Rs.	Rs.	Rs.	Rs.
General superintendence,	4,08,563	3,82,895	25,668	...
Permanent way,	20,23,301	22,83,092	...	2,59,791
Bridges, &c.,	4,66,889	4,33,362	33,527	...
Stations and buildings,.. ..	2,47,409	2,00,074	47,335	...
New minor works,	4,639	6,078	...	1,439
Unclassified expenditure,	1,71,185	1,79,920	...	8,735
	33,21,986	34,85,421	1,06,530	2,69,965
Less—Transfers and Special Funds, ..	15,214	26,763	...	11,549
	33,06,772	34,58,658	1,06,530	2,58,416
			Net decrease in 1881,	... 1,51,886

The decrease in the expenditure under "Permanent Way" shown above, taken in connection with the still larger reduction of Rs. 5,44,819 noticed in the outlay for 1880, appears to call for special remark. In explanation it may be stated that the expenditure for the past year has been reduced by Rs. 3,77,646, being the value of old and unpriced materials which had accumulated in previous years under the arrangement then obtaining of not allowing credit to the returning department until the stores were disposed of, but which as subsequently agreed, were credited in the two-halves of the past year at a temporary valuation of Rs. 20 per ton in anticipation of final disposal by sale or otherwise. The greater portion of these stores, it may also be remarked, has been sold at rates considerably higher than the above, and the difference between the sale proceeds (less cost of carriage) and the nominal value has been credited to Revenue in addition. The increase under "General Superintendence" is due to retiring bonuses, to passages and extra salaries of additional Assistant Engineers and Permanent way Inspectors engaged and sent out to India in the early part of the year, and to the cancellation of the ruling under which capital bore a percentage of the establishment charges on account of supervision. The other increases denote a tendency, which has been noticed during the past few years towards a gradual increase in the annual expenditure on repairs to fences, stations, and staff quarters. The reduction in "Unclassified Expenditure" is accounted for by the charges for "Repairs to Ballast Wagons" previously recorded thereunder having been included with the repairs of goods vehicles under carriage and wagon expenses in accordance with the Revised Standard Form of Account.

The locomotive expenses during the year under report were recorded at Rs. 56,04,430 (excluding, as already intimated, the debit of Rs. 4,67,166 for "Carriage of Revenue Stores"). This is an increase over the expenditure for 1880 of Rs. 7,16,024, which the following table particularises:—

Abstract B.	1881.	1880.	1881.	
			Increase.	Decrease.
	Rs.	Rs.	Rs.	Rs.
General superintendence, ...	3,32,032	3,13,936	18,096	...
Running expenses, ...	13,90,940	11,68,731	2,22,209	...
Fuel, ...	22,57,341	19,34,240	3,23,101	...
Water, ...	1,30,269	1,10,479	19,790	...
Oil, tallow, &c., ...	1,84,294	1,70,892	13,402	...
Maintenance, &c., of locomotives, &c., ...	11,26,797	9,80,825	1,45,972	...
New minor works, ...	1,332	2,418	...	1,086
Unclassified expenditure, ...	1,81,425	2,06,885	...	25,460
Total, ...	56,04,430	48,88,406	7,42,570	26,546
	Net increase in 1881, ...		7,16,024	...

The additional work required for the locomotive department to meet the demands of the increased traffic in 1881 is represented by an increase of nearly two millions in the engine mileage run that year, as compared with the one preceding, the distances for the two periods being 8,498,142 and 6,580,001 miles, respectively. Estimating this increased duty at the average rate per mile obtained by dividing the engine mileage in 1880 into the locomotive expenses for that year, the result is that the actual increase in the expenditure, as shown in the above statement, is less than half the estimated cost of the extra work performed, thus justifying the comparatively large excesses appearing under "Running Expenses" and "Fuel," as well as accounting for the greater consumption of oil, tallow and water. The exemption of Capital from the usual percentage charges on account of supervision, by the change of ruling previously alluded to, increases the total debit to Revenue, and is the immediate cause of the excesses under "General Superintendence" appearing in the above and subsequent statements.

The notice taken by the Consulting Engineer for Railways last year of the inefficient condition into which the Company's rolling stock had then fallen has had the effect of increasing the expenditure for maintenance and renewals, to which the increase under maintenance of engines in the above statement is directly due. Still more appears necessary in this direction, as the above-named officer, when passing the Revenue accounts for the year 1881, was not satisfied that the Company had brought up its rolling stock to a proper standard of efficiency.

The increased consumption of fuel of all descriptions amounted to 33,377 tons, the quantities of the various descriptions used in the two years undergoing comparison being as follows:—

Description.	1881.	1880.	1881.		Percentage of Increase.
			Increase.	Decrease.	
	Tons.	Tons.	Tons.	Tons.	
Coal, English, ...	97,326	83,542	13,784	...	16
" Warrora, ...	28,088	9,085	19,003	...	60
" Bengal, ...	17,747	9,379	8,368	...	
" Mohpani, ...	4,122	12,787	...	8,665	
Patent fuel, ...	556	...	556	...	100
Wood, ...	2,421	2,090	331	...	16
Total, ...	150,260	116,883	42,042	8,665	...
	Net increase in 1881, ...		33,377	...	28

The average cost per ton for each of the different descriptions of coal, and the cost per engine mile of the total quantity of all kinds consumed is given in the subjoined statement, for the two-halves of the past year, as compared with 1880.

Descriptions.	30TH JUNE.		31ST DECEMBER.	
	1881.	1880.	1881.	1880.
English,	{ Quantity, Tons, 68,219 Cost per ton, Rs. 17 6 0	{ Quantity, Tons, 42,089 Cost per ton, Rs. 18 3 2	{ Quantity, Tons, 45,826 Cost per ton, Rs. 17 6 4	{ Quantity, Tons, 42,031 Cost per ton, Rs. 18 10 2
Nerbudda Coal Company, ...	{ Quantity, Tons, 4,372 Cost per ton, Rs. 9 0 0	{ Quantity, Tons, 7,086 Cost per ton, Rs. 9 0 0	{ Quantity, Tons, 3,609 Cost per ton, Rs. 9 0 0	{ Quantity, Tons, 2,303 Cost per ton, Rs. 9 0 0
Bengal Coal Company, ...	{ Quantity, Tons, 4,001 Cost per ton, Rs. 18 7 2	{ Quantity, Tons, 1,373 Cost per ton, Rs. 19 3 6	{ Quantity, Tons, 512 Cost per ton, Rs. 18 7 2	{ Quantity, Tons, 3,125 Cost per ton, Rs. 19 11 3
Barrakar,	{ Quantity, Tons, 91 Cost per ton, Rs. 19 8 5	{ Quantity, Tons, 961 Cost per ton, Rs. 19 9 0	...	{ Quantity, Tons, 2,940 Cost per ton, Rs. 19 8 5
Warrora,	{ Quantity, Tons, 11,532 Cost per ton, Rs. 6 7 6	{ Quantity, Tons, 6,656 Cost per ton, Rs. 6 7 6	{ Quantity, Tons, 17,825 Cost per ton, Rs. 6 7 6	{ Quantity, Tons, 3,152 Cost per ton, Rs. 6 7 6
East Indian Railway Com-pany,	{ Quantity, Tons, 8,440 Cost per ton, Rs. 18 0 0	...	{ Quantity, Tons, 6,591 Cost per ton, Rs. 18 0 0	...
New Beerbhoom Coal Com-pany,	{ Quantity, Tons, 4,003 Cost per ton, Rs. 18 7 3	...	...	...
Cost per engine mile, ...	Annas 4 21	Annas 4 70	Annas 4 29	Annas 4 78
Quantity used per do., ...	lbs. 38 23	lbs. 41 18	lbs. 40 27	lbs. 36 45

The rate for coal received from England represents cost on arrival in Bombay and landing charges; those for the supplies from the East Indian Railway and the Bengal, Barrakar, and new Beerbhoom Coal Companies include carriage to Jubbulpore; while the rate for Nerbudda is that paid at the Garrawara mines per ton loaded into trucks; and for Warrora includes carriage to Wardha Junction. These circumstances explain the great disparity in the rates. Patent fuel was tried during the past year for the first time on this line, a small consignment having been ordered from Home as an experimental measure.

The total locomotive expenses divided over the net train mileage give the following results, as compared with 1880:—

	1881.	1880.	1881.	
			Increase.	Decrease.
			Annas.	Annas.
1st half,	11 91	12 47	...	0 56
2nd ,,	12 95	14 33	...	1 38
Mean,	12 43	13 40	...	0 97
Net mean decrease in 1881, ...				0 97

The "Carriage and Wagon Expenses" for 1881 show an increase of Rs. 3,16,349 over similar expenditure in the year preceding. The particulars of this outlay by main heads are as follows:—

Main Heads of Abstract C.	1881.	1880.	1881.		
			Increase.	Decrease.	
			Rs.	Rs.	
General superintendence,	94,593	94,024	569	...	
Repairs of coaching vehicles,	5,90,119	6,43,911	...	53,792	
" goods "	13,09,805	9,50,058	3,59,747	...	
Cleaning and oiling,	1,72,476	1,79,889	...	7,413	
Unclassified expenditure,	88,781	84,858	3,923	..	
	22,55,774	19,52,740	3,64,239	61,205	
Less—Transferred to Fire Insurance Fund,	3,910	17,225	...	13,315	
Net outlay,	22,51,864	19,35,515	3,64,239	47,890	
			Net increase in 1881, ..	3,16,349	...

The heavy expenditure on maintenance of goods vehicles constitutes the entire increase appearing in the above statement. This represents the cost of repairing and renewing the larger number of vehicles which passed through the shops last year as compared with 1880, the numbers in the two periods being:—

	1881.	1880	Increase.
Repaired,	36,628	33,148	3,480
Renewed,	374	186	188

The actual number of goods vehicles which were found to require attention during the year under notice was 39,500, being more than five times the authorised number of this description of stock, and giving an average of about 3,300 per month. This of itself would appear to indicate the necessity for the action, above referred to, recently taken by Government in the matter of the Company's rolling stock. Of coaching vehicles, however, the number of repairs and renewals was smaller than in 1880 by 61 and 52, respectively, the latter causing the decrease which appears more particularly in the charge for materials. The heavier renewals under goods vehicles necessitated a large expenditure of English stores, and gave rise to the increase under "Loss by Exchange."

"Traffic Expenses" increased to the extent of Rs. 1,19,929 over the amount recorded for 1880, as made up in the following table:—

Main Heads of Abstract D.	1881.	1880.	1881.		
			Increase.	Decrease	
			Rs.	Rs.	
General superintendence,	2,47,162	2,34,851	12,311	...	
Station staff,	9,18,145	8,35,126	83,019	...	
Train staff,	6,06,694	6,09,132	...	2,438	
Fuel, &c., and general stores,	1,83,762	1,81,774	1,988	...	
Clothing,	36,247	28,981	7,266	...	
Printing, stationery and tickets,	79,819	75,251	4,568	...	
Delivery of parcels,	3,392	3,746	...	354	
Miscellaneous expenses,	9,470	4,708	4,762	...	
Payments to other lines,	52,367	43,787	8,580	...	
Unclassified expenditure,	17,461	17,234	227	...	
Total,	21,54,519	20,34,590	1,22,721	2,792	
			Net increase in 1881, ...	1,19,929	...

The largest increase appears under "Station Staff," and is due, in great measure, to the additional cost of working the State lines under the Company's

management during the year, and to extra payments to contractors for loading and unloading goods, the quantities handled in this way during 1880 and 1881 being 636,016 and 1,173,394 tons, respectively, and the extra cost Rs. 34,043. The goods staff of the Company's own stations shows an increase chiefly at Bombay (viz., Rs. 6,550), but this does not appear to have been in excess of requirements, or incommensurate with the very heavy traffic worked to and from that terminus. A small decrease results in the train staff expenses from the employment of a lesser number of guards, as compared with brakemen. The average numbers of men engaged per month for the past two years were:—

	1880.	1881.
Guards,	913	843
Brakemen,	371	455

the State lines requiring, in addition, an average of 10 guards and 7 brakemen.

The only other point worthy of notice is the increase in the "Payments to other Lines." This is due to the payment during the year of a bill for Rs. 7,196 preferred by the East Indian Railway for handling Great Indian Peninsula goods at Jubbulpore from 1st April, 1876, to 31st December, 1880.

Under "General Charges" the figures for 1881 show a net increase of Rs. 50,887, after eliminating as before the charges for "Carriage of Revenue Stores" as brought out in the following statement:—

Main Heads of Abstract E.	1881.	1880.	1881.	
			Increase.	Decrease.
	Rs.	Rs.	Rs.	Rs.
Home expenditure,	1,01,438	94,671	6,767	...
Indian management—				
Salaries, &c., of general officers,	4,58,169	4,44,267	13,902	...
Rents and other charges,	77,538	80,955	...	3,417
Police,	1,38,338	1,76,681	...	38,343
Advertising,	4,334	4,188	146	...
Electric Telegraph,	2,86,851	2,19,605	67,246	...
Unclassified expenditure,	19,936	15,350	4,586	...
Total,	10,86,604	10,35,717	92,647	41,760
			50,887	...
			Net increase in 1881, ...	

The principal variations appear under "Indian Management," "Salaries, &c. of General Officers," "Police" and "Electric Telegraph." The first of these, together with the one preceding it in the above statement, has already been explained in the foregoing remarks; the second is due to the contribution paid by Government last year for the first time, as the share of the Railway police charges payable by the State for purposes of "Law and Order" as distinguished from "Watch and Ward." The increase under "Electric Telegraph" arises partly from a special credit in the accounts for 1880 which reduced the charges for that year by Rs. 36,815, being the proportion of the cost of the new block system chargeable to Capital and partly to an increase in the supervising staff, while the additional wire expended in the work of overhauling served also to swell the charges for 1881. The work done for the above cost by the Telegraph for the past two years is contrasted in the following table:—

		Number of Paid Messages.	Number of Service Messages.	Total.	Average cost per Message.	Average Receipt per Message
					As.	As.
30th June,	{ 1880,	29,852	654,755	684,607	2.20	0.63
	{ 1881,	29,650	769,316	798,966	2.88	0.56
31st December,	{ 1880,	30,697	565,009	595,706	3.37	0.75
	{ 1881,	23,923	248,781	272,704	2.40	0.61

“Special and Miscellaneous Expenses” during 1881 increased upwards of 22 per cent. over the charges for 1880 as exhibited in the table subjoined :—

Main Heads of Abstract G.	1881.	1880.	1881.	
			Increase.	Decrease.
	Rs.	Rs.	Rs.	Rs.
Law charges,	Cr. 2,754	Cr. 2,870	...	Cr. 116
Compensation,	10,717	11,941	...	1,224
Rates and taxes,	16,760	34,950	...	18,190
Payments to other lines,	5,70,009	4,48,544	1,21,465	...
Miscellaneous,	15,225	12,073	3,152	...
Total, ...	6,09,957	5,04,638	1,24,617	19,298
<i>Less</i> —Transferred to Fire Insurance Fund,	4,857	9,822	...	4,965
Net outlay, ...	6,05,100	4,94,816	1,24,617	14,333
			1,10,284	...
			Net increase in 1881, ...	...

The only important increase in the above is that under “Payments to other Lines,” and arises from the larger payments to Government of their accepted proportions of net profits accruing from the State lines leased by this Company. The debits on this account for the two years under reference were Rs. 3,125 in 1880 and Rs. 2,01,702 in 1881. The disparity is due to the fact that only the Berar lines were worked in the former year, and these only for the months of November and December. This expenditure, as well as the cost of working these State lines, it may be remarked, is more than compensated for by the countervailing increase in the traffic receipts during the year to the following extent :—

	Rs.	Rs.
Dhond and Manmad line,	6,36,495	
Amraoti line,	79,157	
Khamgaon line,	62,368	7,78,020

The payments for hire of vehicles, &c., decreased to the extent of Rs. 48,389, which coincides with the declension observed in the traffic interchanged with other lines. The following particulars show the transaction of the year in respect of the interchanges of rolling stock —

	Rs.	Rs.
Paid to East Indian Railway,	1,98,093	
„ Bombay, Baroda and Central India Railway, ...	49,006	
„ Madras Railway,	14,690	
„ Nizam’s State Railway,	6,155	
„ Wardha Coal Railway,	44,031	3,11,975
<i>Less</i> —Received from—	Rs.	
East Indian Railway,	65,377	
Bombay, Baroda and Central India Railway, ...	13,053	
Madras Railway,	32,636	
Nizam’s State Railway,	21,021	
Wardha Coal Railway,	3,949	1,36,036
Net amount paid to Foreign Railways, ...	1,75,939	

In the miscellaneous expenses are included special contributions amounting to Rs. 5,000 in aid of the Nagpur Hospital and the Anglo-Vernacular School at Bhusaval.

SIND, PUNJAB AND DELHI RAILWAY.

The year under review has been an uneventful one in the history of the Sind, Punjab and Delhi Railway.

The length of the line remained as in the previous year at 554 miles from Ghaziabad to Multan (Sher Shah Ghaut on the Chenab); and 110 miles from Kotri to Karachi, or a total of 664 miles.

The total Capital expenditure to the end of the year was Rs. 11,15,82,596, or an average of Rs. 1,68,046 per mile, exclusive of land.

Maintenance.—The roadway was properly maintained during the year without interruption or damage from floods. The heavy expenditure incurred for some years past at the cost of Revenue in stone protection to the shallow piers of the large bridges, and in training works for the large rivers, have, it is hoped, made these bridges safer than before, but they must still continue to be a source of considerable anxiety and expense during the flood season owing to their originally defective design.

The permanent way of the line has been efficiently maintained, and over 80 miles of the condemned Delhi pattern of steel-topped rails have been replaced by rails of solid steel. The old rails have been utilized in goods sheds and other buildings, or sold to the public, at a good price.

Capital works.—The re-arrangement of the Lahore station-yard has been completed at a cost of Rs. 2,95,760.

The re-arrangement of the Amritsar station yard has been partly carried out, and new works at this station are now in hand in constructing the junction with the Amritsar-Pathankote State Railway, and providing the accommodation required by it. This work has been carried out by the Sind, Punjab and Delhi Railway at the expense of the guaranteed line.

The work on the new engine erecting shop, Karachi, progressed satisfactorily during the first half of the year, but has since been delayed for want of tiles for its roof, the tiles originally supplied by the contractor having been condemned.

Stations.—No new stations have been added to the line during the year, but the 21 temporary stations have all been maintained and some have been made permanent.

Good progress has been made with the new terminal passenger station at Karachi city; and that at Multan city has been completed and opened for traffic.

The new staff quarters at Multan were completed in December, their total cost having amounted to Rs. 60,439.

The new blocks of staff quarters at Lahore have been completed, and fair progress made with those at Saharanpur.

Locomotive.—The five new engines mentioned in the last report have arrived from England, and some of them are now at work.

Nineteen coaching vehicles and 13 goods wagons have been added to the stock, and heavy renewals of some of the old stock have been carried out, chiefly in low-sided wagons; and the conversion of the covered wagons conveying only 6 tons to others conveying 8 to 11 tons has been steadily pushed on.

The additions to the Lahore workshops (new boiler shops and foundry) have been completed, and the additional carriage sheds are well advanced; minor additions have also been made to the Saharanpur shops.

During the past year the locomotive department has been doing a considerable amount of work for the connected State Railways in erecting their rolling stock. The total number erected during the twelve months has been 47 locomotives and 489 wagons.

Traffic.—The return of the troops from Southern Afghanistan, in May 1881, gave an abnormal increase to the traffic, which has since fallen back to its normal dimensions. A comparison with the period preceding the war shows a considerable and steady increase of the regular traffic which bids fair to continue. The late excellent harvest and the rise in the price of American wheat, has given a fresh start to the Punjab wheat trade; but it is a traffic that can only afford to pay the very lowest scale of charge for carriage, and is not very profitable to the Railway. Much of this traffic still goes down the river in country boats, and the Railway only gets the benefit of it over the short section between Kotri and Karachi. The approaching completion of the new pier at the latter place may, it is hoped, do something to stimulate the trade at the port, but until the harbour itself is improved and additional facilities are afforded for through traffic from the Punjab, the export traffic can never properly develop.

This line is still hampered with the high price of fuel, its original heavy capital cost, and the numerous heavy charges for special repairs in the engineering and locomotive departments, so that it is feared some years must still elapse before it can be expected to pay regularly the full interest on its capital cost, but its military and commercial importance to the country can scarcely be over-rated.

Considerable difficulty has been met with on this Railway, as well as on the Punjab Northern State Railway, in getting suitable approach roads made to new stations as they are opened, the want of these being in many cases a great hindrance to the traffic which ought to come to the line. The local authorities are often unable or unwilling to construct them from the funds at their disposal. A definite system for the provision of them, whether from Imperial, Provincial or Local Funds, would be of great benefit to all railways in this country, especially to recently constructed ones.

The subject of the provision of bonded warehouses along the Railway has been brought forward during the last half year. Lahore and Ludhiana will probably adopt them for use before long.

The Indus Steam Flotilla has been entirely laid up, and nearly half of its vessels sold.

The following figures give the number of passengers carried, and the receipts from passengers and goods for the last three years :—

Year.				Number of Passengers.	Passenger Receipts.	Goods Receipts.
					Rs.	Rs.
1879-80,	...	...	...	3,624,000	39,60,000	74,71,000
1880-81,	...	...	...	4,413,000	42,96,000	75,50,000
1881-82,	...	...	...	4,044,000	35,73,090	61,39,000

The first two years were largely affected by the war, and the last year was adversely affected by severe sickness in the Punjab in 1881.

The gross receipts, working expenses and net profits for the last three years were as under, deducting the flotilla :—

Year.				Receipts.	Expenses.	Profits.
				Rs.	Rs.	Rs.
1879-80,	...	...	...	1,14,30,000	63,72,000	50,58,000
1880-81,	...	...	...	1,18,46,000	63,56,000	54,90,000
1881-82,	...	...	...	97,12,000	67,10,000	30,02,000

The following statement shows at a glance the principal features of the working of this railway during the official year ending 31st March, 1882:—

Sind, Punjab and Delhi Railway.	Total mileage open.	PASSENGERS DURING THE YEAR.					Receipts from Passengers.	Receipts from Merchandise and Miscellaneous.	Total Receipts.	Working Expenses.	Net Profit.	Number of European and Eurasian Staff.	Number of Native Staff.	Total Capital expenditure from commencement.
		1st Class.	2nd Class.	3rd Class.	Intermediate Class.	Total.								
	Miles.	Nos.	Nos.	Nos.	Nos.	Nos.	Rs.	Rs.	Rs.	Rs.	Rs.	Nos.	Nos.	Rs.
Punjab and Delhi Section, ...	566	20,748½	51,970½	37,71,488	9,212½	38,53,419½	33,21,857	48,54,113	81,75,970	54,58,237	27,17,733	547	12,150	769,82,597 11,15,91,111
Sind Section, ...	110	2,297	8,338	2,04,634	...	2,15,269	2,51,237	12,85,000	15,36,237	12,52,221	2,84,016	125	2,394	

The Company's flotilla stopped running on the 1st April, 1881, and expenditure and receipts have not been included in this statement.

The following figures show the gross earnings of the line at three year intervals since 1872 :—

Years.								Gross Receipts.
								Rs.
1872, ...	...	...	...	...	...	...	...	54,17,000
1875, ...	...	...	...	...	...	...	...	65,13,000
1878, ...	...	...	...	...	...	...	...	89,30,000
1881, ...	...	...	...	...	...	...	...	99,74,000

MADRAS RAILWAY.

Open mileage.—The open length of this railway is 858 miles, of which 815½ miles are single and 42½ miles double line.

Capital expenditure.—The Capital expenditure up to 31st March, 1882, was Rs. 11,12,52,154 (£10,198,114), being at the rate of Rs. 1,29,665 (£11,886) per mile, exclusive of land. The value of stores in stock on 31st March, 1882, including stores in transit (Rs. 67,595), was Rs. 28,93,795. The total Capital expenditure, including stores, was up to same date Rs. 11,41,45,949 (£10,463,380).

The Capital expenditure during the year was Rs. 1,95,124. The principal engineering works on which outlay was incurred were :—

	Rs.
Cheyer bridge,	62,576
Extension of brass and iron foundries, Perambur,	15,614
Extending line to Bangalore Pettah,	15,004
School house, Gooty,	5,960
Laying new permanent way over girder bridges, North-West line,	23,287
Adding siding, Colar Road,	6,577
Running Driver's bungalow, Jalarpet,	6,544
" " Tirupati,	6,057
" " Gooty,	4,840
" " Raichur,	5,032
Total,	1,51,491

Dividend.—The net profits of the official year were Rs. 21,24,004 (£194,700), giving a dividend at the rate of 1·9 per cent. on the total Capital expenditure. The net profits fell short of the guarantee by £334,000.

The guaranteed interest from the formation of the Company up to 31st December, 1881, amounted to £10,245,088, and the net profits for the same period to £4,416,108 ; leaving a balance of £5,828,980 to be met from the revenues of India, in addition to the expenditure on land and control.

Condition of way.—The permanent way has been maintained in excellent condition, and no damage of serious nature occurred to the road during the year. The bank between Kadambatur and Arkonam (the scene of the fatal accident in 1879) has given no cause for anxiety.

The substitution of iron for wooden sleepers progresses between Palghat and Beypore, and at the end of the year there remained only ¾ mile of jungle-wood sleepers.

It has been found that the creosoted pine sleepers on the Walayar are decaying so rapidly, that it is proposed to replace them with iron pot sleepers, which at present price of iron would involve but little additional prime outlay.

Bridges.—The substitution of new girders at the Cauvery bridge is progressing, and the alteration in the masonry of the piers for fixing the girder stones has been commenced.

Cross bracings are being added to the piers of the Cheyer bridge to strengthen them, and it is also being floored; as are also the Poiney, Palar, and Gudiyatam bridges.

Laying new permanent way over and strengthening girder bridges progresses steadily. During the calendar year 66 bridges were completed.

Stations.—At Bellary, alterations and additions in connection with the junction of the Madras with the Bellary-Hubli State Railway have been commenced.

Rolling Stock.—The number of coaching and goods vehicles sanctioned up to 31st March, 1882, was 3,566, and 158 locomotives. The number of vehicles actually constructed at that date was 2,976.

The future equipment of engines is still under consideration.

The wheels of the coaching stock are being fitted with bolted instead of rivetted tyres as rapidly as possible.

Fares and Rates.—No change was made in the passenger fares, which stood as follows:—

First Class	18	pies	per	mile.
Second	7	„	„	„
Third	2	„	„	„

The following reductions and special goods rates were introduced during the calendar year:—

The rate of 6 pies per ton per mile for grain and other produce from Conjeeveram and Palur to Madras *via* Arkonam was withdrawn from 1st March, 1882.

On the 1st March the rate of tanning bark was reduced from 12 pies to 10 pies per ton per mile for 200 miles and upwards, and from 14 to 12 pies for distances less than 200 miles.

On the 1st April the rate for jungle posts for distances exceeding 200 miles was reduced from 10 to 6 pies per ton per mile in wagon loads of 162 maunds, and at the same time the rate for raw silk in cocoons or waste was reduced from 36 to 18 pies per ton per mile.

Bamboos (in wagon loads) 7 pies per ton per mile.

Cheacoy, dholl stalk, fresh fruit and vegetable oils reduced from 14 to 10 pies per ton per mile.

Coffee (in parchment) reduced from 18 to 14 pies per ton per mile.

Firewood (in wagon loads) 7 pies per ton per mile.

Iron (in wagon loads) 8 pies per ton per mile.

Spirits and wine (bottled) reduced from 24 to 18 pies per ton per mile.

Trial Stations.—Eight additional stations were opened during the year (calendar)—

				Miles.	
Vanganur,	Jan. 1881,	219½	} North-West Line.
Jakkalacheruvu,	„	„	..	250	
Krishnarajapuram,	„	„	..	210½	
Baivanhal,	Oct.	„	..	286	} Bangalore Branch.
Kathundaputty,	Nov.	„	..	128	} Bellary Branch.
Kokinguri,	„	„	..	144½	
Kalavi,	„	„	..	156½	
Budiredipati,	„	„	..	174	

Accidents.—The following table gives the number of accidents of various kinds during the last and two preceding calendar years:—

	1879.	1880.	1881.
I. Collisions, ...	5	3	2
II. Derailments, ...	41	27	30
III. Running over cattle, ...	48	56	59
IV. Gates run through and obstructions on line, ...	6	8	11
V. Defects in rolling stock, ...	2	4	1
VI. Damage to line, ...	8	8	1
VII. Fires in train, ...	31	22	22
VIII. Miscellaneous or other causes, ...	9	4	11
Total, ...	150	132	137

These figures are based upon the returns submitted to the Government of India.

Collisions.—Both took place at stations, and were of unimportant character.

Derailments.—Chiefly due to negligence on the part of the Company's servants, especially pointsmen; but a few were caused by defects in the rolling stock and permanent way.

One of these was of a serious nature, and resulted in the death of three servants of the Company, and injury to three others; a loaded truck (lorry) upset on the Bellary Branch, over a bridge. The accident appears to have been caused by a wheel of the lorry shifting on the axle before reaching the bridge, owing to the iron wedges which fasten the wheel becoming loose. The result of the enquiry on the subject was that the accident was purely accidental.

Running over cattle.—No casualty resulted from this cause. The action of the cow-catchers, which were fitted in all cases (with one exception), was generally efficient; but in some instances the animals got entangled in the locomotives or cow-catchers, and the engine had to be brought to a stand.

Gates run through and obstructions on the line.—The entire absence of the first of these classes during the past year is satisfactory. The obstructions placed on the line were chiefly portions of permanent way or stones, but fortunately were not attended with any casualty.

Defects of rolling stock.—One isolated instance occurred. A journal of an axle broke from an internal flaw in the metal, and the vehicle was thereby derailed.

Damage to line.—One of slight nature, in which ballast was washed away by heavy rain.

Fires in trains.—In no case was the damage great. The engines without exception were wood-burners, and their spark-arresters and ash-pans were reported to be in good order.

Miscellaneous.—The carriage shed roof at Cuddapah was blown off by a high wind; and the mail train while leaving that station, being allowed to run into a siding through negligence of a pointsman, came into a collision with some vehicles standing on it. The passengers were considerably shaken and rolling stock damaged.

The number of persons killed and injured was as follows:—

	1879.		1880		1881	
	Killed	Injured.	Killed	Injured	Killed.	Injured.
<i>Passengers.</i>						
From causes beyond their own control, ...	22	46	...	...	...	1
From their own misconduct or want of caution, ...	1	3	...	3	1	2
Total, ...	23	49	...	3	1	3
Carried over, ...	23	49	...	3	1	3

	1879.		1880.		1881.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
Brought forward, ...	23	49	...	3	1	3
<i>Servants of the Company or of Contractors.</i>						
From causes beyond their own control, ...	...	4	1	3	3	3
From their own misconduct or want of caution, ...	2	17	9	16	3	11
Total, ...	2	21	10	19	6	14
<i>Other Persons.</i>						
Crossing at level crossings, ...	...	...	...	...	1	...
Trespassers, including suicides, ...	5	1	1	1	8	2
Miscellaneous, ...	...	1	...	...	...	1
Total, ...	5	2	1	1	9	3
Grand Total, ...	30	72	11	23	16	20

One accident only occurred to a passenger from causes beyond his control, and three from their own misconduct or want of caution.

Under cases of accidents to servants of the Company from causes beyond their own control, the three men killed and three injured were those in the derailment on the Bellary Branch referred to previously.

Unpunctuality of trains.—The following table represents the degree of punctuality of trains during the year; 26·89 per cent. of all trains being more or less late. The unpunctuality was principally due to the insufficiency of time allowed for mail trains with increased loads; but this will be rectified, it is hoped, in the new time-table:—

	Per cent.
Not exceeding 15 minutes,	3·66
Above 15 and not exceeding 30 minutes,	10·19
" 30 " " 60 "	8·50
" 60 " " 90 "	2·94
" 90	1·60

Comparison of Earnings and Working Expenses.—The general results of last five calendar years are compared in the following table:—

Year.	Gross Earnings.	Expenditure.	Net Revenue.	Percentage of Expenses to Receipts.	Receipts per open mile per week.
	Rs.	Rs.	Rs.		Rs.
1877, ...	1,00,35,295	59,47,402	40,87,893	59·26	224·3
1878, ...	66,30,174	50,42,193	15,87,981	76·05	148·4
1879, ...	66,26,486	45,51,316	20,75,170	68·63	148·3
1880, ...	61,62,546	42,05,409	19,57,137	68·24	137·5
1881, ...	63,11,313	42,35,456	20,75,857	67·11	141·1

The gross earnings of the year under review exceed those of the preceding year by Rs. 1,48,767, and the net earnings by Rs. 1,18,720. There is an increase of Revenue under coaching and goods, but the working expenses are higher than last year. Increased revenue has been derived chiefly from piece-goods (Indian), sugar (unrefined), harbour* materials, and leather (formerly classed under hides and skins). There has been a considerable increase in Indian cotton manufactures as compared with European.

* Due to a credit of Rs. 74,773-14-8—G.O., No. 1747 W, dated 15th July, 1881.

The earnings under coaching and goods were—

Year.	COACHING.		GOODS.		Total.
	Amount.	Per open mile per week.	Amount.	Per open mile per week.	
	Rs.	Rs.	Rs.	Rs.	
1877,	26,99,426	60·33	70,87,341	158·42	97,86,767
1878,	27,82,517	62·27	35,69,536	79·88	63,52,053
1879,	26,21,195	58·66	37,30,522	83·48	63,51,717
1880,	25,45,839	56·85	33,41,731	74·58	58,87,570
1881,	26,42,909	59·07	34,85,445	77·91	61,28,354

The train mileage and earnings per mile were as follow :—

Year.	Mean mileage worked.	Traffic train mileage.	Average number of trains each way per diem over the whole line.	PER TRAFFIC TRAIN MILE.		
				Gross Earnings.	Expenses.	Profits.
				Rs.	Rs.	Rs.
1877,	858	3,551,039	5·670	2·826	1·675	1·151
1878,	857	2,155,546	3·446	3·076	2·339	0·737
1879,	857	2,073,541	3·314	3·196	2·195	1·001
1880,	857	1,873,339	2·986	3·290	2·245	1·045
1881,	858	1,921,916	3·069	3·284	2·204	1·080

The traffic train mileage shows an increase over last year; the profits per traffic train mile show a slight improvement.

Passenger traffic.—The numbers of passengers (exclusive of troops and police) carried in each class were as follow :—

Year.	First Class.	Second Class.	Third Class.	Fourth or Cooly Class.	Total.
1877,	13,090	37,224	1,707,836	810,046	2,568,196
1878,	13,737	41,275	2,144,997	440,612	2,640,621
1879,	10,836	35,213	2,586,987	645,750	3,278,786
1880,	10,970	34,566	3,907,487	..	3,953,023
1881,	11,956	33,502	4,178,289	..	4,223,747

The receipts from each class were—

Year.	First Class.	Second Class.	Third Class.	Fourth or Cooly Class.	Total.
	Rs.	Rs.	Rs.	Rs.	Rs.
1877,	1,58,513	1,27,018	15,18,083	3,62,441	21,66,055
1878,	1,62,532	1,37,991	17,05,894	1,82,473	21,88,890
1879,	1,40,875	1,15,472	15,63,793	2,65,730	20,85,870
1880,	1,44,662	1,11,770	18,01,248	..	20,57,680
1881,	1,59,012	1,12,977	18,95,850	..	21,67,839

The percentages of numbers and receipts were—

Year.	NUMBERS.				RECEIPTS.			
	First Class.	Second Class.	Third Class.	Fourth Class.	First Class.	Second Class.	Third Class.	Fourth Class.
1877,	0·51	1·45	66·50	31·54	7·32	5·86	70·09	16·73
1878,	0·52	1·56	81·23	16·69	7·43	6·30	77·93	8·34
1879,	0·33	1·07	78·90	19·70	6·75	5·54	74·97	12·74
1880,	0·28	0·87	98·85	..	7·03	5·43	87·54	..
1881,	0·28	0·79	98·93	..	7·34	5·21	87·45	..

These figures show that the receipts from passengers (excluding troops and police) amounted to Rs. 21,67,839, against Rs. 20,57,680 in the preceding year; an increase of Rs. 1,10,159, equivalent to 5·35 per cent.

The number carried was 4,223,747, against 3,953,023 last year; an increase of 270,724. The third class earned 87·45 per cent. of the passenger receipts, and contributed 98·93 per cent. of the gross number.

The increase in first and second classes is probably due in part to the Colar gold fields. The third class fare of 2 pies is still in force on all trains, and the proportion of third class passengers using the mail trains continues to increase. Except in the case of the Tiruvallur and Tirutani festivals, third class return tickets have been withdrawn. The average receipt per third class passenger carried by all trains was 7 annas 3 pies. The number of third class passengers booked by all trains on different sections of the line is as follows during 1880 and 1881:—

Between	1880.	1881.
Madras and Jalarpet,	1,464,920	1,471,135
Bangalore Branch,	231,364	274,930
Tirupatur and Erode,	326,977	363,284
Perundurai and Combatoore,	263,783	282,648
Nilgiri Branch,	83,807	116,980
Madukurai and Beypore,	454,013	484,797
Tirutani and Cuddapah,	597,956	617,303
Kamalapuram and Bellary,	344,477	380,601
Nancherla and Raichur,	121,710	157,852
South Indian Railway and Great Indian Peninsula,	11,076	13,687

The other items of coaching traffic are compared in the following table:—

Year.	Troops and Police, including Military baggage and horses	Passengers' luggage.	Carriages, horses, &c.	Parcels.	Special trains.
	Rs.	Rs.	Rs.	Rs.	Rs.
1877,	1,84,670	88,358	87,420	1,24,836	45,321
1878,	2,95,755	80,244	86,692	1,15,415	11,727
1879,	2,74,512	74,453	70,779	95,477	14,930
1880,	2,37,121	76,816	64,726	92,936	13,141
1881,	1,70,322	96,421	69,615	1,17,392	16,495

The receipts from carriage of troops shows a heavy falling off.

Passengers' luggage shows a decrease compared with last year, owing chiefly to smaller receipts from military baggage.

Parcels.—Under the new tariff, introduced on 1st January, 1880, the revenue from parcels has gradually improved.

Goods traffic.—Under the new form of accounts introduced on the 1st January, 1881, the receipts and tonnage of each class of goods are not recorded. The totals only are available, and will be found below:—

						1880.	1881.
Receipts from goods,	...	...	...	...	Rs.	31,75,534	32,81,212
Tonnage of goods,	...	...	...	...	Tons,	605,722	498,782
Average receipt per ton lifted,	...	...	...	...	Rs.	5.25	6.58
" " per mile,	...	...	...	...	Pies,	9.41	9.50

The receipts exceed those of last year but the tonnage is less.

The total quantity of food grain carried was 163,417 tons, yielding Rs. 5,25,133. Grain was contributed principally by the Great Indian Peninsula and from Mysore, and was absorbed by Bellary, Cuddapah, Madras and North Arcot.

The following table shows the tonnage of grain brought into Madras :—

						Tons.
Sea,	...	...	...	...	...	17,606
Buckingham Canal,	...	...	...	...	...	22,014
Madras Railway,	...	...	...	...	...	24,029
Carts,	...	...	...	...	...	15,898

Excluding harbour materials, the figures for the last two years compare as follows :—

						Tons.	Receipts. Rs.
1880,	...	...	...	...	...	410,041	30,96,305
1881,	...	...	...	...	...	423,193	31,72,663

The receipts from the chief commodities carried are shown in the following table :—

Articles.	1877.	1878.	1879.	1880.	1881.
	Rs.	Rs.	Rs.	Rs.	Rs.
Betel-nuts,	49,737	55,810	65,698	64,699	74,888
Chillies,	31,317	25,789	44,287	48,273	34,210
Cloths and piece-goods,	80,099	87,751	88,431	97,010	1,11,080
Coffee,	43,015	51,326	52,489	51,262	44,018
Commissariat stores,	66,904	71,631	46,058	52,226	39,030
Cotton,	33,617	1,84,341	2,30,109	2,41,309	2,22,847
Firewood,	23,917	43,206	39,723	40,725	36,602
Fruits and vegetables,	46,315	48,528	55,899	47,368	55,501
Ghee,	13,803	16,673	45,997	26,727	15,965
Gram,	3,22,672	1,35,854	1,64,581	2,00,728	1,89,309
Grains,	33,50,477	6,39,543	3,49,256	58,324	40,627
Gunnies,	63,037	35,850	35,212	33,299	38,202
Harbour materials,	12,315	27,171	61,098	79,237	1,08,549
Indigo,	6,437	14,275	27,523	13,734	24,897
Iron of all kinds,	1,04,882	68,088	76,745	1,65,065	1,89,104
Jaggery,	39,071	32,775	55,348	59,271	86,150
Luggage,	26,965	32,405	28,771	29,865	26,471
Oil of all kinds,	40,641	36,525	55,991	49,725	60,436
Ordnance stores,	47,335	68,391	20,886	24,078	24,692
Paddy,	1,10,953	52,619	63,677	24,967	11,220
Potatoes,	20,179	21,284	36,853	24,373	36,517
Ragi,	1,24,057	80,289	1,68,911	66,466	19,483
Rice,	7,39,030	2,35,038	3,43,886	2,02,580	2,39,812
Salt,	4,44,252	3,60,396	3,52,542	3,76,306	3,50,055
Salt-fish,	41,125	25,386	22,633	25,959	34,474
Seeds of all kinds,	34,541	1,15,844	1,34,463	1,05,790	1,12,882
Skins,	2,18,234	1,46,232	1,53,931	1,62,486	1,42,659
Sugar of all kinds,	29,228	23,440	28,238	36,794	51,770
Sundries,	4,74,593	3,89,277	3,42,007	3,01,870	1,31,480
Tamarind,	26,131	41,730	73,281	52,534	53,580
Timber,	62,031	64,417	68,146	64,866	88,728
Tobacco,	32,214	32,505	31,353	32,251	49,045
Twist,	51,126	53,039	57,576	62,021	69,998
Wines and spirituous liquors,	49,108	51,161	47,410	40,920	49,347
Total,	68,59,358	33,68,589	34,69,009	29,63,108	28,63,628

Cotton traffic.—The following table shows the number of tons of cotton carried; the total receipts; and the average receipts per ton during the last five years:—

	Total.		Average receipts per ton.
	Tons.	Rs.	Rs.
1877,	1,682	33,618	19.98
1878,	11,745	1,84,346	15.69
1879,	16,176	2,29,115	14.16
1880,	15,761	2,30,439	14.62
1881,	15,080	2,22,847	14.78

The quantity exported from Madras was 5,740 tons.

Salt traffic.—The quantity of salt carried over the whole system was 48,143 tons, yielding a revenue of Rs. 3,50,055. The reduction in the monopoly price of salt, which came into force in March 1882, together with the improved arrangements for the sale of salt which are to be introduced at the Madras Salt Cotaur Station, will probably stimulate the development of salt traffic considerably.

Work done.—The work done in coaching and goods transport is shown in the following table:—

Year.	PASSENGERS.				GOODS.			
	Number of passengers.	Average mileage.	Total unit mileage.	Passenger miles per mean mile worked.	Tonnage of goods.	Average mileage.	Total ton mileage.	Goods ton miles per mean mile worked.
1877, ...	2,628,499	53.5	140,547,066	163,808	990,666	161.4	159,902,322	186,366
1878, ...	2,716,040	52.4	142,389,181	166,148	542,528	131.3	71,261,199	83,152
1879, ...	3,344,857	47.3	158,398,392	184,829	647,408	118.1	76,461,018	89,219
1880, ...	4,010,552	45.9	184,052,220	214,763	610,212	108.1	65,990,330	77,002
1881, ...	4,277,444	45.9	196,533,622	229,060	693,613	102.7	71,222,597	83,010

Traffic interchanged with Great Indian Peninsula.—The traffic interchanged with the Great Indian Peninsula Railway is shown in the following table:—

Year.	PASSENGERS.		GOODS.	
	Number.	Receipts.	Tons.	Receipts.
1877,	15,614	Rs. 1,08,713	139,184	Rs. 8,07,854
1878,	14,139	1,10,014	32,659	3,84,514
1879,	19,441	1,46,697	63,734	6,52,230
1880,	18,064	1,34,511	36,355	4,19,393
1881,	22,793	1,25,356	43,786	5,08,931

Trial Stations.—The following statement shows the number of passengers booked and the number of tons of goods (in and out) at all trial stations during three half-years:—

Stations.	NUMBER OF PASSENGERS BOOKED			TONS OF GOODS (IN AND OUT).		
	June 1879.	June 1880.	June 1881	June 1879.	June 1880.	June 1881.
Kamasamudram,*	2,672	9,788	9,547	179	306	276
Taicul,*	2,557	9,115	9,193	100	195	115
Mangalam,	5,816	13,566	17,030	248	241	246
Sulur,*	2,129	4,725	5,708	65	168	382
Singanallur,*	2,206	4,849	5,807	110	97	238
Gudalur,	1,588	4,327	8,593	..	2	6
Ballipalle,*	995	6,294	6,651	1,225	1,633	968
Bantanahal,	3,066	7,663	9,316	158	56	61
Kupgal,	1,226	2,711	6,415	..	14	45
Potakottacherru,	1,335	4,430	4,863	96	43	323
Hagari,	1,580	7,602	10,275	3	109	56
Mamandur,*	168	2,569	4,708	1,116	1,067	1,149
Urampad,*	3,984	14,093	9,999	..	106	155
Ambatur,*	1,823	7,992	13,085	6	..	28
Sevvapet Road,*	384	10,383	12,428	3	131	125
Mullanoor,* .. .. .	..	1,851	1,721	..	..	..
Nagarur, .. .. .	..	1,311	3,472	..	..	9
Krishnapuram,* .. .. .	..	991	7,495	..	11	369
Mangapatnam,* .. .. .	..	..	2,202	..	..	18
Penner,* .. .. .	..	..	4,674	..	..	10
Minnal,* .. .. .	..	..	14,303	..	..	198
Vanganur,* .. .. .	..	..	2,731	..	..	11
Jakkalacheruvu,* .. .. .	..	..	1,895	..	..	1
Krishnarajapuram,* .. .. .	..	..	9,152	..	..	65

Note.—The mail trains do not stop at trial stations marked *.

Working Expenses.—The maintenance and locomotive charges compare as follows with previous years:—

Year.	EXPENSES.					
	MAINTENANCE OF WAYS, WORKS AND STATIONS.			LOCOMOTIVE.		
	Amount.	Mean miles maintained from Revenue funds.	Per mean mile maintained.	Amount.	Per traffic train mile.	Per engine mile.
	Rs.	Miles.	Rs.	Rs.	As.	As.
1877,	12,09,548	858	1,410	21,56,704	9,718	7,426
1878,	12,64,737	857	1,476	16,77,206	12,449	8,633
1879,	13,13,030	857	1,532	15,96,837	12,322	8,602
1880,	12,42,825	857	1,450	13,99,791	11,955	9,886
1881,	12,54,297	858	1,462	13,25,842	11,038	9,589

Maintenance.—During 1881 the cost of maintenance averaged Rs. 1,259 per mile of track including sidings, or Rs. 1,462 per mile of line.

The following items of extraordinary expenditure are included in these figures:—

	Rs.
New permanent way on bridges,	32,158
Renewals with iron sleepers, including the substitution of iron for wooden sleepers between miles 332 and 406,	1,66,655
Total, ..	1,98,813

The expenditure on new permanent way for bridges will continue for some time, but the work is progressing steadily as already explained.

Locomotive and Carriage Department.—The addition to the working expenses for conveyance of Revenue stores counterbalances the small savings which have been effected in the Revenue accounts.

Locomotives.—The number of engines passed through the shop for repairs was 77. There has been a decrease in cost of fuel and maintenance and renewals of engines, but the latter item is covered by a charge in the accounts for the depreciated value of a locomotive converted into a stationary engine, Rs. 19,151.

The expenditure in other departments is shown in the following table:—

Year.	EXPENSES.					
	CARRIAGE AND WAGON.		TRAFFIC.		GENERAL CHARGES.	MISCELLANEOUS.
	Amount.	Per 1,000 vehicle miles.	Amount.	Per traffic train mile.	Amount.	Amount.
	Rs.	Rs.	Rs.	As.	Rs.	Rs.
1877,	7,00,983	14.161	8,17,358	3.683	4,31,797	6,31,012
1878,	6,29,227	18.765	8,34,952	6.198	4,54,453	1,81,619
1879,	3,66,609	10.638	7,13,688	5.507	4,53,681	1,07,471
1880,	3,21,457	10.357	6,60,139	5.638	4,37,687	1,43,510
1881,	4,84,915	13.910	6,52,798	5.434	4,50,295	67,308

Carriages and Wagons.—A large number of new tyres were put on during the year, which partly accounts for the increased expenditure.

The total increase over last year is also partly due to Rs. 93,485, credit given in the former year for the value of 100 harbour work wagons transferred from Revenue to Capital.

The number of vehicles passed through the shops for repairs was 3,383 against 3,603 last year.

The number of vehicles renewed was 35, viz.:—

- 1 Double saloon first class night carriage.
- 6 Second class carriages.
- 19 Third class
- 9 Cattle wagons.

Four composite carriages were altered so as to provide dressing rooms for the first class compartments, and a platform crane was mounted on a goods truck and converted into a travelling crane.

These were also laid down and in progress at the end of the year—

- 5 First class double saloon night carriages.
- 1 Inspection carriage.
- 3 Horse-boxes.
- 100 Iron covered goods wagons.

The new works sanctioned at Perambur workshops are in progress.

Telegraph Department.—The working of the telegraph has been satisfactory. In the calendar year there were 29 interruptions on the telegraph line, and 21 in block and semaphore working.

The following statement shows the working of the electrical inter-communication in trains during the year :—

Total mileage of fitted trains,	1,784,212
Mileage of fitted trains with complete communication,	1,777,525
Percentage of interruptions, .. .. .	.37

The interruptions were principally caused by breakage of bridging ropes attached to foreign and unfitted vehicles.

BOMBAY, BARODA AND CENTRAL INDIA RAILWAY.

Godhra Extension.—This was opened for traffic with a temporary diversion over the river Mahi in February 1882. The progress with the permanent low level bridge has been retarded by the loss at sea of much of the English material, and it will not be ready before the monsoon of 1882. Arrangements for a ferry will consequently have to be made before the rains set in.

Nerbudda Viaduct.—The new viaduct was, as mentioned in last year's report, opened for traffic on the 16th May, 1881. The materials of the old viaduct have been removed, with the exception of certain portions of pile columns which are below the river bed, and could only be removed at great expense. It is proposed to utilize some of this material in strengthening other iron bridges, and to dispose of the surplus to other Railways.

The new *Broach Station* was finished and brought into use during the year.

The *Junction Station at Sabarmati* was entirely remodelled, and the working was made over to the Rajputana-Malwa Railway from 1st January, 1882. The cost of trans-shipment of goods is now borne by the Rajputana Railway in full; and it has been agreed that, with a view to simplify accounts as between the Bombay, Baroda and Central India and Rajputana Railways, no charge shall be made by the former on account of rent of station premises at Ahmedabad, or by the latter on account of rent of station premises at Sabarmati.

The Agreement between the Bhavnagar-Gondal and Bombay, Baroda and Central India Railways in regard to payment on account of traffic interchanged and trans-shipped at Wadhwan has been assimilated to that in force elsewhere. The rent of premises used in common is now debited to joint station expenses, which are divided in proportion to traffic dealt with for each line, and the toll formerly paid by the Bhavnagar-Gondal Railway per unit of passenger and goods traffic abolished.

New Station at Dadar.—Plans and estimates have been prepared for a new station at Dadar, providing improved accommodation for passengers, and means of communication between the Bombay, Baroda and Central India and Great Indian Peninsula Railway stations. These await the assent of the municipal authorities to the portion of the scheme affecting municipal property, and the sanction of Government. The Great Indian Peninsula Railway Company have a new design for this station under consideration.

Improvements at Mahim Station.—In consequence of increase of traffic the goods siding on the west side of the line has been found insufficient. It is also

inconveniently placed, and the working is attended with some danger. A new siding and platform with approach road has, therefore, been sanctioned on the east side of the line. This will be available for passenger traffic as well as goods traffic in case of necessity.

New Goods Terminus at Mody Bay.—The station rented by the Bombay, Baroda and Central India Railway Company from the Port Trustees at Carnac Bandar being found altogether insufficient for the increasing traffic, a new site has been allotted to the Company on the Mody Bay Imperial Estate to the south of the Carnac overbridge; and works to the value of Rs. 3,83,706 were sanctioned, and are now in progress. The access will be from the Great Indian Peninsula Railway at Carnac bridge. The site includes land formerly in the occupation of the Great Indian Peninsula Railway, and relinquished on the re-arrangement of their Bori Bandar terminus; also certain land occupied by the Government Telegraph department which is to be provided with a store-yard at Wadi Bandar; and by other Government departments, but the main portion was in charge of the Port Trustees, who held it on lease from Government, and who received compensation for the unexpired term of that lease.

Extension of double line from Andheri to Virar.—The length of the extension is 26 miles. The estimated cost, Rs. 5,79,059. Much work had been previously carried out, including the second line over the Bassein viaduct and intervening embankments, and the entire width of embankment across the swamp between Borivli and the south Bassein creek. The sanction was given in consideration of the amounts then already spent unproductively; the comparatively small amount required to complete the work; the saving of working expenses that would result from doubling the line; and the increase of traffic that may reasonably be expected.

Uru Salt Sidings.—An extension of the salt works in the Runn of Cutch was sanctioned at Uru, about 7 miles beyond Kharaghoda. The necessary sidings are being laid down for Government by the Bombay, Baroda and Central India Railway Company, the rails employed being chiefly half worn double-headed iron ones purchased from the Great Indian Peninsula Railway Company.

Minor Works.—Among minor works sanctioned on Capital account on the Bombay, Baroda and Central India Railway may be mentioned:—

Additional coal sheds at Parel, Bulsar and Amroli.

Increased siding accommodation at Ahmedabad.

Addition of an upper story to drivers' quarters, Ahmedabad.

Additional columns in iron pile piers of Damanganga bridge.

Construction of Rolling Stock.—The addition of 12 road vans and 3 postal vans to stock was sanctioned; also to 13 covered goods wagons being built to replace the same number of condemned ballast wagons.

The work of substituting 10-ton for 8-ton axles proceeded during the year.

Capital.—The Company's Capital account at the close of 1881 stood as follows:—

			£.	Rs.	
Capital authorised	8,675,000	9,46,36,363
Capital subscribed,	8,156,937	8,89,84,767
Capital withdrawn and expended—					
			£.		
On construction account,	..	7,676,967			
„ stores in stock,	..	301,762			
„ Suspense accounts,	..	Cr. 36,230	7,942,499	8,66,45,448	
Balance available—					
Of Capital authorised,	7,732,501	79,90,915	
• „ „ subscribed,	214,438	23,39,319	

Amount expended on—			£.	Rs.
Way and works,	.. ..	..	*6,498,606	7,08,93,882
Rolling stock,	.. ..	..	*1,178,361	1,28,54,851
Average expenditure per mile—				
On way and works,	.. ..	..	*14,646	1,59,777
„ rolling stock,	.. ..	..	*2,656	28,972

* Exclusive of Patri Line.

The net outlay of the year under review was Rs. 16,40,858, made up of a total expenditure of Rs. 23,76,329 reduced by credits aggregating Rs. 7,35,471, which (excepting Rs. 70,430 for sundry minor credits) represent the value of materials from the dismantled bridge over the Nerbudda returned into stock during the year. The effect on the Company's Capital, of the cost to 31st December, 1881, of the new Nerbudda bridge which then reached the sum of Rs. 37,68,648, was a net debit of Rs. 8,265, the balance being met from the various contributions made to Capital from time to time as the work progressed. This debit, however, was only temporary, and was counterbalanced by the sum of Rs. 57,780 held to the credit of a Suspense account until such time as there should be a sufficiently large debit against the work to admit of its being adjusted in the same manner as the other credits for returned materials. This will be more readily seen from the following details :—

New Nerbudda Bridge.

<i>Credit.</i>	Rs.	<i>Expenditure to 31st December, 1881.</i>	Rs.
Contributions from—		Rs.	
Fire insurance fund,	2,72,727	Work—	
Surplus profits,	28,14,971	Cash,	13,36,372
Stores returned to stock,	6,72,686	Stores,	22,03,829
			35,40,201
		Establishment—	
		English,	71,650
		Indian—	
		Supervision,	45,396
		District,	1,11,401
			1,56,797
			2,28,447
Total, ..	37,60,384	Total, ..	37,68,648
Stores credited to—		Net debit at—	
“Nerbudda Bridge Stores Suspense		31st December, 1881, ..	8,265
Account”— <i>vide Company's</i>			
Capital Balance Sheet, ..	57,780		

The rates at which these materials were returned to stores were approved of by the Consulting Engineer, and the values above given are exclusive of the cost of dismantlement, &c., which amounted to Rs. 50,343, and which has therefore not been included in the items of expenditure. It may here be remarked that some of these materials have already been drawn out and used in connection with the work of strengthening other bridges on the line, and that it is probable the remainder will also be thus utilized on similar operations or new bridges, or advantageously sold so as not to affect for any considerable time the amount of Capital locked up in stores. Ordinarily, expenditure on the replacement of a work by Revenue, such as this virtually is, would be exhibited in the Revenue accounts, but the exceptional nature of the one in question justifies the divergence from rule, as the inclusion in those accounts of the large transactions involved would greatly exaggerate the financial results of the periods in which they occurred, and thus vitiate any comparison with the results of previous or subsequent corresponding periods. The ultimate outcome in the present case will probably be that after the bridge has been paid for from the contributions and credits conjointly, a small surplus of about Rs. 10,000 will remain for adjustment, the disposal of which, however, will be a matter for after consideration.

The other principal Capital works in progress during the past year were as under :—

Name of Work.	EXPENDED IN 1881.		
	1st half.	2nd half.	Total.
<i>Engineers' Department.</i>			
	Rs.	Rs.	Rs.
Godhra extension,	2,85,828	3,69,204	6,55,032
Parel station,	25,254	15,846	41,100
Broach ,,	32,802	10,635	43,437
Boisar water supply,	8,498	2,764	11,262
Dhamanganga bridge, .. .. .	..	45,037	45,037
Iron bridges between Andheri and Virar, .. .. .	..	30,784	30,784
Grant Road lamp room and urinary,	4,406	..	4,406
<i>Locomotive Department.</i>			
Rolling stock—			
Engines,	2,77,148	..	2,77,148
Carriages and wagons,	2,37,615	2,67,569	5,05,184

The extension from Pali to Godhra, a distance of nearly 17 miles, was sanctioned in March of the year under review at an estimated cost of Rs. 9,94,425, including a payment of Rs. 96,521 for the existing Local Fund road between those two towns. From the above statement it will be seen that about two-thirds of the money sanction was expended at 31st December, 1881, while the line itself was opened for traffic on the 25th February following. The expenditure above given includes a sum of Rs. 24,235 on account of establishment charges. This represents the cost of the staff specially employed on the construction of the new line, plus a charge for supervision, *i.e.*, "Direction, Stores, Audit and Accounts, &c.," equivalent to 4 per cent. of the cash outlay thereon for the year. The credit to Revenue arising from the above adjustment was admitted on the understanding that the recent ruling prohibiting such credits for supervision of Capital works is applicable only to works on open line. The following are the details of the outlay on the work under reference by main heads of Construction account :—

	Rs.
Earthwork,	80,116
Bridges,	52,922
Level crossings,	1,600
Ballast and permanent way,	4,48,214
Stations and buildings,	47,207

The outlay under "Rolling Stock" amounted to about 48 per cent. of the entire Capital expenditure for the year, and comprised the following projects, which were then in hand :—

	Rs.
10 New goods engines,	2,66,285
6 First class carriages,	28,568
10 Second "	48,086
60 Third "	50,577
200 High-sided wagons,	2,17,303
67 Covered wagons, Z. pattern,	59,483
14 Goods brake-vans,	13,189
Fixing Smith's vacuum brakes to 48 vehicles,	14,802
2 Overland mail vans,	7,000
12 Road vans,	12,873
Erecting new machinery,	10,403
3 Engines for Patri Railway,	10,870

Of these, the engines and the first and second class carriages were completed during the year, while 47 of the 60 third class carriages were also added to the stock list. The additions under goods vehicles were 57, but did not include either goods brakes or road vans, none of which have yet been turned out. The new

machinery erected during the year was to facilitate the work of replacing 8-ton by 10-ton axles and the necessary renewal of the axles-boxes. The expenditure on account of the three Patri engines was merely an adjustment of the value of duplicate parts used on these locomotives without being charged thereto, as will be explained directly; while that shown against "two Overland Postal Vans" was the price given for two such vehicles purchased from the Punjab Northern State Railway under Government of India's sanction, to meet the increased service required by the postal department.

In addition to the above a sum of Rs. 52,328 was written off to the debit of the Company's Capital under the head "Rolling Stock" on account of the loss on materials (iron work and wheels) used in the construction of 330 vehicles purchased by Government at a cost of Rs. 6,48,965. This charge to the Company's Capital though represented by no corresponding increase to the Company's assets under stock is counterbalanced by the comparatively advantageous disposal of materials, which, not required for the Company's purposes, would probably have continued to depreciate in value from year to year, and have been finally sold at a loss far outweighing that thus written off. The above adjustment concluded the important transactions connected with the supply of bridge materials, roofing and rolling stock for State Railways entered into with this Company, and in respect of which payments in advance were made by Government, which have been appearing under "Suspense" in the successive account since 1879.

The other minor credits, viz., Rs. 46,752, 10,870 and 12,809, referred to in the foregoing remarks, were connected with the adjustment of the value of duplicate engine gear charged originally to Capital, but which remained in stock and was subsequently used free of charge in repairs and renewals as explained in the report for 1880-81. The first of these, with its corresponding debit to Revenue results from the objection taken by the Government of India to the original adjustment as effected by the Company, and with the deduction of Rs. 42,514 from the surplus profits earned in the first half of the year brings the adjustment into accord with the orders of that Government. The second represents the value of duplicate parts used similarly on locomotives constructed for the Patri Salt Railway, but as this sum is also included as expenditure in the item of Rs. 2,77,148, per column 2 of the above abstract, (as shown in the details thereof,) it has no practical effect on the Capital outlay. The third credit is for a further portion of these duplicate parts of engines still in hands of the various locomotive foremen for future use as occasion may require.

The amount of Capital locked up in stores at 1st January and 31st December, 1881, was Rs. 35,76,252 and 32,91,951, respectively, thus showing a net reduction of Rs. 2,84,301. Taking into consideration the exceptionally heavy debits during the year on account of returned bridge-work materials already adverted to above, the difference between the receipts and issues of the year would, but for them, have been a net credit of Rs. 9½ lakhs, and would have brought the total amount standing at debit of "Stores Suspense Account" on 31st December, 1881, to within 26½ lakhs, as compared with 21½, the limit assigned for this purpose. The present debit, however, is seen to be considerably in advance of this maximum, but the matter is receiving such attention as will ensure a prompt and satisfactory reduction so far as is consistent with the interests and requirements of the Company in this respect.

The guaranteed interest for the year paid by Government was Rs. 43,69,254, of which Rs. 43,66,604 and Rs. 2,650 were paid in England and India respectively. The return to Government in the shape of net earnings for the year was Rs. 57,45,703, less Rs. 8,64,272 refunded to the Company as their moiety of the surplus profits for the first half-year, and Rs. 33,474 similarly refunded as half the contribution earned in behalf of the Company's Provident Fund, the Company contributing an equal sum from their portion of the surplus earnings. The result is thus seen to have been in favour of Government to the extent of Rs. 4,78,703, which reduces the net deficit to date made good by the State to Rs. 3,76,99,434. The average rate of guaranteed interest for 1881 on the interest bearing capital

was 4.93 per cent. as compared with 6.48, the percentage of the net earnings thereon for the same period.

Revenue.—The financial results of working during the official year 1881-82 are shown in comparison with those for the preceding year in the following abstract :—

Main Heads.	1881-82.	1880-81.	1881-82.	
			Increase.	Decrease.
	Rs.	Rs.	Rs.	Rs.
Gross earnings,	98,87,304	85,61,215	13,26,089	...
Gross expenses,	41,90,968	35,61,678	6,29,290	...
Net earnings,	56,96,336	49,99,537	6,96,799	...

The figures for 1881-82 compare as under with the budget and regular estimates for the same :—

Main Heads.	Budget Orders.	Regular Estimate.	Actuals.	Increase over Estimate.
	Rs.	Rs.	Rs.	Rs.
Gross earnings,	92,00,000	98,00,000	98,87,304	87,304
Gross expenses,	37,00,000	40,00,000	41,90,968	1,90,968
Net earnings,	55,00,000	58,00,000	56,96,336	-1,03,664

For reasons already stated, the remainder of this report will deal with the results of the calendar year 1881.

The results of the 12 months ending 31st December, 1881, as compared with the previous corresponding period were as follows :—

Main Heads.	1881.	1880.	1881.	
			Increase.	Decrease.
	Rs.	Rs.	Rs.	Rs.
Gross earnings,	97,45,133	82,44,376	15,00,757	...
Gross expenses,	39,99,430	35,09,722	4,89,708	...
Net earnings,	57,45,703	47,34,654	10,11,049	...

The above net increase of Rs. 10,11,049 was gained by an improvement of 18.2 per cent. in the gross earnings as compared with 1880, diminished by a corresponding increase of 13.9 per cent. in the working expenses, and is 21.3 per cent. of the net earnings obtained in that year. The percentage of expenses to earnings for 1881 would have appeared slightly more favorable had the transactions on account of "Carriage of Revenue Stores" been disregarded as in 1880. The comparison for the two years in the above and some other respects is tabulated below :—

	1881.	1880.	1881.	
			Increase.	Decrease.
			Rs.	Rs.
Percentage of expenses to earnings, ...	41	42	...	1
Percentage of net earnings on Capital subscribed, ...	6.45	5.34	1.11	...
Capital subscribed expended, ...	6.63	5.77	.86	...
	No.	No.	No.	No.
Passengers carried, ...	7,128,234	6,237,074	891,160	...
Tonnage of goods hauled (paying), ...	631,802	572,916	58,886	...
Train mileage run for traffic, ...	1,644,949	1,357,359	287,590	...
	Rs.	Rs.	Rs.	Rs.
Net earnings per traffic train mile, ...	3.49	3.49	...	...
" " mile open, ...	12,947	10,652	2,295	...
" " week, ...	1,10,494	91,052	19,442	...

The improvement in the results obtained for the past year as indicated in the preceding table has been general, affecting both the coaching and goods traffic, the former of which shows an increase of 23.3 per cent. and the latter one of 15.2 per cent. over the receipts for 1880 (excluding the credits for carriage of Revenue stores), a year more favorable than any previous one, and may be regarded as the natural expansion of traffic consequent on the extensive area brought into connection with this Railway by the through opening of the Rajputana-Malwa State Railway from the commencement of the year under review. The favorable influence of this conjunction on the earnings of the Company will be noticed further on as the results of the past year are more closely examined.

Earnings.—The classification of the gross earnings for 1881 under the five general heads of account corresponding with the five main sources of revenue, and the percentage of each to the total income during the year is given in the subjoined table :—

Main Heads of Receipts.	1ST HALF OF 1881		2ND HALF OF 1881.		TOTAL FOR 1881.	
	Amount.	Per cent. of Total.	Amount.	Per cent. of Total.	Amount.	Per cent. of Total.
	Rs.		Rs.		Rs.	
Coaching traffic, ...	17,57,613	29.6	15,72,427	43.7	33,30,040	35.0
Goods traffic, ...	40,30,430	67.8	19,36,859	54.1	59,67,289	62.6
Telegraph earnings, ...	14,333	0.3	10,494	0.3	24,827	0.3
Steam boat earnings, ...	...	...	...	...	...	...
Sundries, ...	1,36,450	2.3	66,210	1.9	2,02,660	2.1
Total, ...	59,38,826	100.0	35,85,990	100.0	95,24,816	100.0

The difference noticeable between the gross earnings as represented above and as exhibited in the previous statement of financial results for 1881, viz., Rs. 2,20,317, is the sum of the credits for carriage of Revenue stores included in the latter. As explained in the review of the Great Indian Peninsula Railway working, these credits, with their corresponding debits, form a disturbing element in

the comparison of the figures for the two years under consideration, and will, in like manner, be eliminated wherever they occur.

The comparison of the totals shown in the preceding table with those for 1880 is given below :—

Main Heads.	1881.	1880.	1881.	
			Increase.	Decrease.
	Rs.	Rs.	Rs.	Rs.
Coaching traffic,	33,30,040	27,00,522	6,29,518	...
Goods „	59,67,289	51,81,628	7,85,661	...
Telegraph earnings,	24,827	27,747	...	2,920
Steam boat earnings, ... ..	...	...	...	...
Sundries,	2,02,660	3,34,479	...	1,31,819
Total, ...	95,24,816	82,44,376	14,15,179	1,34,739
			Net increase in 1881, ...	12,80,440

Coaching traffic.—As already remarked, the increase under “Coaching Traffic” is equivalent to over 23 per cent. of the receipts from this source during 1880, and is the net result of the variations appearing in the subjoined statement embodying the figures shown in Abstract H. of the half-yearly Revenue accounts concerned :—

	1881.	1880.	1881.	
			Increase.	Decrease.
	Rs.	Rs.	Rs.	Rs.
Passengers,	29,75,727	24,39,882	5,35,845	...
„ luggage,	93,700	73,117	20,583	...
Military baggage,	10,885	12,606	...	1,721
Carnages, horses, and dogs, public,	60,041	31,791	28,250	...
„ „ „ military,	16,958	7,253	9,705	...
Parcels,	1,58,553	1,29,840	28,713	...
Special trains,	2,692	2,433	259	...
Post offices,	11,484	3,600	7,884	...
	33,30,040	27,00,522	6,31,239	1,721
<i>Less—Outstandings irrecoverable, ...</i>	...	...	...	...
	33,30,040	27,00,522	6,31,239	1,721
			Net increase in 1881, ...	6,29,518

Of this increase 85 per cent. accrues from the receipts under “Passengers,” of whom 1,122,980 more were carried in 1881 than in the preceding year. The largest increase in the numbers conveyed appears in the 3rd class traffic as set forth in the following table :—

Class.	1881.	1880.	1881.	
			Increase.	Decrease.
	No.	No.	No.	No.
First class, ordinary, ...	34,953	30,205	4,748	...
„ season tickets, ...	35,200	30,480	4,720	...
Second class, ordinary, ...	265,984	223,216	42,768	...
„ season tickets, ...	181,720	162,840	18,880	...
Third class, ordinary, ...	6,401,754	5,438,133	963,621	...
„ mail trains, ...	414,803	545,520	...	130,717
„ season tickets, ...	808,680	589,720	218,960	...
	8,143,094	7,020,114	1,253,697	130,717
	Net increase in 1881, ...		1,122,980	...

The reduction of fares introduced in the beginning of 1880 has been attended with satisfactory results. The increase in the total number of passengers of all classes carried during 1881 was 16 per cent. above the number recorded in 1880, and 33 per cent. above that for 1879, while the earnings during the past year increased 22 and 38 per cent. over the earnings booked in 1880 and 1879 respectively. The higher percentage in the receipts than in the numbers arises from the extensive through passenger service between Bombay and Northern India which has been rapidly increasing since the establishment of this shorter route. The only point in which the results of the past year appear less favorable than those for 1880 was in respect of the 3rd class mail train service, wherein a falling off in the number of passengers carried of 24 per cent. and in the earnings of 10 per cent. was recorded; this loss, however, is more than counter-balanced by the improvement that took place in the 3rd class, ordinary, and suburban traffic, the former of which yielded an increase of 18 per cent. in numbers and 36 per cent. in earnings, the latter 19 and 17 per cent. respectively, so that the net improvement in 1881 may be set down at 16 per cent. in respect of numbers and 20 per cent. in regard to earnings, while the decline itself may be explained to have arisen from the running of a "through" passenger train since March 1881 (by which the third class fare is only 2½ pies per mile, the same as by the mixed train) and the natural preference for it as a cheaper and nearly equally quick mode of conveyance as the mail train.

The *earnings* from the various classes are shown below:—

Class.	1881.	1880.	1881.	
			Increase.	Decrease.
	Rs.	Rs.	Rs.	Rs.
First class, ordinary, ...	97,953	61,345	36,608	...
„ season tickets, ...	4,931	4,197	734	...
Second class, ordinary, ...	2,17,175	1,73,703	43,472	...
„ season tickets, ...	14,542	12,887	1,655	...
Third class, ordinary, ...	19,52,663	14,36,059	5,16,604	...
„ mail trains, ...	6,47,432	7,18,756	...	71,324
„ season tickets, ...	41,031	32,935	8,096	...
Total, ...	29,75,727	24,39,882	6,07,169	71,324
	Net increase in 1881, ...		5,35,845	...

The local and suburban traffic, which constitutes an important item in these results, has increased, as already stated, but not in the same proportion as in the four years preceding. The numbers and receipts for 1881 with the comparative increases over the four years under reference are given in the following abstract:—

Half-year ending					BOMBAY SUBURBAN AND LOCAL (INCLUDING SEASON TICKET) TRAFFIC	
					No. of Passengers	Receipts.
						Rs.
June 1881,	...	...	...	...	2,155,889	1,43,860
December 1881,	...	...	...	...	2,195,616	1,44,082
Total for the year,					4,351,505	2,87,942
Increase over—						
1880,	...	...	...	...	691,739	41,916
1879,	...	...	...	...	1,217,139	69,830
1878,	...	...	...	...	1,535,178	86,729
1877,	...	...	...	...	1,805,332	94,694

The extraordinary number of passengers who habitually avail themselves of this local train service is proof of the great need that is thus supplied. In the 2nd half of the year 319,991 passengers were carried at only half an anna each, the total number that travelled by these local trains during 1881 aggregated more than five times the population of the town and island of Bombay with its suburbs. It should here be remarked, however, that the Chappan Bhog fair held at Nadiad during the month of March 1881 tended largely to increase the local traffic.

Explanatory of the large increases which appear under "Carriages, Horses and Dogs" belonging to the public, and under "Parcels," which are the next in importance to that under "Passengers" disposed of above, it may be stated that the former which amounted to 89 per cent. of the sum realised in 1880 was due to the Baroda festivities held in December last on the occasion of the investiture of His Highness the Gaekwar, while the latter, which was equivalent to 22 per cent. of similar earnings in the previous year, grows out of the inter-communication with the North-West Provinces and the Punjab, the increase affecting almost entirely the terminal stations of this line, and gives promise of further improvement. A larger movement of troops, chiefly artillery, explains the increased receipts from "Military Carriages, Horses and Dogs," and the special trains run in connection with the English Overland Mail Service under agreement with the Postal Department, the additional income from that Department.

The following table gives the comparative results for the two years under reference in respect of the coaching service performed and the resulting average earnings per train, vehicle and unit miles:—

	1ST HALF.		2ND HALF.	
	1881.	1880.	1881.	1880.
	No.	No.	No.	No.
Train miles, ...	364,453	270,651	414,970	295,824
Vehicle miles, ...	6,405,442	4,849,868	6,859,391	5,057,307
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
Average earnings per train mile, ...	4 13 2	5 4 3	3 12 8	4 4 11
" " per vehicle mile, ...	0 4 5	0 4 8	0 3 8	0 4 0
	Pies.	Pies.	Pies.	Pies.
per passenger per mile, ...	2·76	2·76	2·71	2·73

The combined results thus show increases in the train and vehicle mileages of 212,948 and 3,357,658, and as a consequence decreases in the mean average earnings based on those figures of Re. 0-7-8, and Re. 0-0-3½ respectively; but notwithstanding the greater distance traversed, the average receipts per unit mile has not been appreciably lowered.

Goods traffic.—The improvement in the goods traffic, viz., Rs. 7,85,661, constitutes a little over 61 per cent. of the net increase in the earnings during the past year as compared with 1880. The particulars of this are subjoined:—

Main Heads of Abstract I.	1881.	1880.	1881.	
			Increase.	Decrease.
	Rs.	Rs.	Rs.	Rs.
Merchandise, general,	56,63,336	49,23,818	7,39,518	...
Military stores,	23,326	24,094	...	768
Construction materials,	62,090	36,276	25,814	...
Coal,	63,596	56,849	6,747	...
Live stock,	1,45,999	1,29,935	16,064	...
Rents and demurrage, &c.,	8,945	10,656	...	1,711
	59,67,292	51,81,628	7,88,143	2,479
Less—Outstandings irrecoverable, ...	3	...	3	...
Net receipts, ...	59,67,289	51,81,628	7,88,140	2,479
			7,85,661	...
			Net increase in 1881, ...	...

The above enhancement in the earnings was caused by an addition of 58,814 in the total merchandise tonnage moved during the year, the paying weight hauled in 1881 compared with 1880 being 631,730 and 572,916 tons respectively. This accession of traffic, as has already been intimated, was associated with the **Rajputana-Malwa Railway** system, as the following figures representing the Company's proportion of traffic interchanged with that line abundantly proves:—

	1881.		1880.		Increase in 1881.	
	Tons.	Rs.	Tons.	Rs.	Tons.	Rs.
<i>Via Sabarmati</i> —						
Forwarded,	37,611	6,77,480	18,634	2,79,408	18,977	3,98,012
Received,	91,533	10,12,483	32,987	3,58,107	58,546	6,54,376
Total, ...	129,144	16,89,963	51,621	6,37,575	77,523	10,52,388
					77,523	10,52,388
					Net increase in 1881, ...	...

The above increase more than covers that shown as the net sum earned in excess of the total receipts for 1880, and therefore indicates that the revenue from some other source has diminished. This is seen to be the case in regard to the traffic interchanged with the Great Indian Peninsula Railway, in which a falling off to the extent of Rs. 32,847 was recorded, which arose from a decline in the salt traffic originating on this Company's line affecting the stations on the above-mentioned Railway. The outturn of Kharaghoda salt is reported to have been less during the year under review, but the main reason of the declension noticed above was that large quantities of this commodity which formerly were carried northward *via* the Great Indian Peninsula Railway are now finding more direct transport through Rajputana. This is one of the few instances in which the through

opening has acted prejudicially to the Bombay trade. The net effect of the traffic interchanged with foreign lines during the year was an increase of 63,116 in the tonnage carried, and Rs. 7,97,027 in the earnings, as compared with 1880, as arrived at below :—

	1881.		1880.	
	Tons.	B. B. and C. I. Receipts.	Tons.	B. B. and C. I. Receipts.
		Rs.		Rs.
<i>Vid</i> Sabarmati,	129,144	16,89,963	51,621	6,37,575
" Wadhwan,	8,527	91,046	...	...
" Miyagam,	22,114	1,24,264	26,664	1,42,204
" Dadar Junction,	54,464	3,47,360	72,848	6,75,827
Total,	214,249	22,52,633	151,133	14,55,606
		Tons.	Rs.	
Net increase in 1881,		63,116	7,97,027	...

The commodities from which the revenue of the year was principally derived were the following :—

Cotton,
Grain, and
Seed,

the next in importance being—

Jagree,
Piece-goods,
Salt, and
State Railway materials ;—

while each of the following contributed more than a lakh to the gross earnings of the past year :—

Metal,
Mowra,
Sugar,
Timber, and
Tobacco.

The subjoined statement compares the quantities carried and earnings realised in respect of the above-mentioned commodities with the similar results during 1880 :—

Particulars.	1881.		1880.		Increase in 1881.		Decrease in 1881.	
	Tons.	Rs.	Tons.	Rs.	Tons.	Rs.	Tons.	Rs.
Cotton,	58,548	9,72,567	55,482	8,21,333	3,066	1,51,234	...	...
Grain,	119,881	9,29,435	110,633	8,40,406	9,248	89,029	...	...
Jagree,	22,890	3,06,489	20,540	2,74,104	2,350	32,385	...	...
Metal—manufactured and un-								
manufactured,	11,459	1,93,371	7,507	1,14,920	3,952	78,451	...	...
Mowra,	17,316	1,17,682	18,620	1,15,323	...	2,359	1,304	...
Piece-goods,	11,575	3,03,401	8,773	2,49,354	2,802	54,047	...	...
Salt,	69,614	2,37,099	75,149	4,98,087	...	...	5,535	2,60,988
Seeds,	54,876	5,72,868	24,876	2,29,437	30,000	3,43,431	...	...
State Railway materials,	14,781	2,93,273	16,149	1,78,915	...	1,14,358	1,368	...
Sugar,	10,568	1,56,783	11,028	1,62,181	...	...	460	5,398
Timber,	21,132	1,47,623	18,125	1,16,949	3,007	30,674	...	...
Tobacco,	12,284	1,16,486	13,040	1,27,405	...	...	756	10,919

The improvement in the receipts from the above was equivalent to about 15 per cent., and though the aggregate of the earnings obtained from other articles of commerce amounted to the not inconsiderable sum of Rs. 14 lakhs, the component items themselves are not worthy of special mention. The only notable decrease in the merchandise traffic was that in "Salt," already pointed out in the foregoing remarks. The receipts from this source fell from Rs. 4,98,087 in 1880 to Rs. 2,37,099 in 1881, the loss being 52 per cent. of the traffic for the former period. A falling off was also observed in "Sugar" and "Tobacco," but to a very small extent, viz., 3 and 8 per cent. respectively. On the other hand, a remarkable increase of 150 per cent. took place in the "Seed" traffic; the receipts from "Metals" and "State Railway Materials" yielded 68 and 64 per cent. over the earnings for 1880, while the extra yield in 1881 from "Piece-Goods," "Cotton" and "Grain" equalled 21, 18, and 10 per cent., respectively of the receipts during the previous year. The increase under "Cotton" was due entirely to large quantities received at Sabarmati from the Rajputana-Malwa State Railway for trans-shipment to Bombay; but for this, the traffic would have suffered considerably by the partial failure of the Gujrat crops, the effect of which was a diminution of 74 per cent. in the bookings to Bombay from Surat and Broach, and 16½ per cent. in the shipments by sea from those two ports during the season. The following table gives the various descriptions of cotton carried during the year as compared with 1880:—

Particulars.	1881.	1880.	1881.	
			Increase	Decrease.
	Tons.	Tons.	Tons.	Tons.
Cotton, full pressed,	21,199	17,262	3,937	...
„ half pressed,	36,641	37,457	...	816
„ unpressed,	708	763	...	55
Total,	58,548	55,482	3,937	871
Net increase in 1881, ...			3,066	...

The following figures trace the progress made in the cotton traffic during the past five years:—

				Tons.	Rs.
1877,	...	...	...	45,227	8,77,259
1878,	...	...	...	20,324	3,78,958
1879,	...	...	...	20,513	3,62,711
1880,	...	...	...	53,482	8,21,333
1881,	...	...	...	58,548	9,72,567

The imports into Bombay by sea and rail respectively during the above periods are given below:—

Imported.	1877.		1878.		1879.		1880.		1881.	
	Tons.	Per cent. of Total.	Tons.	Per cent. of Total.	Tons.	Per cent. of Total.	Tons.	Per cent. of Total.	Tons.	Per cent. of Total.
By sea,	1,386	11	5,776	73	6,693	70	8,046	41	6,697	69
By rail,	11,199	89	2,154	27	2,816	30	11,508	59	2,972	31
Total,	12,585	100	7,930	100	9,509	100	19,554	100	9,669	100

The reduction in the rates which it was considered advisable to make in order to compete with the sea route does not appear to have had the desired

effect, as the percentage of rail to sea-borne traffic has fallen from 59 per cent. in 1880 to 31 per cent. in the past year.

The comparatively large increase under "Railway Materials for Construction" was due to the carriage of materials for the Godhra Extension. The receipts under this head include the hire of locomotives employed on Capital work, which during the year amounted to Rs. 16,208.

The following gives the results of the past year compared with 1880 in respect of the mileage run for the goods service and the average earnings thereon, &c., in a synoptical form :—

	1ST HALF.				2ND HALF.			
	1881.		1880.		1881.		1880.	
	Number.	Average Earnings per each.	Number.	Average Earnings per each.	Number.	Average Earnings per each.	Number.	Average Earnings per each.
	Rs. A. P.		Rs. A. P.		Rs. A. P.		Rs. A. P.	
Train miles, ...	550,534	7 7 0	519,432	6 11 10	836,869	6 3 5	271,452	6 3 1
Vehicle " ...	21,673,205	0 3 3	19,733,899	0 2 10	12,219,868	0 2 9	9,498,516	0 2 10
Average traffic miles, ..	176	22,900 0 0	175	20,007 0 0	156	12,416 0 0	170	9,685 0 0
Total paying weight, ...	424,638	9 8 1	396,952	9 5 10	207,092	7 5 5	175,964	9 4 11
		Pies.		Pies.		Pies.		Pies.
„ ton miles run, ..	74,391,947	10 38	64,056,307	10 27	35,812,610	9 03	29,925,628	10 51

The variations in the sundry earnings of the Company show a net decrease, as compared with 1880, of Rs. 1,31,819, which is equivalent to 65 per cent., and appears mainly under the heads "Hire of Locomotives" and "Mileage of Vehicles over Foreign Lines" as set forth below :—

Main Heads of Abstract K.	1881.	1880.	1881.	
			Increase.	Decrease.
	Rs.	Rs.	Rs.	Rs.
Hire of locomotives,	5,440	1,06,681	..	1,01,241
„ vehicles,	860	1,077	..	217
Mileage of do. on foreign lines,	49,761	1,17,535	..	67,824
Rent of joint stations,	27,096	24,727	2,369	..
Tolls on bridges,	1,900	1,810	90	..
Rents of dwelling houses,	18,919	19,093	..	174
Fees on share transfers,	1,819	1,787	32	..
Sales of unclaimed goods,	491	541	..	50
„ of revenue stores,	6,486	5,700	786	..
Platform tickets,	2,345	2,091	254	..
Toll on Colaba-Dadar traffic,	17,519	15,281	2,238	..
Workshop receipts,	49,044	21,090	27,954	..
Unclaimed salaries,	2,341	377	1,964	..
Other receipts,	11,039	11,560	..	521
Superintendence of Gaekwar's lines,	7,600	5,079	2,521	..
Total, ..	2,02,660	3,34,479	38,208	1,70,027
			Net decrease in 1881, ..	1,31,819

As pointed out in the report for 1880 the income from "Hire of Locomotives" in that year was abnormal, being due to the loan of engines to the Punjab Northern State Railway in connection with the operations in Afghanistan. The decrease under "Mileage of Vehicles over Foreign Lines" coincides with the lesser traffic interchanged with the Great Indian Peninsula Railway, which has already been noticed. The only important increase that in the receipts from

workshops, arose from the final adjustments on account of rolling stock supplied to Government for State Railways having been effected in the accounts of the year under review.

Expenses.—The natural result of the heavier traffic dealt with in the past year was a corresponding increase in the working expenses, as compared with 1880, of Rs. 2,69,392, after discarding the charges for “Carriage of Revenue Stores,” viz., Rs. 2,20,316. The percentage of expenses to gross earnings, however, fell from 42·0 in 1880 to 38·7 per cent. in 1881, and the results obtained by dividing the total train mileage into the gross earnings (which give the average cost per train mile) from Rs. 4-7-0 to Rs. 4-4-2, thus indicating that the maintenance and working was, proportionately to the increased service, more economical in 1881.

The working expenses for the two years under reference are shown below as they appeared in the half-yearly accounts, except that the charges for “Carriage of Revenue Stores” have now been eliminated for purposes of comparison :—

Main Heads.	1881.	1880.	1881.	
			Increase.	Decrease.
	Rs.	Rs.	Rs.	Rs.
Maintenance of way and works,	8,53,791	7,58,079	95,712	..
Locomotive expenses,	12,84,293	13,92,695	..	1,08,402
Carriage and wagon expenses,	4,36,424	2,24,815	2,11,609	..
Traffic expenses,	6,31,441	5,76,807	54,634	..
General charges,	4,73,988	4,84,109	..	10,121
Steam boat service,	4,252	1,270	..	5,522
Special and miscellaneous expenses,	1,03,429	71,947	31,482	..
Total, ..	37,79,114	35,09,722	3,93,437	1,24,045
Net increase in 1881, ..			2,69,392	..

Maintenance of Way, Works and Stations.—The increase under maintenance of way was 12 per cent. of the total outlay for 1880, and resulted from the following variations :—

Main Heads of Abstract A.	1881.	1880.	1881.	
			Increase	Decrease.
	Rs.	Rs.	Rs.	Rs.
General superintendence,	1,59,838	1,54,171	5,667	..
Permanent way,	4,92,819	3,78,053	1,14,766	..
Bridges, &c.,	93,423	1,21,064	..	27,641
Stations and buildings,	72,420	62,091	10,329	..
New minor works,	7,932	4,176	3,756	..
Unclassified expenses,	27,359	38,524	..	11,165
Total, ..	8,53,791	7,58,079	1,34,518	38,806
Net increase in 1881, ..			95,712	..

The inspection of this line by the Consulting Engineer during 1881 brought to notice that the permanent way was in bad condition, “much of it being nearly worn out,” as certified by that officer. The effect of this, though not concurred

in at the time by the Company's Chief Engineer, was that the expenditure on renewals of permanent way, as above, increased by 30 per cent., which however was not sufficient to remedy the defectiveness, as the Consulting Engineer for Railways in passing the accounts for the 2nd half of the year remarked as follows :—" An increased expenditure both on labour and materials will be necessary in the (then) current and future half-years to bring and keep the road up to the standard of efficiency at which I consider it should be maintained." The matter has since attracted the attention of the Company's Home Board and will doubtless be speedily brought to a satisfactory issue. The decrease under "Bridges" was owing to heavier repairs in 1880, chiefly to the Bassein and Vetarni bridges, and to credits during 1881, for materials returned from the Nerbudda bridge. That under "Unclassified Expenditure" arose through smaller losses on account of exchange, and stores having been written off against this head in the past year. While the increase under "Stations and Buildings" appears large, as the outlay in the previous year fell comparatively short.

Locomotive Expenses.—The locomotive expenses, as recorded in the accounts showed a decrease of Rs. 1,08,402. This arose from the large special adjusting debit of Rs. 1,98,727 on account of duplicate engine gear which appeared in the accounts for 1880. Excluding this and the similar charge of Rs. 46,751 which was debited in 1881, a net increase occurred in the normal expenditure of Rs. 43,574, comprising the following variations :—

Main Heads of Abstract B.	1881.	1880.	1881.	
			Increase.	Decrease.
	Rs.	Rs.	Rs.	Rs.
General superintendence, ...	94,880	98,329	...	3,449
Running expenses, ...	2,80,607	2,29,091	51,516	...
Fuel, ...	5,88,674	5,50,181	38,493	...
Water, ...	38,644	39,445	...	801
Oil, tallow, &c., ...	26,708	22,511	4,197	...
Maintenance, &c., of engines, ...	1,83,428	2,24,105	...	40,677
Unclassified expenditure, ...	24,601	30,306	...	5,705
Total normal expenditure, ...	12,37,542	11,93,968	94,206	50,632
Net ordinary increase in 1881, ...	...	...	43,574	...
Add—Special debit for duplicate parts of engines, ...	...	...	46,751	1,98,727
Decrease in 1881 as per accounts, ...	...	...	...	1,08,402

The greater service required to meet the increased traffic during 1881 is represented by an increase of 318,822 in the engine mileage run, and explains the heavier charges recorded under "Running expenses," "Fuel," and "Oil and Tallow, &c." The reduction under "Water" arose not from a diminished consumption, but from an improvement in the watering arrangements. The short outlay on "Maintenance of Engines," was due partly to a special debit in 1880 of Rs. 16,160 for balance of cost of five engines to a credit in 1881 of Rs. 5,000, the sale proceeds of old boilers, and partly to lighter repairs to engines, the numbers receiving attention in the two years being 39 and 36 respectively. The charges under "Unclassified Expenditure" related exclusively to "Loss by Exchange on Stores," the decrease therefore indicates that a diminished quantity of English stores, including coal, was used in the past year. The recent reorganisation of the Locomotive Superintendent's office effected the saving noticed under "General Superintendence," which would have been still greater had the cash outlay on Capital works been charged with a percentage for supervision as in 1880 and previous years.

The average consumption of fuel per train mile and per 1,000 ton miles during the two years under comparison is shown below :—

Half-year ended	PER TRAIN MILE.		PER 1,000 TON MILES.	
	Coal.	Wood.	Coal.	Wood.
	lbs.	lbs.	lbs.	lbs.
30th June, { 1881,	47.29	0.58	141.42	1.76
{ 1880,	52.65	0.82	158.18	2.45
31st December, { 1881,	42.22	1.87	147.57	6.54
{ 1880,	46.76	0.66	166.68	2.35

The total quantity of fuel consumed was 33,435 tons of coal and 867 tons of wood in 1881, as against 30,412 and 454 respectively in 1880, a small quantity of patent fuel being used in addition in the past year. The total locomotive expenses during the two years, exclusive of the debits on account of duplicate parts of engines and conveyance of Revenue stores, compare as under :—

Half-year ended	Per Train Mile.	Per 1000 Ton Miles
	Ans.	Rs.
30th June, { 1881,	12.10	2 26
{ 1880,	14.00	2 63
Decrease in 1881, ...	1.90	.37
31st December, { 1881,	11.61	2 54
{ 1880,	14.18	3 16
Decrease in 1881, ...	2.57	.82

Carriage and Wagon Expenses.—The increase under carriage and wagon expenses was the largest of all, being 94 per cent. of the charges for 1880. This high percentage is, however, due to the larger transfer of expenditure to the wagon renewal reserve fund in the past year, excluding which the excess amounted to only 40 per cent. as set forth below :—

Main Heads of Abstract C.	1881.	1880.	1881	
			Increase.	Decrease.
	Rs.	Rs.	Rs.	Rs.
General superintendence,	30,119	29,838	281	...
Repairs, &c, of vehicles,	3,70,832	2,51,358	1,19,474	...
Cleaning and oiling,	29,838	30,837	...	999
Unclassified expenditure,	17,387	9,030	8,357	...
	4,48,176	3,21,063	1,28,112	999
Less—Transferred to Renewal Funds, ...	11,753	96,248	...	84,495
Total, ...	4,36,423	2,24,815	1,28,112	— 83,496
		Net increase in 1881, ...	2,11,608	...

The work of substituting 10-ton for 8-ton axles formed a large item in the expenditure under "Repairs and Renewals," on which the bulk of the above increase occurred. The completion of the rolling stock constructed for Government enabled the Company to pay more attention during the past year to the maintenance and improvement of their own stock which was becoming necessary, as the large amount of work performed sufficiently attests. The repairs and renewals of the different descriptions of stock for the two years are compared below :—

					Coaching Stock.	Goods Stock.	Total Number of Vehicles.
30th June, 1881,	..	..	..	..	103	928	1,031
31st December, "	..	..	..	..	80	759	839
Total for 1881,				..	183	1,687	1,870
30th June, 1880,	..	..	..	..	60	905	965
31st December, "	..	..	..	..	93	650	743
Total for 1880,				..	153	1,555	1,708
Net increase in 1881,					..		162

The increase under "Unclassified Expenditure" was on account of the loss by exchange on stores written off having been greater owing to the heavier expenditure of English materials during the half-year under review. The average cost of work actually done per train mile and per 1,000 vehicle miles during the year, excluding reserves and the "Carriage of Revenue Stores," was Re. 0-4-2 and Rs. 9-4-1, as compared with Re. 0-2-8 and Rs. 5-11-11 in 1880.

Traffic Expenses.—The expenditure under traffic expenses was recorded at Rs. 6,31,441, for the past year, being 10 per cent. in excess of that for 1880. The net increase of Rs. 54,634 resulted from the following variations :—

Main Heads of Abstract D.	1881.	1880.	1881.	
			Increase.	Decrease.
			Rs.	Rs.
General superintendence,	82,275	77,775	4,500	..
Station staff,	3,63,735	3,43,611	20,124	..
Train staff,	54,252	46,138	8,114	..
Fuel, lighting, &c.,	80,285	63,358	16,927	..
Clothing,	12,189	8,383	3,806	..
Printing, stationery and tickets,	30,886	27,347	3,539	..
Collection and delivery of goods,	4,487	4,613	..	126
Miscellaneous expenses,	1,980	1,980	..	..
Unclassified expenditure,	1,352	3,602	..	2,250
Total, ..	6,31,441	5,76,807	57,010	2,376
Net increase in 1881, ..			54,634	..

Estimating the additional mileage run the past year at the average rate obtained by dividing the total train mileage into the traffic expenses for 1880, the result proves that the actual increase in the expenditure was not incommensurate with extra work performed. The increase under "Fuel, Water, &c.," which was considerable, was due to the heavy charges for "Wagon covers and ropes" dur-

ing the first half of the year to supply the deficiencies from losses, &c., reported in this description of stores. The average cost of the "Station" and "Train Staffs" per 1,000 ton miles of freight hauled for the two years under reference is given below :—

						1881.	1880.
Station staff,	{	June,	..	..	..	2.22	2.47
		December,	..	..	..	3.32	4.60
Train staff,	{	June,	..	..	..	0.35	0.36
		December,	..	..	..	0.46	0.57

General charges.—The expenditure under general charges for 1881 compares as follows with that for the preceding year; the net saving in the former being equivalent to 2 per cent. of the latter :—

Main Heads of Abstract G.	1881.	1880.	1881.	
			Increase.	Decrease.
			Rs.	Rs.
Home expenditure,	64,138	61,338	2,800	..
Indian management,	2,58,567	2,54,837	3,730	..
Police,	60,931	79,871	..	18,940
Advertising,	1,340	1,047	293	..
Electric telegraph,	77,865	78,286	..	421
Unclassified expenditure,	11,147	8,730	2,417	..
Total,	4,73,988	4,84,109	9,240	19,361
			Net decrease in 1881, ..	10,121

The reduction in the police charges which embraces the whole of the net decrease above shown was due to a contribution of Rs. 20,526 by Government, similar to that noticed in respect of the Great Indian Peninsula Railway expenditure, as the State proportion of the cost of the Railway Police force. The new ruling prohibiting credits to Revenue for supervision of Capital works on open line which took effect during the year under notice accounts for the increased expenditure under the 1st and 2nd heads in the foregoing abstract. The other variations are unimportant.

Steam boat service.—The credit which appeared in the accounts for 1881 under Steam boat service was for the hire and value of a steam launch purchased originally by Revenue for use at the Nerbudda river while a gap existed in the old bridge there. It was returned to stores on the restoration of rail communication, but re-issued as an experimental measure to ply between Bhayndar and Bassein. The experiment proving unprofitable, the launch was hired out to the contractors of the new Nerbudda bridge, and returned by them, when no longer required, at the reduced value of Rs. 4,000. The difference, viz., Rs. 252, between this and the sum credited, represents the ferry receipts, and should perhaps have been more correctly credited in Abstract K. The effect of this credit, heightened by the expenditure on this head during 1880, on the comparison drawn between the figures of the past two years was inappreciably small, being only .02 per cent. of the total charges in 1881.

Special and miscellaneous expenses.—The special and miscellaneous expenditure recorded under this head in 1880 fell, as then noticed, 40 per cent. below that for the year preceding; the increase in the figures for 1881 which otherwise would appear comparatively great, was, therefore, not exceptional, being less than

the record for 1879 by about 8 per cent. The details for the past two years were as follows:—

Main Heads of Abstract G.	1881.	1880.	1881.	
			Increase.	Decrease.
	Rs.	Rs.	Rs.	Rs.
Law charges, ...	2,279	1,103	1,176	...
Compensation, ...	7,238	5,198	2,040	...
Rates and taxes, ...	10,040	7,690	2,350	...
Payments to other lines, ...	58,384	36,421	21,963	...
Grant-in-aid of education, ...	7,200	7,200	...	...
Prizes for station gardens, ...	3,051	2,877	174	...
Loss on defaced coins, ...	780	482	298	...
Bombay Port Trust, ...	14,457	10,976	3,481	...
Total, ...	1,03,429	71,947	31,482	...
			Net increase in 1881, ...	31,482

Increases thus appearing under all heads would, but for the circumstances above explained, call for some special notice.

The charges for compensation include a provision of Rs. 4,000 to meet known claims on traffic booked during the first half of the year, while the increase under this head with the one above it is exceedingly small in comparison with the large increase in the traffic dealt with during the past year. The other large increases under "Payments to other Lines" and "Bombay Port Trust Fees," viewed in the light of the increased traffic of which they are the legitimate outgrowth, may be regarded with satisfaction, as the countervailing increase in earnings far outweighs the additional cost. With regard to the transactions connected with the interchanges of rolling stock, it may be remarked in conclusion, that the Company benefitted to the extent of Rs. 33,812 during the period reviewed.

MISCELLANEOUS REMARKS RELATING TO THE RAILWAYS TERMINATING IN BOMBAY.

Messrs. Thomas Cook and Sons have obtained certain concessions from the Railway Companies and Government, and have established themselves as Tourists' Agents in India.

There has been some discussion on the subject of *carriage of explosives* on Railways, and especially with regard to the refusal of the Great Indian Peninsula Railway Company to carry dynamite under any circumstances. An Act is to be shortly published laying down rules to be observed when explosives are carried; subject to these rules, it will be left to the Railway Agencies to determine what explosives they will accept for conveyance.

The standard *capacities of passenger carriages* of the various types in use on the Railways under the control of the Government of Bombay were revised in committee, with the result that in the case of some vehicles the maximum number of passengers allowed has been reduced.

The question of *communication between Guards and Drivers and Passengers and Guards* was again mooted during the year, and the Bombay, Baroda and Central India and Great Indian Peninsula Railway Companies are both experimenting with an electrical apparatus, the former using an adaptation of the apparatus invented by Mr Winter, Superintendent of Telegraphs, Madras Railway; the latter with one invented by Mr. Floyd, the Company's own Su-

perintendent. Both appear to meet the object in view, but it is desirable that these two Companies should adopt the same system.

The question of *through rates* came forward prominently; first as affecting the alternative routes between Northern India and Bombay *via* Rajputana and Allahabad respectively; and secondly, as affecting the trade of Bombay and Calcutta. The Government of India, who have the exclusive control of the rates to be charged on the Rajputana and East Indian Railways, have ruled that no changes affecting through rates by either route is to be made without their sanction; and deprecate any competition for traffic between Railways belonging to, or guaranteed by, the State. Representations have been made by the Chamber of Commerce at Bombay and Calcutta which are still under consideration; in the mean time, speaking generally, rates from Delhi to Bombay are higher than rates from Delhi to Calcutta, the difference being chiefly felt in the item of grain and seeds. The East Indian Railway, having a much larger traffic than the Rajputana Railway, and the advantage of cheap cost and easy gradients, can afford to carry at lower rates. On the other hand, the Rajputana Railway having been constructed mile per mile at less than $\frac{1}{3}$ rd of the capital expended on the East Indian, would give an equal return on the investment with $\frac{1}{3}$ rd of the net revenue. The question, what rates should be charged is undoubtedly complicated; and experience alone will enable Government to settle it satisfactorily; the development of traffic on the Rajputana Railway has been rapid and satisfactory so far, and as its capacities increase, a larger traffic must be attracted if progress is to be maintained.

The Agent and Chief Engineer, Bombay, Baroda and Central India Railway Company, has put forward a scheme for connecting Godhra *via* Rutlam with Cawnpore and Gwalior, and the Great Indian Peninsula Railway Company one for extending the Bhopal line to Cawnpore and Gwalior. The Government of Bombay have recommended that a survey be made for a line between Godbra and Rutlam, considering it most desirable to give direct communication between Malwa and Gujrat, but are not prepared to support the proposal to extend it to Gwalior, and they have expressed the opinion that if more direct communication is required between Bombay and the North-West Provinces, the Great Indian Peninsula Railway Company's scheme is the one to adopt.

EASTERN BENGAL RAILWAY.

The following is the report for this line furnished by the Consulting Engineer for Guaranteed Railways at Calcutta.

The length of this line on which rates and fares are charged is 159·91 miles of single road. The total length, including sidings, is 199·72 miles. The total Capital expenditure up to the end of the year was Rs. 3,31,72,422, excluding steam-boat expenditure, Rs. 14,77,668, which gives an expenditure per mile of Rs. 2,07,444 upon the running or train length (159·91 miles).

During the year—

	Rs.
The Capital expenditure, including steam-boat expenses, amounted to	83,438
„ credits to Capital,	18,660
	<hr/>
Balance to Capital expenditure,	64,778
	<hr/>

Construction.—The special works sanctioned last year for protecting the line against high flood on the main rivers have been completed. Owing to moderate rain, the rise of the rivers was not high, and none of those crossed by the line gave any trouble during the floods.

The main stream of the Ganges, though strong, kept well away from the right bank most part of the year, and there was very little erosion until the rains, when, owing to the rise of the river, considerable erosion occurred between mile 147 and Goalundo, where the bank and railway are parallel; and it was considered advisable to divert the line inland at this point before the next floods.

A short loop-line from the Kushtea station to the extension line was constructed during the year, with the object of reducing the comparatively heavy working expenses of the branch line to this station. It was opened for public traffic on the 1st August, 1881.

Maintenance.—The relaying of the line between Sealdah and Barrackpore with steel rails was completed up to the $8\frac{1}{2}$ mile-post.

The inverting of the rails on the Goalundo extension has been completed.

The details of the cost of maintenance are—

	1880.	1881.
Per mile per month,	Rs. 201-11-7	176-4-10
Number of wooden sleepers renewed, ..	No. 21,150	14,994
Number of cast-iron bowls (single) renewed, ..	252	165
Lineal feet of rails renewed,	16,891	14,894
" " " inverted,	52,620	42,457
Cubic feet of ballast expended,	337,807	258,033

There was an evident falling off in the ordinary maintenance of the permanent way during the year.

The Damukdia branch of the Northern Bengal State Railway was maintained by the Company in good order.

Locomotive Department.—Fifteen locomotive engines were thoroughly repaired, and the workshop machinery was kept in good order.

The average daily engine and train mileage run by the engines was—

	Engine miles	Train miles.
In 1880,	49·67	40·40
„ 1881,	52·29	42 45
Increase,	2·62	2·05

The consumption of coal in pounds per train mile was—

	lbs.
In 1880,	47·56
„ 1881,	52·61
Increase,	5·05

Carriage and Wagon Department.—During the year—

- 1 vehicle has been constructed,
- 82 vehicles have been rebuilt,
- 167 heavily repaired,
- 2,303 slightly repaired.

At the end of the year there were—

- 99 vehicles rebuilding,
- 94 under heavy repairs,
- 143 under slight repairs.

A refrigerating fish wagon was placed on the line in March, but owing to the paucity of fish in the rivers, it has not yet had a fair trial.

Steam Boat Department.—The boilers of the steamer *Prince of Wales* were thoroughly repaired and the fire-boxes renewed. The engines were also overhauled, and all necessary repairs to the hull, decks, and cabins executed. The vessel was also painted throughout. She was laid up from the 1st February to the 21st June.

The boilers of the steamer *Rob Roy* were also thoroughly repaired, and the steamer *Prince Alfred* and flat No. 2 were sent to Calcutta at the close of the year to be docked and overhauled.

Details of Goods Traffic.

Description of Goods.	WEIGHT CARRIED.		Increase in 1881.	Decrease in 1881.	RECEIPTS.		Increase in 1881.	Decrease in 1881.
	1880.	1881.			1880.	1881.		
	Tons.	Tons.	Tons.	Tons.	Rs.	Rs.	Rs.	Rs.
<i>Merchandise.</i>								
For the public, ...	391,055	422,846	31,791	...	27,78,201	32,77,688	4,99,487	...
Military stores, ...	1,850	1,020	...	830	20,298	11,461	...	8,837
Railway materials for construction, ...	4,360	89	...	4,271	4,852	121	...	4,731
Railway materials for revenue, ..	...	18,738	18,738	...	...	16,942	16,942	...
<i>Minerals.</i>								
For the public, ...	16,908	45,282	28,374	...	52,693	85,327	32,634	...
„ construction, ...	...	...	...	...	...	...	...	...
„ revenue, ...	...	16,117	16,117	...	...	17,222	17,222	...
„ other departments, ...	...	6,719	6,719	...	...	16,739	16,739	...
Live stock, ...	...	...	...	...	1,012	536	...	476
Rent, demurrage, &c., ...	...	...	...	...	15,535	14,170	...	1,365
Miscellaneous, ...	...	...	...	...	672	...	...	672
Total, ...	414,173	510,811	96,638	...	28,73,263	34,40,206	5,66,943	...
Percentage of goods traffic to total rail- way receipts, ...	...	...	...	...	64.64	67.12	...	...

The following table gives an abstract of the inwards and outwards goods traffic at Sealdah and Chitpore Stations :—

Abstract of goods forwarded from and received at Sealdah and Chitpore stations during the years 1880 and 1881.

Names of Articles.	RECEIVED AT SEAL- DAH AND CHITPORE STATIONS.		Increase in 1881.	Decrease in 1881.	FORWARDED FROM SEALDAH AND CHITPORE STATIONS		Increase in 1881.	Decrease in 1881.
	1880.	1881.			1880.	1881.		
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Beer, spirits and wine, ...	8	11	3	...	360	679	319	...
Brass-ware, ...	205	151	...	54	218	1,024	806	...
Chillies, ...	222	1	...	221	12	568	556	...
Coal, ...	17	33,303	33,286	...	8,565	33,759	25,194	...
Cotton, ...	1,086	1,421	335	...	242	255	13	...
Dall, grain and pulses, ...	5,939	12,260	6,321	...	486	1,600	1,114	...
Flour, ...	...	...	...	...	95	478	383	...
Ghee, ...	2	4	2	...	157	186	29	...
Gunny bags, ...	4,117	8,340	4,223	...	439	834	395	...
Hides, ...	5,673	4,584	...	1,089	9	6	...	3
Indigo, ...	374	378	4	...	5	2	...	3
Indigo seeds, ...	41	7	...	34	247	241	...	6
Jute, ...	115,402	196,757	81,355	...	167	1,505	1,338	...
Linseed, ...	5,581	2,146	...	3,435	2	23	21	...
Mustard seed, ...	5,964	2,368	...	3,596	116	761	645	...
Piece-goods, ...	57	1,427	1,370	...	6,812	17,410	10,598	...
Rice, ...	5,519	41,009	35,490	...	676	5,164	4,488	...
Salt, ...	...	...	...	...	8,465	35,280	26,815	...
Seeds, not otherwise classified, ...	975	245	...	730	198	185	...	13
Sugar, ...	6,558	6,992	434	...	575	380	...	195
Tea, ...	3,551	8,129	4,578	...	42	29	...	13
Tobacco, ...	9,422	8,071	...	1,351	38	104	66	...
Turmeric, ...	454	372	...	82	6	3	...	3
Miscellaneous, includ- ing railway materials, ...	6,307	11,242	4,935	...	19,577	19,756	179	...
Total, ...	177,474	339,218	161,744	...	47,505	120,232	72,723	...

Among the imports, there was a remarkable increase in coal, jute, and rice; and amongst the exports, in coal, piece-goods and salt. The jute crop of this year was large, and an unusually large quantity was offered for conveyance by rail.

Working expenses.—The gross expenditure was more than that of 1880 by Rs. 1,20,910, or 5·46 per cent.

Working expenses for the years 1880 and 1881.

Head of charges.	EXPENSES.		Increase in 1881.	Decrease in 1881.
	1880.	1881.		
	Rs.	Rs.	Rs.	Rs.
Maintenance,	3,96,886	3,38,310	...	58,076
Locomotive,	4,34,923	5,81,379	1,46,456	...
Carriage and wagon,	2,14,286	1,97,057	...	17,229
Traffic,	5,04,850	5,46,945	42,095	...
General charges,	3,01,388	3,06,098	4,710	...
Steam boat,	3,04,304	3,14,381	10,077	...
Special and miscellaneous,	55,714	48,590	...	7,124
Total,	22,11,851	23,32,760	1,20,909	...

Details of the flotilla traffic for the last five years are given below.

Steamer traffic.

Years.	Earnings.	Expenses.	Deficit.	Profits.
	Rs.	Rs.	Rs.	Rs.
1877,	4,71,031	2,64,955	...	2,06,076
1878,	4,28,833	2,82,261	...	1,46,572
1879,	4,38,113	2,89,992	...	1,48,121
1880,	4,84,843	3,04,304	...	1,80,539
1881,	5,72,434	3,14,381	...	2,58,053

OUDH AND ROHILKHAND RAILWAY.

Open mileage.—The total length of line open to public traffic at the end of the year was :—

Main Line.

Moradabad to Benares, (Ganges river,)	Miles.
...	420·25

Branches.

Aligarh branch,	60·60
Cawnpore branch,	44·48
Bahramghat branch,	21·52
Total,	546·85

The total cost of the system, including the expenditure, on the Nalhati Railway, and on lines abandoned, but exclusive of the cost of land, was Rs. 5,84,79,102, or Rs. 1,06,938 per mile of Railway.

Extensions.—The following extensions were in progress :—

- (1). That in connection with the bridge over the Ganges at Benares, $5\frac{1}{2}$ miles.
- (2). The Northern Extension from Moradabad to Saharanpur, about 120 miles.

Financial transactions.—The following table gives the Capital authorized by Government, and the amount paid in, and withdrawn, by the Company up to 31st March, 1882.

Capital.				1st April, 1881.	31st March, 1882.	During the year.
				£	£	£
Amount authorised to be raised,	..	..	..	6,511,488	7,019,555	508,067
Amount paid in by Company,	..	..	..	6,181,377	6,489,444	308,067
Amount withdrawn by Company—						
England,	..	..	..	2,843,130	3,021,320	178,190
India,	..	..	..	3,214,034	3,287,444	73,410
			Total,	6,057,164	6,308,764	251,600
Balance,	{	At Credit of Company,	..	124,213	180,680	..
		Overdrawn by	..	..	..	..

Engineering works, Benares bridge.—The Benares bridge, as now designed, will consist of seven spans of 356 feet from centre to centre of piers, with an extension on the south bank of nine spans of 114 feet from centre to centre of piers.

The girders are to be of steel. Their details are being worked out at home, and the drawings have not yet been sent to the Executive Officers in India.

The flooring of the bridge at rail level will be adapted to ordinary wheel traffic, and will be carried on the lower boom of the large, and on the upper boom of the small, spans. A clear headway of 25 feet will be given above the estimated highest flood level.

At the end of the year the excavations for the foundations of the abutments were in hand, and considerable progress had been made in the well sinking for the extension piers, and for the two main piers (Nos. 6 and 7), next to the extension, which were started above low water level.

Three of the pontoons were afloat, and the erection of the fourth was in hand.

There was an abundant supply of building materials in stock, and 128 of the 300 lakhs of bricks contracted for had been delivered.

The greater portion of the plant expected from England has arrived, and it is hoped that considerable progress will be made during the next working season.

The last plot of land required for the approaches was made over to the Company by the end of January 1882, and by the 31st March, 1882, 66 per cent. of the total estimated quantity of earthwork had been executed.

Out of 24 minor bridges and culverts to be provided in the approaches, 18 were in hand and making good progress at the end of the year.

The station building and staff quarters on the Rajghat plateau were com-

pleted, and the levelling of the original irregular surface of the plateau was well advanced. The whole of the staff quarters on the right bank of the river had been erected with the exception of No. 2 barrack, since finished.

The greater portion of the machinery sent out had been set up in the workshops, but had not been connected with the engine, owing to a deficiency in the shafting supplied, which had to be made good, locally, in the Company's workshops at Lucknow.

Northern extension.—The construction of the northern extension was sanctioned by the Secretary of State for India at the end of August 1881, and in view to the immediate commencement of operations, and before the conclusion of any final agreement for the completion of the undertaking, the Company were authorized to issue debentures for £500,000, bearing interest at the rate of $3\frac{1}{2}$ per cent. per annum.

On the 23rd September, 1881, the Government of India authorized the Agent to make the necessary arrangements for starting work at once in connection with the extension, and in the beginning of October a meeting, at which the Chief Engineer of the Railway and the Consulting Engineer were present, was held at Simla to discuss and pass orders on the project.

At this Meeting it was decided that from Moradabad to Nagina, the alignment laid down in 1874 should be adopted, and that, after crossing the Ganges at Balawala, the line should be taken *via* Roorkee to Saharanpur. Between Nagina and the Ganges river, (Balawala,) the alignment was to be determined after consideration of the relative merits of the alternative routes *via* Najibabad and *via* Kiratpur.

The land plans for the first 47 miles, up to Nagina, were received from the Agent in November 1881, and the Company were placed in possession of the land by the end of February 1882. Earthworks were started at various points along this length in the beginning of March 1882.

The surveys and estimates of the alternative routes between Nagina and the Ganges river were received from the Agent at the end of March, and the question of the route to be adopted is now under discussion with the North-West Provinces Government.

Between Balawala and Saharanpur the surveys and levels were completed by the end of March 1882, and the working sections and land plans are under preparation.

The field work of the last two miles was kept in abeyance pending a decision regarding the junction arrangements with the Sind, Punjab and Delhi Railway at Saharanpur. It has since been decided by the Government of India, to have a joint station there, worked by the Sind, Punjab and Delhi Railway Company.

The question of the design of the bridge over the Ganges at Balawala is under consideration.

Maintenance.—The Consulting Engineer, during his half-yearly inspection in February 1882, observed a marked improvement in the state of the road generally.

The new rails got out for maintenance are of steel, and provided with heavy four bolt fish-plates.

In the end of May 1882, an indent for 1,000 tons of these fish-plates, sufficient for 118 miles of line, was sanctioned by the Government of India. They will be used with the iron rails, now in the road, in substitution for the existing clips which give most unsatisfactory results. It is hoped that the latter will be gradually superseded along the whole line, and this measure will more than any other tend to the maintenance of a really good road.

Rolling stock.—The following table shows the number of engines and vehicles in hand on 1st April, 1881, and 1st April, 1882.

Description.	STOCK IN HAND ON		Increase during 1881-82.	Under construc- tion on 31st March, 1882.
	1st April, 1881.	1st April, 1882.		
<i>Locomotive—</i>				
Mixed engines,	24	29	5	1
Goods „	90	90	...	...
Total locomotive, ...	114	119	5	1
<i>Coaching Stock—</i>				
Upper class,	36	36	...	6
Lower „	206	206	...	...
Composites,	2	2	...	...
Officers' carriages,	4	4	...	...
Horse boxes,	27	27	...	...
Brake-vans,	57	61	4	9
Total coaching stock, ...	332	336	4	15
<i>Goods Stock—</i>				
Covered goods wagons,	2,705	2,726	21	...
Ammunition wagons,	4	4	...	...
Timber trucks,	157	157	...	...
High-sided trucks,	72	72	...	...
Cattle trucks,	6	6	...	...
Total goods stock, ...	2,944	2,965	21	...
<i>Maintenance—</i>				
Low-sided wagons,	121	121	...	...

Traffic working.—No serious accident took place during the year under review.

The earnings and expenses for the last four years are shown below :—

	1881-82.	1880-81.	1879-80.	1878-79.
Mean mileage open, ... Miles.	546·85	546·85	546·85	545·17
Train mileage, ... No.	1,387,823	1,237,358	1,243,789	1,395,504
Traffic earnings, ... Rs.	52,94,878	45,64,674	39,88,644	49,36,846
Working expenses, ... „	32,58,904	25,25,450	24,91,070	25,73,601
Net profits, ... „	20,35,974	20,39,224	14,97,574	23,63,245
Receipts per mile open per week, ... „	186	160	140	174

Compared with the results for 1880-81, the earnings show an increase of 16 per cent., and the working expenses of 29 per cent., causing a diminution of 0·16 per cent. in the net profits. The details of the working expenses, and their cost per train mile under the several heads of account, are given below.

Since the 1st of January, 1881, the receipts and charges for the carriage of Revenue stores have, for the first time, been shown in the accounts. These are merely book debits, but they tend to increase the proportion which the expenditure bears to the receipts, and the fact of their having been made should be borne in mind in making comparisons with the results of previous years.

It should also be remembered that since the 1st January, 1881, Revenue has not received any credits for Capital works supervised by the ordinary open line staff.

Earnings.—The receipts from coaching and goods traffic are given in the following table for the last four years :—

Details.	1881-82.		1880-81.		1879-80.		1878-79.	
	Number or weight.	Earnings.	Number or weight.	Earnings.	Number or weight.	Earnings.	Number or weight.	Earnings.
	No.	Rs.	No.	Rs.	No.	Rs.	No.	Rs.
Upper class passengers	21,823	78,642	21,649½	77,348	19,463	68,104	20,363	76,541
Lower " " ...	2,680,169½	19,63,285	2,492,033½	17,69,680	2,669,056	15,56,785	2,663,324	15,60,316
Luggage, parcels, horses, &c., ...	...	1,34,007	...	1,34,655	...	1,19,517	...	1,71,574
Total coaching, ...	...	21,75,934	...	19,81,683	...	17,44,406	...	18,08,431
	Tons.	Rs.	Tons.	Rs.	Tons.	Rs.	Tons.	Rs.
Public goods, ...	601,136	24,13,750	527,388	21,89,852	460,553	18,26,715	604,842	26,66,553
Railway materials, ...	253,820	3,34,506	103,133	71,825	24,505	23,778	57,115	24,602
Telegraph, ...	...	11,007	...	11,963	...	10,306	...	12,015
Sundries, ...	...	3,59,682	...	3,09,351	...	3,83,439	...	4,25,245
Total goods, ...	...	31,18,945	...	25,82,991	...	22,44,238	...	31,28,415
Grand Total, ...	...	52,94,879	...	45,64,674	...	39,88,644	...	49,36,846

Compared with that for 1880-81, the passenger traffic for the year under review shows a satisfactory increase both in numbers and receipts. But, looking to the figures for the last four years, the lower class passenger traffic does not expand as rapidly as might be wished, or expected; and it is probable that the raising of the fare in January 1880, from two to two-and-a-half pies per mile has checked the growth of the numbers travelling, although the immediate financial results have possibly been improved by this measure.

There is a considerable increase in the tonnage of and receipts from goods traffic.

The table below gives the working expenses for the last four years :—

		1881-82	1880-81.	1879-80.	1878-79.
Total train miles, ...	No.	1,387,825	1,237,358	1,243,789	1,395,504
Maintenance, ...	Rs.	8,15,675	6,06,459	5,15,716	4,43,017
Locomotive expenses, ...	"	10,54,372	7,33,291	7,86,504	9,25,002
Carriage and wagon expenses, ...	"	3,07,170	2,41,183	2,44,883	2,95,362
Traffic expenses, ...	"	5,37,671	5,24,057	5,28,292	5,08,862
General charges, ...	"	3,93,139	3,82,813	3,68,121	3,60,802
Special and miscellaneous expenditure, ...	"	1,50,877	37,647	47,554	40,556
Total, ...	"	32,58,904	25,25,450	24,91,070	25,73,601
Percentage of working expenses to receipts, ...	"	61·55	55·33	62·45	52·13

The cost of the same per train mile is as follows :—

		1881-82.	1880-81.	1879 80	1878-79
Mean mileage open, ...	No.	546 85	546 85	546 85	545 17
" " maintained by revenue, ...	"	546 85	546 85	545 00	543 70
Monthly cost of maintenance per mile, ...	Rs.	124	92	79	68
Maintenance per train mile, ...	As.	9 40	7 84	6 63	5 08
Locomotive expenses per train mile, ...	"	12 16	9 48	10 12	10 61
Carriage and wagon expenses per mile, ...	"	3 54	3 12	3 15	3 38
Traffic expenses per train mile, ...	"	6 20	6 78	6 79	5 84
General charges per train mile, ...	"	4 53	4 95	4 74	4 14
Special and miscellaneous per train mile, ...	"	1 74	48	61	46
Total per train mile, ...	"	37 57	32 65	32 04	29 51

cluding the cost of 168 miles of broad gauge line, subsequently converted into metre gauge) Rs. 4,28,83,171 (£4,109,637), being at the rate of Rs. 65,471 (£6,274) per mile. The value of stores in stock on 31st March, 1882, was Rs. 23,92,099. The total Capital expenditure, including line under construction and stores, was Rs. 4,52,75,270 (£4,338,880).

The Capital expenditure during the year was Rs. 8,96,042, which includes items of abnormal expenditure amounting to Rs. 1,03,065; but the following credit was brought to account :—

	Rs.
For sale of two engines to the Mysore State Railway,	40,390

The net profits of the official year were Rs. 12,36,333, being at the rate of 2·7 per cent. on the total Capital expenditure. The net profits fell short of the guarantee by about £85,000.

The guaranteed interest from the formation of the Company up to 31st December, 1881, amounted to £2,614,752, and the net profits for the same period to £1,087,133; leaving a balance of £1,527,619 to be met from the revenues of India, in addition to the expenditure on land and control.

The following shows the expenditure on the principal Capital works during the official year :—

	Rs.
1. Alterations and additional accommodation at Arkonam Junction Station,	14,113
2. Iron and brass foundries for native workmen, Negapatam locomotive and carriage workshops,	9,088
3. Additional accommodation required for locomotive works at Cudalore station,	4,189
4. Flooring Chittar bridge,	978
5. Draining Tutucorin station yard,	6,563

Earthwork.—The line has been maintained in generally good order throughout. Points and crossings, as well as some curves on the main line, continue to be relaid with teak instead of fir sleepers.

Fencing.—The fencing is receiving attention, but still the number of cattle that came through the wire fencing is excessive. The vegetable fencing in parts is still inefficient, and not fully grown on the new sections of the line; and there is room for improvement in the maintenance of the wire fencing.

Bridges and works.—The large bridge over the Gingee River, seven spans of 150 feet, was completed in August, and on the 11th September trains began to run over it; this bridge is now being floored. On the Chingleput-Conjeeveram line the bridge of two 120 feet openings was opened for traffic on 17th January, 1882. At the end of March 1882 there only remained three unfinished bridges: one on the Chingleput-Conjeeveram line and two on the Pondicherry line.

The bridges in the Tanjore Delta and the piers of other large bridges over sandy beds are all being floored, but much yet remains to be done; and if no more bridges are to be washed away, this protective work must be pushed on with more vigour than has been the case hitherto. This work, so far as sanctioned, will, it is hoped, be completed before the next north-east monsoon.

The line to the Madras Beach has been opened for increased speed; gates and fencing having been fixed and electric bells supplied.

Stations and Signals.—The following station was opened during the year experimentally, but it is not anticipated that it will prove a success: Palaya Sivaram.

The new stations at Conjeeveram and Arkonam are completed, and the present Madras Railway overbridge at Arkonam will be replaced by an iron structure and extended to the South Indian Railway platform, which at present can only be reached by passengers crossing the line. The new station is a great improvement, but the want of increased booking facilities is felt at times. A light shed has been erected over the trans-shipping platform.

Distant signals are being erected at all stations between Negapatam and Erode.

Latrines are being added to the Station Masters' bungalows on the Southern extension.

At Negapatam the iron and brass foundries are in progress; also the engine shed at Chingleput.

The passenger platform at Trichinopoly Junction has been paved with stone, and the locomotive shed at Cuddalore Old Town has been commenced.

Rolling stock.—The total sanctioned rolling stock up to 31st March, 1882, consisted of 120 engines and 2,158 vehicles, including 58 converted from 3 feet 6 inch gauge. The stock finished consists of 118 engines and 2,113 vehicles.

Rates and fares.—From the 1st January to 30th June, 1881, the following passenger fares were in force:—

	Pies per mile.
First Class,	18
Second ,,	6
Third Class by through trains,	3
„ by local trains,	2

From 1st July, 1881, the differential third class rates were abolished, and the scale of passengers' fares was made:—

	Pies per mile.
First Class,	18
Second ,,	6
Third ,,	2½

These rates are still in operation, but it is hoped that before long the Agent will see the expediency of returning to the two pies fare for the lowest class.

Accidents.—The following table gives the number of accidents during the last and two preceding calendar years:—

	1879.	1880.	1881.
I. Collisions,	9	3	4
II. Derailments,	40	34	19
III. Running over cattle,	120	239	170
IV. Gates run through and obstructions on line,	21	26	11
V. Defects in rolling stock,	20	23	11
VI. Damage to lines,	9	17	6
VII. Fires in trains,	15	3	7
VIII. Miscellaneous or other causes,	15	17	17
Total,	249	362	245

The figures for 1881 show a satisfactory decrease over those for 1880 under most heads.

Collisions.—All occurred at stations.

Derailments.—Chiefly due to negligence on the part of the Company's pointsmen, but a few were attributed to defects in the permanent way and rolling stock.

Running over cattle.—The number of cases during the year under review shows a satisfactory decrease when compared with the previous year; but it is still larger than it need be.

Gates run through and obstructions on the line.—Of the four obstructions, one was, "stones placed on the line;" one, "bricks similarly placed;" and one, "a cart run over by the train." The gates run through were chiefly due to negligence of the gatekeepers.

Defects in rolling stock.—Chiefly failures of machinery and springs of engines, hot axles, and failures of couplings.

Damage to line.—Chiefly caused by heavy local rain. On Tuticorin branch the bank was breached by bursting of a large tank; there was no other damage of any moment.

Fires in trains.—Only one case of any considerable damage. Engines generally burning coal, and spark-arresters reported in good order.

Miscellaneous.—The most important under this head occurred at Egmore station, where the train being backed sharply came into contact with some vehicles which were driven against the buffer blocks. Five passengers were slightly injured. The driver of this train was dismissed the service, and sued the Company unsuccessfully for wrongful dismissal.

The number of passengers killed and injured was as follows:—

	1879.		1880.		1881.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
<i>Passengers.</i>						
From causes beyond their own control, ...	...	...	...	...	...	5
From their own misconduct or want of caution, ...	...	6	...	2	...	4
Total, ...	...	6	...	2	...	9
<i>Servants of the Company or of Contractors.</i>						
From causes beyond their own control, ...	...	2	5	5	1	3
From their own misconduct or want of caution, ...	5	10	7	31	3	20
Total, ...	5	12	12	36	4	23
<i>Other Persons.</i>						
Crossing at level crossings, ...	...	...	2	2	...	1
Trespassers including suicides, ...	2	1	4	1	7	3
Miscellaneous, ...	...	...	...	...	...	...
Total, ...	2	1	6	3	7	4
Grand Total, ...	7	19	18	41	11	36

Of the four passengers injured from their own misconduct, three fell out of trains in motion and one between carriage and platform.

The accidents to servants of the Company from causes beyond their own control occurred to three coolies killed and one injured by fall of earth they were excavating. Want of precaution in getting on and off vehicles and engines, crossing line, attending gates, and coupling wagons, caused other accidents.

Train service.—A revised train service is contemplated, by which the maximum speed will be raised to 25 miles an hour. This will enable a passenger to travel from Madras to Trichinopoly in one day. The new time table will be introduced on 1st July next.

The following table represents the degree of punctuality of trains during the year, 16·65 per cent. of all trains being more or less late:—

	Per cent.
Not exceeding 15 minutes, ...	1·96
Above 15 and not exceeding 30 minutes, ...	7·85
" 30 " " 60 " ...	4·54
" 60 " " 90 " ...	1·32
" 90	0·98
	2 D 2

Comparison of earnings and working expenses.—The general results for the last five calendar years are compared in the following table :—

Year.	Gross earnings,	Expenditure.	Net Revenue.	Percentage of expenses to receipts.	Receipts per open mile per week.
	Rs.	Rs.	Rs.		
1877,	32,33,246	16,45,026	15,88,220	50·88	106·9
1878,	32,33,140	21,55,033	10,78,107	66·65	102·2
1879,	33,62,067	22,98,815	10,63,252	68·37	104·8
1880,	35,59,594	26,29,576	9,30,018	73·87	105·8
1881,	37,55,688	25,17,962	12,37,726	67·04	109·9

From the commencement of 1881 the carriage of revenue stores appears in the accounts both as a receipt and as expenditure.

The total expenditure shows a saving of Rs. 1,11,614 over last year, and the gross earnings exceed the previous years by Rs. 1,96,094. The receipts, however, for the year under review include Rs. 1,20,167 for carriage of revenue stores, which must be deducted before a fair comparison can be made with the figures for 1880; they also contain an exceptional item of Rs. 31,260 for supervision charged on rolling stock constructed during the whole of 1881 and credited to Revenue. This reduces the gross earnings to Rs. 36,04,261, or Rs. 44,667 over the previous year.

In the working expenses also certain deductions should be made :—

	Rs.
Carriage of Revenue stores,	1,20,167
Extraordinary expenditure on repairs to bridges and tunnels, ...	41,805
Miscellaneous workshop charges omitted from previous returns under locomotive expenses,	40,771
Do. do. under carriage and wagon expenses,	26,728
Allowances for timber wastage in previous half years,	22,976
Total,	2,52,447

This reduces the working expenses to Rs. 22,65,515, which compares favorably with last year's figures.

The earnings under coaching and goods were as follow :—

Year.	COACHING.		GOODS.		Total.
	Amount.	Per open mile per week.	Amount.	Per open mile per week.	
	Rs.	Rs.	Rs.	Rs.	Rs.
1877,	15,96,193	52·78	15,14,783	50·09	31,10,976
1878,	19,06,087	60·22	12,26,495	38·75	31,32,582
1879,	20,03,022	62·46	13,09,593	40·84	33,12,615
1880,	20,62,513	61·30	14,45,911	42·98	35,08,424
1881,	21,06,450	61·68	15,41,534	45·14	36,47,984

Both coaching and goods show an improvement over the previous year.

The train mileage and earnings per mile compare as follow :—

Year.	Mean mileage worked.	Traffic train mileage.	Average number of trains each way per diem over the whole line.	PER TRAFFIC TRAIN MILE.		
				Gross earnings.	Expenditure.	Profits.
	Miles.	Miles.	No.	Rs.	Rs.	Rs.
1877, ...	580	1,136,374	2·684	2·846	1·448	1·398
1878, ...	607	1,174,309	2·650	2·753	1·836	0·917
1879, ...	615	1,161,153	2·586	2·895	1·980	0·915
1880, ...	639	1,190,018	2·526	2·991	2·210	0·781
1881, ...	655	1,249,477	2·638	2·977	1·996	0·981

Passenger traffic.—The number of passengers (exclusive of troops and police) carried in each class were as follow :—

Year.	First Class.	Second Class.	Third Class.	Total.
	No.	No.	No.	No.
1877, ...	11,738	130,161	3,868,491	4,010,390
1878, ...	15,191	125,994	4,855,592	4,996,777
1879, ...	17,071	106,859	5,056,933	5,180,863
1880, ...	7,709	40,853	4,402,908	4,451,470
1881, ...	7,559	36,036	4,259,391	4,302,986

The receipts from each class were—

Year.	First Class.	Second Class.	Third Class.	Total.
	Rs.	Rs.	Rs.	Rs.
1877, ...	23,007	68,145	14,06,991	14,98,143
1878, ...	29,116	70,409	17,05,974	18,05,499
1879, ...	33,760	64,404	17,88,485	18,86,649
1880, ...	43,767	54,175	18,58,437	19,56,379
1881, ...	44,815	49,071	18,92,848	19,86,734

The percentage of numbers and receipts work out thus :—

Year.	NUMBER.			RECEIPTS.		
	First.	Second.	Thrd.	First.	Second.	Thrd.
1877, ...	0·29	3·24	96·47	1·54	4·55	93·91
1878, ...	0·30	2·52	97·18	1·61	3·90	94·49
1879, ...	0·33	2·06	97·61	1·79	3·41	94·80
1880, ...	0·17	0·92	98·91	2·24	2·77	94·99
1881, ...	0·17	0·84	98·99	2·26	2·47	95·27

Compared with 1880, the passenger traffic shows a falling off in numbers of 159,407, and an increase in receipts of Rs. 35,311. The decrease since the change of fares on 1st July is, however, more apparent than real; as in the figures for the previous periods some of the passengers who used the local trains had to book

more than once, thus swelling the number. It is mainly, however, to the abolition of the two pies fares that the reduction in numbers is attributable.

The other items of coaching traffic compare thus :—

Year.	Troops and police, including military baggage and horses.	Passengers' luggage.	Carriages, horses, &c.	Parcels.	Special Trains.
	Rs.	Rs.	Rs.	Rs.	Rs.
1877,	24,123	15,043	13,238	38,813	6,397
1878,	20,593	22,205	16,386	36,245	4,543
1879,	35,717	25,914	15,707	35,402	2,458
1880,	19,230	27,907	14,563	37,065	6,412
1881,	26,026	27,571	14,173	37,532	13,348

Troops and Police show an increase; the receipts from special trains were abnormal.

Goods traffic.—The receipts from goods, the tonnage of goods, and average receipts per ton for the last five years have been as follows :—

Year.	Receipts.	Tonnage.	Average receipts per ton per mile.
	Rs.		Pies.
1877,	14,79,350	375,240	8.410
1878,	11,88,743	369,332	8.900
1879,	12,74,566	440,463	8.542
1880,	13,65,810	513,266	8.063
1881,	13,73,528	449,478	7.796

The total receipts exceed those in 1880 by Rs. 7,718; but nearly Rs. 50,000 less were paid in 1881 for carriage of stone for the Harbour works.

The average lead of ordinary goods in the last two years was 97 miles and 93 miles, and the average receipts per ton mile 8.36 and 7.89 pies respectively.

The receipts from the chief commodities carried were as follows :—

	1877.	1878.	1879.	1880.	1881.
	Rs.	Rs.	Rs.	Rs.	Rs.
Areca-nuts, fruit and vegetables, ...	22,727	33,464	41,723	58,163	81,660
Cloth,	18,092	23,069	31,066	52,453	82,315
Cotton,	6,972	19,826	26,620	37,456	27,388
Curry-stuff, oil and ghee,	36,279	54,583	79,034	83,699	46,026
Grain of all kinds,	9,97,070	5,44,707	5,23,752	3,64,279	3,56,171
Granite stones,	14,475	21,979	16,798	25,379	62,055
Hides,	12,038	12,495	12,915	19,909	25,154
Jaggery, ... ..	..	..	..	81,141	81,881
Salt,	71,196	58,481	63,093	72,827	74,396
Seeds of all kinds,	37,788	87,002	67,424	73,237	97,582
Sundries and oil cakes,	2,42,712	2,79,377	3,14,385	3,82,447	2,08,867
Tea, ... ..	..	..	..	6	208
Tobacco,	7,559	8,633	8,880	11,344	16,581
Stone for Madras Harbour Works, ...	18,124	48,405	86,659	1,05,025	55,073
Total, ...	14,85,032	11,92,021	12,77,349	13,67,365	12,15,357

The grain traffic is falling off, and the trade in raw cotton is not so good as last season.

The work done in transporting passengers and goods is shown in the following table:—

Year.	PASSENGERS.				GOODS.			
	Number of passengers.	Average mileage.	Total unit mileage.	Passenger miles per mean mile worked.	Tonnage of goods.	Average mileage.	Total ton mileage.	Goods ton miles per mean mile worked.
1877, ..	4,048,095	37·89	153,388,313	264,463	387,052	89·49	34,636,940	69,719
1878, ..	5,030,434	35·40	178,071,622	293,363	385,195	69·34	26,708,420	44,001
1879, ..	5,215,043	34·41	179,441,151	291,774	455,209	65·34	29,743,487	48,363
1880, ..	4,477,895	33·30	149,111,679	233,351	526,379	63·94	33,657,752	52,672
1881, ..	4,333,882	34·54	149,684,169	228,525	927,732	43·82	40,656,602	62,071

Working expenses.—The maintenance and locomotive charges compare as follows with previous years:—

Year.	MAINTENANCE OF WAY, WORKS AND STATIONS.			LOCOMOTIVE EXPENSES.	
	Amount.	Mean miles maintained from revenue funds.	Cost per mean mile maintained from revenue funds.	Amount.	Per traffic train mile.
1877, ...	1,79,287	217	826	7,53,062	10 612
1878, ...	4,81,912	424	1,137	8,59,980	11·717
1879, ...	5,25,825	580	907	7,85,944	10·830
1880, ...	5,72,197	607	943	10,67,851	14·358
1881, ...	7,11,017	630	1,129	8,86,611	11·182

The cost of the staff was Rs. 35,733 less than in the preceding year. There is increased expenditure under maintenance and renewal of permanent way, owing to the additional mileage brought on to the Revenue account. The extraordinary expenditure amounted to Rs. 41,805.

The cost of maintenance averages Rs. 573 per mile.

The consumption of coal per train mile is compared in the following statement:—

Year.	Total train miles.	Lbs. of coal per total train mile.	Engine miles.	Lbs. of coal per engine mile.	Percentage of engine mileage in excess of total train mileage.
1877, ...	1,165,098	39·63	1,616,907	28·55	38·78
1878, ...	1,228,157	38·68	1,617,581	29·37	31·71
1879, ...	1,250,561	34·62	1,713,171	25·27	36·99
1880, ...	1,297,067	32·06	1,624,606	25·60	25·25
1881, ...	1,261,507	29·72	1,576,156	23·78	23·78

The expenditure in other departments is compared in the following table:—

Year.	CARRIAGE AND WAGON EXPENSES.		TRAFFIC EXPENSES.		GENERAL CHARGES.	SPECIAL AND MISCELLANEOUS EXPENDITURE.
	Amount.	Per 1,000 vehicle miles.	Amount.	Per traffic train mile.	Amount.	Amount.
	Rs.	Rs.	Rs.	As.	Rs.	Rs.
1877, ...	1,31,154	6·285	2,75,617	3 881	1,59,686	1,46,220
1878, ...	1,21,307	5·540	2,85,744	3·893	2,46,214	1,59,376
1879, ...	3,68,143	15·920	3,10,735	4·282	2,48,016	60,152
1880, ...	3,56,492	15·342	3,40,692	4·581	2,75,844	16,500
1881, ...	2,36,291	9·447	3,41,059	4·318	3,21,390	21,594

In *Carriage and Wagon expenses* there is an extraordinary debit of Rs. 22,976, an allowance on account of timber wastage.

Under *Special and Miscellaneous* there is a great increase, owing to compensation for personal injury, and law expenses in connection therewith.

Pondicherry line.—The amount received for working the Pondicherry branch was Rs. 12,918.

Stores.—During the calendar year stores and materials amounting to 3,227 tons, valued at £34,874, were shipped to India in 22 consignments; besides which, 13,500 tons of coal were forwarded from England, and 1,900 tons were obtained from Australia at an average cost, at port of delivery, at £1 7s. 1d. per ton.

CHAPTER IV.

LINES UNDER CONSTRUCTION.

CONTENTS.—Marmagao Railway—Southern Mahratta Railway—Bengal Central Railway—Deoghur-Baidyanath Railway—Assam [Dibrugath-Sadiya] Railway—Jorhaut Railway—Amritsar-Fathankot Railway—Rewari-Hissar Railway—Jodhpore Railway—Bhopal Railway.

THIS Chapter comprises descriptions of the works in progress on all Railways of which no parts have as yet been opened to traffic, and which have been considered as separate projects in themselves. The progress made on extensions of lines open to traffic will be found in Chapters II. and III. under the respective headings.

MARMAGAO RAILWAY.

The first proposals made to the Government of India for a railway from Marmagao, in Portuguese India, towards Hubli (British) and the Southern Mahratta Country were made in December 1876, and had special reference to certain contemplated political and fiscal negotiations with the Portuguese Government relative to its Indian

<i>References.</i>	
P. W. D. Pros.	February 1879, Nos 241-57.
" "	September 1879, " 143-53.
" "	October 1880, " 1-21.
" "	November 1880, " 43-57.
" "	November 1880, " 40-2.
" "	August 1881, " 56-103.

possessions. These negotiations were carried to completion; the treaty was signed on the 26th December, 1878, and ratified at Lisbon on the 6th August, 1879. Article VI. of the treaty which relates to railway connection between British and Portuguese India runs as follows:—

ARTICLE VI.

The High Contracting Parties being equally animated by the desire of procuring for their respective subjects new facilities of communication, and of extending the external commerce of India, agree to the following stipulations.—

(a). Whenever His Most Faithful Majesty shall give notice to Her Britannic Majesty that a joint stock company has been formed for the construction of a railway from the port of Marmagao to the town of New Hubli, and that His said Majesty proposes to give to the said Company concession of powers and facilities for the construction and maintenance of the portions of the said railway lying within Portuguese India, and the rendering of the said port safe and suitable for purposes of commerce, Her Britannic Majesty engages, upon being satisfied that such concession is suitable and sufficient, and that the capital necessary for the undertaking is forthcoming, and upon the said concession being actually granted by His said Majesty, to enter into a contract with the said Company providing for—

1. The grant upon the same terms as those upon which land has been granted to Guaranteed Railway Companies in British India, of whatever land may be temporarily or permanently necessary for the construction and maintenance of the portion of the line lying within British territory.

2. The use of Her Majesty's best endeavours to obtain from any Native State whose territory the line is intended to traverse, the grant on the same terms of whatever land may be so necessary for the said purpose, but subject to Her Britannic Majesty's Imperial jurisdiction and sovereignty.

3. The affording of all usual and reasonable facilities for the making and working of the line.

4. The conveyance by the said Company, on the whole line of railway between Marmagao and New Hubli, or any part thereof, upon terms similar to those on which the same are conveyed upon the Guaranteed Railways in British India of Her Britannic Majesty's mails, post-office, officials, police, artizans and stores, and also (subject in the case of transit through His Most Faithful Majesty's territory, to the provisions of Article XVIII. of this Treaty) of her troops, arms and munitions of war.

5. The right of Her Britannic Majesty to construct and maintain an electric telegraph on such whole line, or any part thereof.

6. The right of Her Britannic Majesty to construct from any point or points of the said whole line a line of railway to Karwar, and lines to any other places in British India, and the use with engines, carriages, and otherwise, for the purposes of any such lines, of the whole or any part of the Company's said whole line, and the stations, works, watering places, and conveniences thereof, upon such terms and considerations as may be mutually agreed upon or settled by arbitration.

7. The exercise by Her Britannic Majesty, in respect of the portion of the said whole line situated within British India, of all power usually exercised, or provided to be exercised, over any of the Guaranteed Railways aforesaid, and the subjection of the said Company to any enactment for the regulation of the affairs of railways which may be passed by the Legislative Council of the Governor-General of British India.

- (b). In the event of a contract, as contemplated in clause (a) of this article, being entered into within two years from the date of this Treaty coming into force, or otherwise previous to the completion by Her Britannic Majesty of an Imperial State Railway between the towns of New Hubli and Bellary, Her Britannic Majesty further engages to include in such contract, should the said Company so desire, the further right to complete and maintain the line of railway between the said towns, upon the same terms as those applicable to the line between the Portuguese frontier and New Hubli, together with the addition of an engagement on the part of the said Company to take over, on equitable terms to be mutually agreed upon or settled by arbitration, any portion of the said line then completed or under construction, and the works, stock, or appliances appertaining thereto.
- (c). Whenever either of the High Contracting Parties may be desirous of ascertaining the feasibility and expediency of constructing a railway from the port of Marmagao to the town of New Hubli, and the advantages of such a railway to commerce generally, as compared with a railway from the port of Karwar to the said town, the said parties shall, in concert, appoint a mixed Commission under the provisions of Article XVI. of this Treaty, which shall cause a thorough survey to be made of the routes available, and any other investigations which may be necessary, and shall submit a report on the question. Each of the High Contracting Parties shall pay the salaries of its own engineers or officers engaged on the Commission or investigations, together with the expenses which the Commission may occasion in its own territories.
- (d). In the event of His Most Faithful Majesty not finding it practicable or expedient to grant a concession to any joint stock company as contemplated in clause (a) of this article, but of the report of a Commission appointed under clause (c) of the same establishing to the satisfaction of both Governments that a railway can be constructed from Marmagao to New Hubli at a reasonable cost and with fair prospects of becoming remunerative, and that such a railway would be preferable in the interests of commerce generally to one from New Hubli to Karwar, the High Contracting Parties engage to adopt in concert such measures as may be compatible with their respective financial circumstances, with the view to ensure the construction thereof at as early a date as may be practicable.

In December 1876, the Portuguese Government conceded to Mr. F. Campbell, or to any Company got up by him, the right, to be exercised within the period of one year, to construct a railway from Marmagao through Portuguese territory towards Hubli, provided he could obtain the consent of the British Government to extend the line of railway from the Portuguese frontier as far as Bellary, or any other point where it could connect with the trunk lines of British India. On the 27th April, 1878, the Secretary of State informed Mr. Campbell of the assistance he would give him towards the construction of the part of the line in British territory; and would execute a contract with him any time during the ensuing 12 months provided that the Portuguese Government concessions still held good, and provided that the adequate capital required for the whole line from Marmagao to Bellary was subscribed. Mr. Campbell failed to float a company within the period allowed him, and so the concessions fell through.

Immediately after this a Committee of gentlemen, known as the "Stafford House Committee," entered into negotiations with the Secretary of State, and also with the Portuguese Government, for the construction of this line of railway. The preliminary arrangements were satisfactory; the Committee sent out some engineers to survey a line between Marmagao and Hubli, a good trace was obtained, and the operations of the Committee have resulted in the formation of the "West of India Portuguese Guaranteed Railway Company," to construct that portion of the line (49 miles) lying in Portuguese territory, and of the Southern Mahratta Guaranteed Railway Company, to construct the portion (75 miles) in British territory. This latter Company has also a guarantee to construct a large system of railways in the Southern Mahratta country, and which will be described in another place. These two Companies have, it is understood, practically the same head offices and the same direction, but the contracts being with separate Governments are entirely distinct, and the accounts will be kept quite separate, although the two lines must be worked as one and the same undertaking.

The line from Marmagao to Hubli may be divided into three sections—the ghaut section, and the sections above and below. The original survey was made

for a 5 feet 6 inch gauge, with limiting curves of 800 feet radius on the ghaut and 1,200 feet elsewhere, and with limiting gradients of 1 in 40 on the ghaut and 1 in 100 on the other lengths.

From Marmagao to Karapenni, mile 0 to mile 34.—The work near Marmagao will be very heavy, as a low ridge composed of laterite has to be crossed, but with this exception the work is generally light on this section. Three considerable rivers—the Paroda (tidal, requiring 300 feet of waterway); Sanguem (tidal, 420 feet); and the Calay (120 feet)—have to be crossed. Of the 34 miles in this section, 16 miles are level, and 14 miles with the limiting gradient of 1 in 100. 24 miles are laid on the straight, and 10 miles on the curve, of which only five curves have the limiting radius of 1,200 feet. Sanvordem, where the river Sanguem is crossed, is $26\frac{1}{2}$ miles from Marmagao, and up to this point there is excellent water communication for large boats at all times of the tide.

The ghaut section mile 34 to mile 55.—The ghaut proper commences at the 39th mile, but Karapenni has been selected as the probable site for the changing station for the ghaut engines, as the spot is comparatively open, water supply abundant, and being at some distance from the dense damp jungle of the ghauts more fitted as a place of residence.

It was at first considered that the line could be taken up the Tinni ghaut, but the actual height to be surmounted was found to be much greater than anticipated, and requiring gradients much steeper than the limit imposed for the railway. A practicable route was found *via* the Kulmul ghaut, 3 miles to the south-east of the Tinni, and 335 feet lower than the Tinni summit. On this section there are two obligatory points, the summit and the crossing of the Koessi river at the Dudh-Sagur fall. The distance by the railway trace between these two points is 9 miles, and the difference in height 1,115 feet, which gives an average gradient of 1 in $42\frac{1}{2}$ for the 9 miles. The work on the ghaut section will be very heavy. There are 16 tunnels aggregating in length 2,216 yards; two imposing viaducts, one 160 yards long and 115 feet high, the other 58 yards long and 77 feet high; and there are numerous cuttings 40, 50, and 60 feet deep, besides several very large embankments.

Of these 21 miles, a little over 12 miles is on the curve; and of the 73 curves 52, aggregating a length of $8\frac{1}{2}$ miles, are laid out with the limiting radius of 1 in 800. Nearly 4 miles is on the level; $9\frac{1}{2}$ miles with the maximum grade of 1 in 40; $3\frac{1}{2}$ miles with 1 in 50; 2 miles of 1 in 57, and 1 in 60; and $1\frac{1}{2}$ miles of 1 in 100.

At the 44th mile, about equidistant from Karapenni and Kulmul, there is a short length of 855 feet of level which can be utilized as the intermediate watering station. At this place, however, only one-third of the total ascent has been surmounted. The total length of actual ghaut ascent is $13\frac{1}{2}$ miles, and the difference in height 1,593 feet, the foot of the ghaut being 101 feet higher than Karapenni station. For catch sidings there are several convenient sites along the ghaut track. The frontier between Portuguese and British India is crossed at $49\frac{1}{4}$ miles from Marmagao; 10 miles of the actual ghaut ascent are in Portuguese territory, and only $3\frac{1}{2}$ miles in British, but the heaviest works are situated in the British portion.

From Kulmul to Hubli—mile 55 to mile 124.—Between Kulmul and Dharwar the country is severely undulating, and the line has to cross two considerable ranges of hills; after that to Hubli the country becomes open and easy. Of the 69 miles 11 only are on the level, 39 miles on the maximum gradient of 1 in 100, and 11 miles between 1 in 100 and 1 in 200. Just half the length of this section is on the curve, but the curves are very flat, only 12 having the limiting radius of 1,200 feet. If a direct branch is made to Belgaum—32 miles distant—it will probably branch off at Shetowra, 67 miles from Marmagao and $14\frac{1}{2}$ miles from the summit of the incline; but the location of this branch will greatly depend on the outcome of the surveys now in hand of a line from Poona southwards to Belgaum. The line passes Dharwar at the 112th mile from Marmagao at an altitude of 2,395 feet, and runs on the remaining 12 miles into Hubli (124th mile) through easy country, descending 313 feet in the distance.

The Stafford House Committee at first intended that this line should be made on the standard 5-foot 6 inch gauge, but the Secretary of State considered that the metre gauge was amply sufficient for the system of lines in the Southern Mahratta country, and consequently it was decided to build the Portuguese portion on the same gauge. Provision for a second line of rails will from the first be made along the ghaut section; probably, also, throughout the whole of the Portuguese portion, and along the most difficult portions between Kulmul and Hubli.

Estimates were, however, made both for the 5 feet 6 inch and metre gauges according to present rates, and for sake of comparison an estimate was made at the same rates as were used for the Karwar estimate; they are as follows:—

Marmagao to Hubli—124 miles.

	Rs.
For 5 feet 6 inch gauge, single line throughout,	1,83,68,012
„ metre gauge, single line throughout,	1,45,78,206
„ „ „ at rates used in Karwar-Hubli estimate,	1,49,60,727

A contract for the construction of the works in Portuguese territory has been given to Messrs. Thompson, Dixon Bayley and Company, and work has commenced. The works in British territory as far as Hubli will probably be undertaken by the same firm, as soon as the trace of the main line has been finally decided upon.

A comparison of this line with the Karwar-Hubli Railway Project is given in Chapter V. in the description of the latter line.

SOUTHERN MAHRATTA RAILWAY.

The famine of 1877-78 was severely felt in this part of the Indian Empire, and it soon became fully recognized that for protection against famine, a network of railways throughout the Southern Mahratta country was required. Several lines had been proposed, but the full system was taken to include the following lines:—

	Miles.
Marmagao to Portuguese Frontier,	49
Portuguese Frontier to New Hubli,	75
New Hubli to Bankapur,	36
„ „ <i>via</i> Gadag to Bellary,	126
Hudgi station, Great Indian Peninsula Railway, to Gadag,	163
Branch to Belgaum,	35
Total,	484

To these were added as possible additions—

Poona to Belgaum, (about)	200
Bellary to Guntoor in the Kistna district,	235
Total,	435

or a total mileage of about 920 miles.

During the famine a considerable portion of the earthwork on the sections Hudgi-Bijapur (55 miles), and Bellary-Hospett (38 miles), was completed. The lines from the Portuguese frontier to Bellary and from Gadag to Sholapur, (next station on the Great Indian Peninsula Railway to Hudgi), were sanctioned by the Secretary of State as Famine Protective Works, and have been proceeded with as rapidly as possible. Meanwhile the West of India Portuguese Railway Company was in treaty with the Secretary of State to be allowed to construct these railways under a guarantee, and a contract was entered into. The full text of the contract is given in the Appendix (Appendix E). The lines comprised in this contract are—

The railways comprised in the Southern Mahratta Railway system are:—

- (a). The Eastern Deccan Railway from Sholapur to Gadag, a length of 183 miles.

- (b). The Marmagao-Bellary Railway comprising the section from Portuguese Frontier to Hubli and the section from Hubli to Bellary, a length of about 200 miles.
- (c). The Western Deccan Railway from Poona to Belgaum, about 253 miles.

All are on the metre gauge. A description of the Western Deccan line will be found in Chapter V.

Works were commenced on the Eastern Deccan Railway and on the Marmagao-Bellary Railway in the year 1879 for famine relief purposes. A large quantity of earthwork was executed on both the lines. A grant of funds was allowed for survey operations on the Eastern Deccan Railway during 1881-82.

Under orders communicated in Bombay Government Resolution No. 2747 of 1881, arrangements were sanctioned for proceeding with the works between Sholapur and Bagalkot and between Bellary and the Portuguese Frontier, and the following programme of operations was laid down :—

- (a). That there be three Executive Divisions on the Eastern Deccan Railway to carry on construction works, and three on the Marmagao-Bellary Railway,—one for construction and the other two for survey.
- (b). That the construction of the Bellary-Hospett section be commenced at once, and a design and estimate made of the Tungabhadra bridge.
- (c). That a survey party be organised for locating the line between the Portuguese Frontier and Hubli, and that another party be organised to locate the branch lines to Bankapur and Belgaum.

The Bombay Government in the Resolution quoted above, laid down, subject to sanction by the Government of India, that the branch line from Belgaum should be laid out with reference to, and as part of, the proposed through line to Poona.

The Government of India in their No. 934 R. C., Public Works Department, Railway, dated 15th December, 1881, accorded provisional sanction to an estimate for the Eastern Deccan line of Rs. 1,18,65,527.

Length.—Length 68 miles, 1,461 feet. The works on this division commenced in November last, when Mr. Croudace took charge of that Division.

Sholapur Division.

Earthwork.—2,690,847 cubic feet of earthwork were executed during the year. It includes the work done in diversions and 3 miles of unfinished work in the Division. Approximately, 26,502,000 cubic feet were executed in 1879-80 as Famine Relief work : or a total of 58 per cent. of the estimated quantity.

Bridgework.—The only important bridge on this Division is that over the river Bhima. It has been decided to build a girder bridge of 13 spans of 150 feet.

During the last year, borings were taken and a certain quantity of stone collected. The temporary bridge, with sidings on each side to site of the permanent bridge and to the ballast and shingle pits, was completed.

There are 6 small bridges and 10 culverts to be built on this Division; arrangements were made for the collection of stone and other materials, and a stone quarry was opened on the first mile.

Ballast.—900,000 cubic feet of ballast were collected during the year, or 25 per cent. of the estimated quantity.

Permanent way.—29 miles of permanent way were laid. This includes the sidings at Hudgi, Tadli, Bhima and Lutchan.

Stations.—Arrangements were made for sinking wells at the station sites.

Buildings.—Temporary store shed and engine shed were nearly completed. Some of the staff quarters were ready for roofing at the close of the year.

Length.—Length 56 miles, 1,556 feet. The work on this division was commenced in November 1881.

Earthwork.—13,300,000 cubic feet of earthwork were executed up to the end of the year, or 18 per cent. of the estimated quantity.

Bridgework.—The two important bridges on this division are those over the Don and Krishna rivers. It has been decided to build a girder bridge over the Don of 7 spans of 100 feet.

Estimate for a bridge over the Krishna with girders and an alternative design with arches were under preparation.

40,000 cubic feet of stone were collected for the Don bridge, and 5,000 cubic feet for the Krishna. Works were commenced on four other large bridges. Arrangements were made for the collection of materials for the minor bridges.

Ballast.—115,000 cubic feet of ballast were collected.

Stations.—Arrangements were made to sink wells at the station sites.

Buildings.—Hospital at Alimati and most of the quarters for the staff were ready for roofing at the close of the year.

Length.—Length 58 miles, 796 feet. The works on this division commenced only in the middle of February last; consequently very little work was done by the end of March.

Preliminary arrangements.—Jungle was cleared between miles 115½ and 125½ and between miles 140 and 141. Centre line was set out between miles 115½ and 120, between 124 and 125 and between 139 and 144. Line marked out 31½ miles, centre line pillars were built 3 miles, service road made between miles 115½ and 119, and trial pits were dug every half mile to ascertain the nature of the soil between miles 115½ and 119.

Earthwork.—25,000 cubic feet of earthwork were executed.

Bridgework.—The only important bridge on this Division will be that over the Malprabha river. Examination for crossing is being made, and suitable site for the bridge will be selected. Arrangements, however, are being made for obtaining stone and lime for the bridge.

Trial pits were dug at the sites for minor bridges, miles 118 and 119, during the year.

Length.—Length 75 miles. As this Division comprises a portion of the principal ascent up the Western Ghauts and passes through difficult country, a considerable number of trial lines had to be run before the proper trace could be selected, and the staking out the line from New Hubli to the Portuguese Frontier could be proceeded with.

The following is the work done up to the end of the official year :—

						Miles.
Trial lines run,	...	...	...	...	...	66½
Line staked out,	...	...	...	...	...	83¾
Lock-spitting done,	...	...	...	...	...	92
Trial levels taken,	...	...	...	...	...	90½
Finished levels,	...	...	...	...	...	83
Side widths set out,	...	...	...	...	...	15

The excess shown under certain heads is due to the re-staking of the ghaut, to the improvement on the line staked out, and to lock-spitting the side widths.

Every effort was made to have the line ready for the commencement of construction works, which were to be taken in hand by the contractors, Messrs. Thompson, Dixon Bayley and Company, early in June.

Length.—Length $38\frac{1}{2}$ miles. The works on this Division commenced in Bellary Division. November 1881.

Preliminary arrangements.—The centre line throughout was set out afresh, a new section made and the gradients revised: the absence of any correct section of the line and the non-existence of any permanent centre pillars rendered this work necessary.

Earthwork.—2,600,000 cubic feet of earthwork in completing the formation as also in road diversions were executed during the year.

Bridgework.—Out of 74 minor bridges on the division, 39 were finished, 19 nearly finished and the rest in progress. Large bridges were not taken in hand.

Level crossings.—In addition to three long diversions, seven level crossings in the Bellary Cantonment were made with temporary gates.

Ballast.—650,000 cubic feet of ballast were collected during the year, and including the quantity stacked at the time of famine, there was at the close of the year a total quantity of about 8 lakhs cubic feet on the division.

Permanent way.—8 miles of permanent way were laid.

Buildings.—Executive Engineer's bungalow at Bellary with servants' quarters was nearly completed and bungalows for subordinates taken in hand.

The following is a statement of outlay on these lines up to the end of March 1882:—

Capital Finance Account 1881-82.

Main Heads of Expenditure.	OFFICIAL YEAR 1881-82.		Net expenditure to end of previous year.	Net expenditure to end of 1881-82.	Sanctioned estimate.
	Regular estimate.	Net expenditure.			
	Rs.	Rs.	Rs.	Rs.	
Preliminary expenses,	34,129	38,732	71,329	1,10,061	
Land,	7,000	2,474	...	2,474	
Construction of line,	3,60,636	2,18,575	3,64,075	5,32,650	
Ballast and permanent way,	14,82,500	4,98,142	1,06,209	6,04,351	
Stations and buildings,	48,000	49,570	...	49,570	
Total Construction Accounts, ...	19,32,265	8,07,493	5,41,613	13,49,106	
Plant,	91,522	1,25,505	6,759	1,32,264	
Steam ferries, ... ..	...	...	...	...
Rolling stock,	1,25,000	76,537	...	76,537	
Establishment,	1,01,213	85,577	1,04,512	1,90,089	
Total Expenditure on Final heads, ...	22,50,000	10,95,112	6,52,884	17,47,996	
Suspense accounts,	9,00,000	17,86,289	...	17,86,289	
Grand Total Expenditure, ...	31,50,000	28,81,401	6,52,884	35,34,285	

Estimated cost of Rs. 98 lakhs sanctioned for the construction of a line of Railway from Sholapur to Gadag, vide paras. 1 and 2 of Secretary of State's Despatch, No. 23 P., dated 2nd February, 1882.

Distribution of Outlay by Funds to which chargeable.

	PROTECTIVE PUBLIC WORKS OUTLAY.		ORDINARY OUTLAY.		Grand Total.
	Imperial.	Provincial.	Imperial.	Provincial.	
	Rs.	Rs.	Rs.	Rs.	Rs.
During the year,	28,81,401	...	...	...	28,81,401
To close of the year,	28,81,401	...	6,52,884	...	35,34,285

NOTE.—During the year 1879-80, an outlay of Rs 3,24,989-15-7 was incurred on the Eastern Deccan Railway which was charged off to "Civil Department Famine Relief" in the accounts of that year, and is excluded from the expenditure shown up to end of 1881-82 in this statement.

BENGAL CENTRAL RAILWAY.

In last year's administration report the agreement between the Secretary of State and the Bengal Central Railway Company, will be found published *in extenso*.

References.			
P. W. D. Pros.	May	1878,	Nos. 58-62.
"	July	1880,	" 4-8
"	September	1880,	" 14-21.
"	June	1881,	" 1-27.
"	November	1881,	" 44-62.
"	February	1882,	" 117-9.
"	February	1882,	" 120-2.

This contract differs materially in its construction from those entered into with the Guaranteed Railway Companies; for as no lasting money guarantee was to be given by

the State, the end desired by the Secretary of State was to avoid all unnecessary interference with, or control over, the affairs of the Company, but at the same time to secure to Government such power of supervision as is necessary to uphold a proper standard of maintenance and efficiency, and also to protect the interests of the State in respect of the power of purchase and of re-payment of the advances made for interest during construction. The Government retains no power over outlay incurred on works of construction or maintenance, as it has with the guaranteed companies, but it has reserved to itself power of control over the entries of expenditure in the Capital account, and which are to be confined to objects which legitimately fall within the description of Capital outlay as defined in the contract in accordance with sound established principle. This control, however, is only to be exercised through an audit of expenditure, and so it has been arranged for a Government officer to act as Joint Auditor to do the Company's work and to protect Government under the contract.

A power analogous to that of controlling the Capital expenditure is also given in respect of outlay against Revenue, on the correct treatment of which will essentially depend the net receipts from which Government has to look for the re-payment of the interest advances.

While leaving the Company complete freedom of action in managing its affairs, power is reserved to Government to prevent the Company from allowing the undertaking to fall out of repair or to deteriorate in any way.

The Government also reserved to itself the selection of the route and the positions of the stations; and in consequence of this the Government of India approved of the Bengal Central Railway starting from the Eastern Bengal Railway Company's line at some convenient point near the bifurcation of that Company's line to Chitpore and Sealdah, and proceeding *via* Dum Dum, Baraset, Gobaridanga, Bongong and Jessore to Khulna, with a branch line from Bongong to the Eastern Bengal Railway at Ranaghat station.

Power to construct a terminal station in Calcutta has been reserved to the Company, but as the accommodation at Sealdah is ample for the present, the Company arranged with the Eastern Bengal Railway Company for joint use from the point of junction of the lines into Sealdah and Chitpore, and agreed that the sections Dum Dum-Baraset, and Ranaghat-Bongong-Jessore should be first completed, and worked as branches to the Eastern Bengal Railway, and by the Eastern Bengal stock. Since that arrangement was made, the Eastern Bengal Railway Company has found that it has not sufficient stock to do the increased work, so the Bengal Central Railway Company is providing its own stock which it will lease to the Eastern Bengal Railway Company to work the traffic while the temporary arrangements last.

The Director General of Railways has been appointed by Government of India as the officer through whom such Government control as is contemplated in the contract should be exercised; and the Consulting Engineer for Guaranteed Railways at Calcutta is the Inspecting officer and officer to enquire into serious accidents, under the provisions of the Indian Railway Act [Act IV. of 1879].

The lengths of the line are—

	Miles
Ranaghat, Jessore, to Khulna,	82½
Bongong to Junction with Eastern Bengal Railway at Dum Dum,	43

The earthwork was commenced in May 1881 by the officers of the Public

Works Department, and was handed over to Mr. Furnivall, Agent and Chief Engineer, who, with the Company's engineering staff, reached Calcutta in November, and at once took charge of the undertaking.

During the cold season the works were taken in hand as sections of the land were acquired, and at the close of the financial year good progress had been made in earthwork as far as Jessore, and in minor bridges in the sections Dum Dum to Baraset, and Ranaghat to Bongong; preparations for the supply of materials for the rest of the structures having been made at other points on the railway.

Permanent way materials and girders for bridge-work began to arrive in Calcutta early in the year, and at the end of March arrangements had been completed for platelaying. It is anticipated that the sections Dum Dum-Baraset, 10 miles, and Ranaghat-Bongong, 20 miles, will be ready for opening soon after the monsoon of 1882. A suitable site for the terminus at Khulna along the banks of the Bhairub has been decided upon, and the land is being acquired for the Company.

There are no very important works of construction on this line. The earthwork is naturally heavy owing to the position of the line, and as no stone of any description is obtainable, brickwork and brick ballast has to be exclusively used. The gradients and curves are extremely flat; in fact, except at the approaches to the larger bridges, where gradients of 1 in 400 are used, it may be said that the line is practically level.

The principal bridges are over the Jabuna river, 13 miles from Bongong towards Baraset; the Echamati river, 2 miles from Bongong towards Jessore; the Godla, 3 miles from Bongong; the Bhetna, 12 miles from Bongong; and the Gobbadak, 19 miles from Bongong. Between the Gobbadak river and Khulna, a distance of nearly 44 miles, only minor bridging, and of that very little, is required, the line running nearly parallel with the river Bhairub, an estuary river through the delta and parting from the Matabhanga near the Ramnuggur station Eastern Bengal Railway.

The bridge over the Jabuna will be 3 spans of 80 feet each, with the rails being carried on the lower boom; the piers and abutments being founded on a single well 15 feet in diameter.

The Echamati river is more formidable and requires a bridge of 5 spans of 100 feet. This estuary parts from the Matabhanga river near the Kissenganj station, Eastern Bengal Railway, and in the flood season carries off a large quantity of water received directly from the Matabhanga through its ordinary channel, and also from the flood spills of that river. The two central piers will be founded each on two wells 15 feet in diameter, while the piers next the abutments will be founded on single wells 18 feet in diameter. Rails laid on lower boom of girders.

The Godla bridge will consist of 3 spans of 80 feet each, the piers founded on single wells of 15 feet diameter.

The Bhetna bridge is to be one span of 100 feet, and the Gobbadak 3 spans of 80 feet, the piers of the latter being founded on single wells 18 feet in diameter.

DEOGHUR-BAIDYANATH.

Messrs. Burn and Company of Calcutta offered to construct and work a metre gauge branch from the Baidyanath station, East Indian Railway, to Deoghur, a distance of 6 miles, if Government would hand over to them the land free of cost.

References.

F. W. D. Pros. October 1881, Nos. 81-4.
" " February 1882, " 5-6.

The scheme also embraces a short branch to Rohini.

The offer was accepted, and the line is now being constructed as rapidly as possible. There are no difficulties of any kind, and Messrs. Burn and Company have bound themselves to have the line open within 12 months from the time that the land is made over to them. The capital required to construct and work the line is about Rs. 2½ lakhs. No guarantee was sought for, the local

traffic to be found being considered quite sufficient to determine the success of the undertaking.

The Company is bound down to the following maxima fares—

First Class, for whole distance of 6 miles,	...	...	8 annas.
Second,	"	"	4 "
Third,	"	"	2 "
Goods,	"	"	6 pies per maund.

The line is to be under periodical Government inspection, the mails are to be carried free, and the Company will furnish such accounts and statistics as Government may from time to time require.

Work was commenced in October 1881, and as good progress has been made, it is expected that the line will be opened from Baidyanath to Deoghur for traffic in November 1882; but the branch to Rohini is for the present deferred and work stopped, pending further enquiries into the prospects of the traffic on this section.

The Capital of the Company as now formed is Rs. 2,75,000.

DIBRUGARH-SADIYA.

This line is now being constructed by the Assam Light Railways and

<i>References.</i>			
P. W. D. Pros.	May	1879,	Nos. 166-71.
"	"	November 1879,	" 71-4.
"	"	July 1880,	" 49-53.
"	"	January 1881,	" 1-14.
"	"	May 1881,	" 34-44.
"	"	August 1881,	" 25-31.
"	"	December 1881,	" 27-32.
"	"	July 1882,	" 59-80.

Trading Company under a modified guarantee; the terms of the agreement will be found in the Appendix [Appendix F]. It extends from the terminus of the steamer lines at Dibrugarh to Sadiya, a distance of 51 miles, with a branch of about 24 miles from Doom Dooma to the Makum coal-

field.

The Government has given over to the Company, free of cost, a strip of the Sadiya, Jaipur, and Rangagora roads, 12 feet wide on which to lay the line, on condition that a width of 12 feet is left for the cart road. The country is perfectly flat; the country traversed by the road is high; there are no engineering difficulties of any kind, and only four insignificant streams to bridge. The gauge of the railway is one metre, to be laid with 30-lb. steel rails with 2,000 wooden sleepers per mile, and with the standard fastenings adopted on State lines. As the line is to be built and opened with a minimum amount of first cost, it is not intended to supply ballast in the first instance nor any permanent buildings, and only a limited amount of rolling stock. These will all be added as the traffic increases, but it is believed that a sound stable road can be laid down and opened with a fair quantity of stock for Rs. 23,000 per mile.

The Company also can make two small branch lines—one from Dibrugarh to Nagagoolee, a distance of 8 miles, the other from Panitolla to Hopewell, a distance of 4 miles—but these will not be put in hand until the traffic on the main line is assured.

Construction work was commenced in 1881 as soon after the rainy season as possible, and has been continued uninterruptedly.

ASSAM-JORHAUT TRAMWAY.

For the accommodation of the several tea industries in the neighbourhood of Jorhaut, in the Sibsagar district, the

	<i>References.</i>	Chief Commissioner is constructing a two-
D. G. Rys. Pros	June 1882, Nos. 256-63.	feet gauge tramway from Jorhaut to the
"	R. R. No. 688 of 1882.	Brahmaputra river at Kokila-mukh, a distance of 6½ miles. The country between

Jorhaut and the river bank is very low and subject to continued inundation; so cart traffic is tedious and often difficult for several months in the year. The project is estimated to cost Rs. 1,12,617, or about Rs. 17,320 per mile; this includes a small quantity of trucks and two powerful locomotives.

The project will it is thought be financially very remunerative; and surveys for its extension eastwards to Sibsagar and from there back to the Brahmaputra river at New Dikho-mukh, a distance of about 55 miles, are either in progress or are contemplated.

AMRITSAR-PATHANKOT.

This project was thought of and brought to notice in 1871 when Lord Mayo visited the Kulu and Kangra valleys.

References

P. W. D. Pros.	September	1875,	Nos. 62-4.
" "	July	1878,	" 20-9.
" "	January	1881,	" 120-7.
" "	July	1881,	" 68-72.
" "	November	1881,	" 28-33.
" "	January	1882,	" 8-11.
" "	March	1882,	" 74-84.
Genl. No 9421	of 1882.		

Mr. Francis Halsey, in 1875, proposed to raise a Company to construct this line, and early in 1876, a preliminary survey and rough estimate were got out. The estimate amounted to Rs. 44,31,000 for a broad gauge 66 miles long, but the desire to raise a Company for its construction failed.

Early in 1879 the Punjab Government took the project in hand, and had it carefully laid out and estimated. The prospects of the traffic to be obtained were so good that the Punjab Government resolved to construct the line as a Provincial Productive Work and to assume financial responsibility for it, and the Secretary of State's sanction having been obtained, work was commenced early in the year 1882.

The line as laid out runs for the most part along a watershed, and only crosses two minor rivers and several canals. Most of the country passed through had been previously cross-sectioned by officers of the Irrigation Department in connection with the projects for the Bari Doab Canal; so their observations and records were of valuable assistance in determining the proper alignment for the railway. The country passed through is extremely populous and villages very numerous; but the towns of Batala (29,000 inhabitants), Gurdaspur, (4,000 inhabitants), and Dinanagar (7,000 inhabitants), were considered obligatory points, and the line was run accordingly.

In consequence of the numerous gardens and roads in the vicinity of Amritsar, the junction with the Sind, Punjab and Delhi Railway could not be arranged for within the limits of the present Sind, Punjab and Delhi Railway station, without considerable expense. The junction is, therefore, made at $1\frac{1}{2}$ miles from the station, and a second line into the station will be made when the traffic demands it. Leaving the Sind, Punjab and Delhi Railway by an easy curve of 3,500 feet radius, the line runs in a north-easterly direction by the villages of Wairka (5th mile, station), Modal (7th mile), Kathunangal ($11\frac{1}{2}$ mile, station), to the banks of the Bari Doab Canal, lower main branch, and which is crossed at Variam Nangal at the 13th mile. Two spans (Warren girders) of 60 feet at a skew of $55\frac{1}{2}^\circ$ with a roadway under the girders of 10 feet are given for this bridge. After crossing the canal, the line runs straight for Batala (24th mile), an intermediate station being provided at Shekupura (mile 18). Batala is a large and important centre; and to its west, some 18 miles distant, lies Dera Nanak, one of the most important of the Sikh shrines.

To the west of Batala runs the Kasar nullah, which occasions much damage to the surrounding country during the rains, and which had to be avoided in locating the line.

On leaving Batala the line goes slightly more northerly, and again crosses the Bari Doab Canal (upper main branch) at Dhariwal at mile $36\frac{1}{2}$, having an intermediate station at Naushahra (31st mile). At the 38th mile a station is provided for the important village of Sohal, near which the Egerton Woollen Mills Company have their works. From Sohal the line is taken straight into Gurdaspur (43rd mile), and passes a very large number of flourishing villages *en route*. Gurdaspur is only a moderate sized town of about 4,000 inhabitants, but it is the head quarters of the district Courts at which the whole of the principal Civil and Revenue business of the district is conducted.

From Gurdaspur the country begins to ascend, and consequently the gradients are a little steeper, but they are not sufficiently steep to be of any consequence. The important town of Dinanagar is passed at the 52nd mile, where a station is provided; and a mile further on the Sirkian escape of the Bari Doab Canal is crossed, over which a single span of 60 feet (girder) is provided. In the 53rd mile is also crossed the Parmanand nullah, for which 4 spans of 60 feet (Warren girders on screw piles) are provided.

From the Parmanand bridge to the Sarna Station (62nd mile) the line runs perfectly straight, crossing the main road at the 59th mile. The Sarna Station, situated on the right bank of the Bari Doab Canal, will meet the requirements of the important town of Sujanpur, and accommodate the works of the Punjab Sugar Company which are erected near the canal and utilize its water power.

Immediately on leaving Sarna the main channel of the canal is crossed by a Warren girder bridge of 3 spans of 60 feet; and the Hasli canal is crossed on the 64th mile by a plate girder bridge of one span of 30 feet and 2 spans of 10 feet. At the 65th mile the Nalluah drainage cut has to be provided for, and is bridged with 4 spans (plate girders) of 30 feet each; and from thence the line runs straight into Pathankot (66th mile). The actual distance from the Amritsar station (Sind, Punjab and Delhi Railway) is 66.4 miles; the total rise 335 feet; the steepest gradient (close to Pathankot) 1 in 205 for 3 miles; and the sharpest curve 2,300 feet radius.

Pathankot is distant 6 miles from Madhopur, where the headworks of the Bari Doab Canal are located, and is the point from whence roads to the different hill sanatoria, to Kulu, and to Kangra diverge.

Water supply throughout the line is abundant; the greatest depth being 29 feet.

The estimate for a line on the 5 feet 6 inch gauge, using 62-lb. steel rails, and without rolling stock, amounts to Rs. 45,52,211 under the headings of direct charges; but if the indirect charges are included—such as abatement of land revenue, loss by exchange, interest on capital during construction—the total cost amounts to Rs. 52 lakhs.

No rolling stock has been estimated for, nor will it be provided in the first instance, as it is intended that the Sind, Punjab and Delhi Railway Company shall work the line as a branch, and so utilize some of its redundant stock. The work has been let out on one large contract, the contractors binding themselves to complete the line by 1st November, 1884, and they started work in March 1882. As there are no difficulties of any kind, it is expected that they will finish the works some time before the contract date.

Very little work had been done at the close of the official year; so the usual statement of Capital outlay, &c., is omitted.

REWARI-HISSAR.

In March 1881, the Government of India instructed the Director General of

<i>References.</i>			
P. W. D	Pros.	March	1881, Nos. 62-80.
"	"	May	1881, " 31-3.
"	(C W)	August	1881, " 1-2
"	Pros.	October	1881, " 1-38.
"	"	February	1882, " 262-5.

Railways to locate a line of railway between Rewari and Hissar, and to mark it sufficiently permanently to allow the trace to be at once taken up when it might be decided to commence the work as a protection against famine. The line from Delhi to Hissar was

also to be investigated; but this route was not advocated by the Punjab Government, as it was most desirable to accommodate Bhiwani, the largest town in the Hissar district (32,254 inhabitants); and being only a protective line, and not a through route, it was proper to study economy in the first outlay and avoid the heavy work required in crossing the Sabi torrent and other drainage channels which terminate in the Najafgarh jheel.

In order to accommodate the town of Hansi a small detour had to be made, and this increased the distance from Rewari to Hissar to 89 miles. The line passes through the chief towns—Kosli, Dadri, Bhiwani, Hansi, and Hissar. No engineering difficulties were met with; about 86 miles out of the 89 are on the straight; the smallest curve has a radius of 1,432 feet; 60 miles of the line are on the level, and no gradients are steeper than 1 in 200. There are no large streams crossed, but depressions in the sandy tract occur which obviously have been at some time channels for water, and which now pass some water during heavy falls of rain. But at present they show indications of being regular channels for the passage of water, and no permanent bridges will be provided until cause is shown for them. Throughout most of the length of this railway the water supply is impure and insufficient; the local rainfall is very small, and the water in the local wells generally brackish if not absolutely salt.

The estimate for these 89 miles on the metre gauge, with a moderate supply of rolling stock, amounted to Rs. 40 lakhs, giving a mileage rate of Rs. 45,000; this was sanctioned by the Secretary of State, and the works were actively pushed on during the cold season of 1881-82. The permanent way material was drawn from the surplus material obtained from England for frontier railways, and was soon at site. Platelaying had commenced before the close of the year, and it is expected that the whole line into Hissar will be ready by the end of 1882.

The following statement shows the progress of the works to the 31st March, 1882:—

Outlay to end of 1881-82.

Heads of Account.	Estimated amount.	Previously expended to 31st March, 1881,	Expended during 1881-82.	Total expenditure to end of 1881-82.
	Rs.	Rs.	Rs.	Rs.
32 Railways ordinary Capital surveys—				
Preliminary expenses, ... ..	...	10,634	* 49,146	† 59,780
Suspense, ... ..	...	1,467	— 1,384	83
Total Rs., ...	...	12,101	47,762	59,863
31 Famine Relief Protective P. W. Railways—				
I. Preliminary expenses,	65,048	...	‡	‡
II. Land,	39,864	...	...	...
III. Construction of line—				
1 Earthwork,	1,56,066	...	68,144	68,144
2 Bridges,	34,847	...	1,183	1,183
3 Tunnels, ... ..	...	...	...	...
4 Level crossings, &c.,	87,723	...	...	...
5 Fencing,	3,23,659	...	...	...
6 Electric telegraph,	86,884	...	874	874
Carried over, ...	7,94,091	...	70,201	70,201
			Rs.	
* Survey expenses, ... ..	...	...	3,296	
Plant, ... ..	...	...	3,703	
Establishment, ... ..	...	...	42,147	
Total, ...			49,146	
† Survey expenses, ... ..	...	...	3,459	
Plant, ... ..	...	...	6,218	
Establishment, ... ..	...	...	50,103	
Total, ...			59,780	
‡ Included in above figures of ... ..	...	...	...	59,780

Heads of Account.	Estimated amount.	Previously expended to 31st March, 1881.	Expended during 1881-82.	Total expenditure to end of 1881-82.
Brought over,	Rs. 7,94,091	Rs. ...	Rs. 70,201	Rs. 70,201
IV. Ballast and Permanent Way—				
1 Ballasting, ...	2,33,243	...	1,677	1,677
2 Permanent way, ...	14,55,113	...	47,143	47,143
V. Stations and Buildings—				
1 Stations and offices, ...	1,86,315	...	902	902
2 Workshop and store buildings, ...	2,603	...	349	349
3 Staff quarters, ...	1,22,291	...	3,557	3,557
4 Station machinery, ...	2,58,610	...	59	59
VI. Plant—				
1 Engineering, ...	63,190	...	8,607	8,607
2 Locomotive, ...	...	...	...	...
3 Carriage and wagon, ...	...	...	...	...
4 Station and office furniture, ...	...	...	1,072	1,072
VII. Steam Ferries, ...	...	...	...	...
VIII. Rolling Stock, ...	5,13,030	...	...	...
IX. Establishment, ...	3,71,514	...	43,766	* 43,766
Total Final Heads,	40,00,000	Nil.	1,77,333	1,77,333
Suspense, ...	...	...	...	14,44,429
Stores, ...	...	...	14,22,497	...
Manufacture, ...	...	...	17,111	...
Miscellaneous advances, ...	...	...	4,821	...
Total,	...	...	14,44,429	14,44,429
Deduct receipts on Capital account, ...	...	...	35	35
Grand Total,	...	...	16,21,727	16,21,727

JODHPORE RAILWAY.

In 1879 the Maharajah of Jodhpore expressed a desire to construct a branch line of railway from the Rajputana line towards his capital, a distance of about 70 miles, but for a commencement he was prepared to make it only as far as Pali, a distance of about 18 miles. This line of railway would carry all the salt made at Pachpadra on the Loonee river, distant about 50 miles further to the west of Jodhpore.

References.

- P. W. D. Pros. March 1882, Nos. 1-6
 " August 1882, " 107-36.
 D. G. Rys " March 1881, " 479-82

The point of junction with the Rajputana Railway was fixed at Kharchi, a place about 2 miles from the Bitura station, and 13 miles south of the engine station at Sujat. It is most conveniently situated, as the branch line is enabled to be run principally on a watershed line, and it is the only place between the Sujat and Rani stations where the existence of numerous sweet-water wells gives promise of a continuous water supply for engine purposes.

The length of the line as laid out is 18½ miles, and runs nearly due west to Pali. The rails used are the second hand 36-lb. iron rails which had originally been laid with clip joints on the Rewari-Delhi section of the Rajputana Railway. The sleepers are of imported timber, of creosoted pine, both half round and rectangular being supplied, 8 sleepers to the 21 foot rail. The only waterway allowed for

* Direction or General, ...	...	16,952
Engineering, ...	...	21,318
Stores, ...	...	4,076
Audit and Accounts, ...	...	1,420
Total, ...	...	43,766

consists of three culverts each of double 4 feet openings, and spanned by rolled girders, and of a causeway through the Khari nullah at the 8th mile. This causeway, or road dam, which is 400 feet in length and 9 feet wide at top, is formed of masonry walls founded on rock and filled in between with concrete. There are cross walls, 2 feet thick at intervals of $14\frac{1}{2}$ feet. The foundations vary from 10 to 20 feet in depth; the coping is of ashlar work, and ashlar blocks are laid to take the cross sleepers which are bolted through them by holding-down bolts 5 feet long. The rails are both spiked and screwed to the sleepers. The structure is solid, and as the floods rarely rise to more than a foot above rail level, it is probable that the permanent way will be seldom displaced. The causeway is, however, so arranged that it can be surmounted by a bridge when desired.

The sharpest gradient is 1 in 175, descending to the Khari river causeway; the sharpest curve has a radius of 1,000 feet. Most of the line (13 miles) is laid with gradients between 1 in 300 and 1 in 1,000, and with the exception of about one mile laid on the curve the line is straight. The banks and cuttings are very light; the worst cuttings being about 10 feet deep, and occurring at the approaches to the Khari river causeway. The ballast will be either of screened gravel or stone.

At the first it is intended to restrict to a minimum all expenses for station buildings and equipment, and only provide as circumstances demand. Being only $18\frac{1}{2}$ miles long no telegraph will be provided at first, the traffic to be worked on the train-staff system; and as the country is very sparsely populated no fencing will be provided at first.

The line has been very cheaply constructed, the total cost for $18\frac{1}{2}$ miles only amounting to Rs. 3,95,416, but without any provision for rolling stock. The line was authorized to be opened to passenger traffic in July 1882, the speed being limited to 12 miles an hour.

BHOPAL RAILWAY.

On the 31st March, 1882, the state of construction of the works on this line was as follows:—

From Itarsi junction to Hoshangabad—0 to 11 miles—the mileage being estimated from the outside of the Great Indian Peninsula Railway property, and about 2 miles less than if counted from the Itarsi station platform, the line works were finished and the permanent way laid, but the station buildings and the ballasting were still unfinished. The only large bridges on this length are over the Katara nullah ($1\frac{1}{4}$ miles) 3 spans of 40 feet, the Kolari nullah ($7\frac{1}{4}$ miles) 4 spans of 40 feet, and a single span of 40 feet, at $10\frac{1}{4}$ miles. These were all finished and the rails laid over them.

From Hoshangabad to foot of ghaut—11 to 16 miles—the earthwork was well advanced, but the works at the Nerbudda bridge were somewhat backward. Progress, however, was improving. The approaches to the Nerbudda bridge—heavy banks of 32 and 38 feet in height, on ascending grades of 1 in 150 towards the bridge—were well advanced, and the remaining earthwork finished. At the Nerbudda bridge—14 spans of 150 feet—all the piers had been founded, but the principal progress was made at the southern end, the two most southern piers being far advanced and admitting staging being erected for the erection of the girders. The piers have been founded throughout at almost the same level, about 75 feet below rail level. The rails run between the girders, so the piers will average about 70 feet in height.

The ghaut section extends from mile 16 to mile $23\frac{1}{2}$, and the severest grade is 1 in 80; the aggregate lengths of this grade amounting to $7\frac{1}{2}$ miles, the longest being $2\frac{1}{2}$ miles. The height surmounted in this section is 447 feet, but the highest altitude attained is nearly 80 feet higher at the Barkera station at mile 27. On this section the progress made is generally good, but some of the principal engineering works on it are somewhat backward. There are naturally a large number of

culverts varying from 4 to 20 feet on this section, and fair progress has been made with them, as also with the cuttings and embankments; but there is only one large viaduct over the Gadaria ravine (mile 20 $\frac{3}{4}$), and which requires a bridge of 4 spans of 150 feet. The progress at this bridge was fairly good, but apparently not much in advance of the contract time. From the top of the ghaut to near Bhopal—or from mile 23 $\frac{1}{2}$ to mile 55 $\frac{1}{2}$ —the gradients are numerous and undulate somewhat, but they are generally light, only a few short lengths of 1 in 100 and 1 in 167 occurring. At the 24th mile occurs one span of 40 feet well advanced; at the 24 $\frac{1}{2}$ mile, the Gadari river is again crossed by a bridge of 3 spans of 60 feet, the masonry of which is practically completed; a little further on another single span of 40 feet occurs, the masonry of which was nearly finished; at 26 $\frac{1}{2}$ miles the Gadari ravine is again crossed by a bridge of one span of 40 feet. After this no large bridges are met with until at the 36th mile the Basna nullah—5 spans of 40 feet—and at the 38 $\frac{1}{2}$ mile the Jakla nullah—4 spans of 40 feet—are met with; both these are fairly well advanced. At the 41st mile the upper reaches of the Betwa river are crossed by a bridge of 5 spans of 40 feet, the masonry of which is finished. At 43 $\frac{3}{4}$ mile, the Kerwa river is spanned by a bridge of 6 spans of 40 feet, the masonry of which was practically finished; and at the 44 $\frac{3}{4}$ mile, the Kaliasot river is bridged by 5 spans of 60 feet. The foundations of this bridge are on wells, on the sinking of which fair progress had been made. Beyond this the line is practically a surface one entailing no difficulties.

All the small girders—20, 40, and 60 feet spans—and 6 spans of 150 feet had been delivered at Itarsi junction, and the balance of the girder material (12 spans of 150 feet) was either in India or on the way out at the end of the year. Rails and fastenings for 24 miles and sleepers for 13 miles had been received.

A good deal of difficulty has been experienced with the contractors, Messrs. Glover and Co., and the progress of the works undoubtedly suffered thereby; this led to the retirement of one of the partners, and since that there has been no friction, and material improvement has been made in the works at the Nerbudda bridge. The contract time for finishing the line is 31st December, 1883; at present there seems no reason to believe that the time will be exceeded.

The following table shows the capital outlay on this line up to 31st March, 1882:—

Capital Appropriation and Outlay Accounts for 1881-82.

Main heads of expenditure.	OFFICIAL YEAR 1881-82			Net expenditure to end of previous year.	Net expenditure to end of 1881-82.	Sanctioned estimate.
	Budget estimate.	Regular estimate.	Net expenditure			
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Preliminary expenses,...	...	...	...	...	...	...
Land, ...	4,775	...	...	888	988	5,775
Construction of line, ...	19,67,000	10,25,225	10,24,824	2,80,545	13,05,369	32,51,325
Ballast and permanent way, ...	7,12,000	3,21,466	3,08,300	...	3,08,300	19,57,200
Stations and buildings, ...	80,000	55,017	58,483	2,960	61,443	2,62,506
Total Construction accounts, ...	27,63,775	14,01,708	13,91,607	2,84,393	16,76,000	54,76,800
Plant, ...	...	—859	—636	5,544	4,908	...
Steam ferries, ...	...	...	...	...	...	...
Rolling stock, ...	...	...	...	...	...	...
Establishment, ...	1,00,000	97,097	97,150	24,620	1,21,770	4,87,200
Total final heads, ...	28,63,775	14,97,946	14,88,121	3,14,557	18,02,678	59,64,000
Suspense accounts, ...	...	9,02,054	6,40,085	32,922	6,73,007	...
Grand Total expenditure, ...	28,63,775	24,00,000	21,28,206	3,47,479	24,75,685	59,64,000

Distribution of outlay by funds to which chargeable.

	PRODUCTIVE PUBLIC WORKS.		ORDINARY.		Foreign funds.	Grand Total.
	Imperial.	Provincial.	Imperial. "32-Rys."	Provincial		
	Rs.	Rs.	Rs.	Rs.		
During the year,	7,00,000	...	14,28,206	21,28,206
To close of the year,	7,00,000	...	17,75,685	24,75,685

CHAPTER V. RAILWAY PROJECTS.

CONTENTS.—*Madras including Mysore*—Nilgiri Railway—Beypore-Calicut—Shoranur-Cochin—Beypore-Mysore—Tinnevely-Trivandrum-Quilon—Mayaveram-Tranquebar—Vizagapatam-Jaipur-Raipur (Central Provinces)—Madura-Paumben—Cuddapa-Nellore—Adoni-Kurnool—Palghat-Dindigul—Mysore Extensions.

Bombay—Western Deccan Railway—Karwar-Hubli—Barsi Road station (Great Indian Peninsula Railway)—Pandharpur-Miraj—Barsi Road station-Barsi town—Itarsi-Bhopal-Jhansi-Cawnpore—Surat-Bardoli-Songad-Nandurbar—Broach-Jambusar—Annand-Fitland-Piploe—Godhra-Rutlam-Cawnpore—Pahlanpur-Deesa—Mehsana station (Rajputana Railway)—Pattan-Kheralu—Wadhwan-Mehsana—Railway to connect Bombay with Sind.

Bengal including Assam—Hooghly Bridge, East Indian Railway—System of Railway lines through Central Bengal—Memari-Ranaghat—Santipur-Bhagwangola—Dinapore towards Furneah and Sahibganj—Burdwan-Kutwah—Kissengunge-Kotchandpur—Mozufferpore-Hajipur—Behar Railway—Cuttack Railway—Tarakeshwar Railway—Sonthal Railway—Bengal-Nagpur Railway—Gya-Lohardugga or Ranchi—Palamow-Bartun—Aitcha-Dacca Mymensingh—Daudkandi-Comillah-Chittagong—Railway routes into Assam.

North-West Provinces and Oudh—General scheme for Light Railways throughout the Provinces—Jhansi-Cawnpore—Jhansi-Gwalior—Jhansi-Bargarh—Jumna Bridge at Muttra—Farukhabad-Hathras—Bareilly-Pilibhit—Bareilly-Ranighat—Lucknow-Sitapur and Lucknow-Rai Bareli—Patna-Bahraich—Akbarpur-Buxar—Moradabad-Ramnagar—Railway into the Dehra Dun—Godhra-Gwalior-Cawnpore.

Punjab including Sind—Indus Bridge at Sukkur—Rawind-Ferozepore-Ludhiana—Hissar-Ferozepore—Delhi-Rohtak—Wazirabad-Sialkot—Umballa-Kalka-Simla—Rawalpindi-Murree—Bhara-Shahpur—Railway to Quetta and Kandahar—Project to connect Sind system of Railways with Bombay system.

Rajputana and Central India—Ujjain-Bhopal—Godhra-Rutlam-Cawnpore—Jhansi-Bhopal—Kutni-Rewah Coal-field—A line from Kutni or Sutna towards Gwalior.

Central Provinces, Hyderabad and the Berars—Sangor-Chhindwarra Station (Great Indian Peninsula Railway)—Sangor-Damoh-Jubbulpore—Jubbulpore-Pindrai-Balaghat-Gondia—Chhindwarra Station (Great Indian Peninsula Railway)—Dhooma-Nidhani-Pindrai-Gondia—Jubbulpore-Baraila-Seoni-Nagpur—Nagpur-Umarwara-Kharakbel-Narsinghpur—Warrora-Chanda—Nizam's Railway Extensions.

In Chapters II and III all extensions of lines open to traffic and now under construction have been described; and the construction of new lines has been described in Chapter IV. In this Chapter will be found a short description of all the several projects which have been surveyed or reconnoitred, giving as far as possible the results of the surveys and estimates. For facility of reference the projects have been grouped territorially, and all are shown on the General Map at the end of the Volume; but in order to illustrate the projects in Central India and the Central Provinces a special Map is given at the end of the Chapter.

MADRAS INCLUDING MYSORE.

The following gives the length of railway open, under construction, and in course of preparation on the 1st January, 1882, within the Madras Presidency:—

<i>Open to traffic.</i>							Miles.
Madras Railway,	broad gauge,	{ double line,	.. .. .	.. .. .	.. .. .	42½
		{ single line,	.. .. .	.. .. .	.. .. .	798½
South Indian Railway, metre	..	..	..	..	..	653
Mysore Railway	..	..	..	..	..	58
Total,						1,552	
<i>Under construction.</i>							Miles.
Mysore Railway,	..	..	..	..	..	28
<i>Projects under preparation.</i>							Miles.
Raipur to Vizagapatam, about	..	..	..	..	..	350
Tinnevely to Trivandrum,	..	..	..	..	..	92
Beypore to Calicut,	..	..	..	..	..	7
Beypore to Gudalur,	..	..	..	..	..	65
Mettapollum to Coonoor,	..	..	..	..	..	12

The following is a short narrative of the several projects proposed from time to time:—

NILGIRI RAILWAY.

For many years past the design of getting a line of railway up the Coonoor

References.

P. W. D. Pros.	November 1880,	Nos. 14-20.
"	July 1881,	" 4-6.
"	August 1881,	" 47-8.
"	November 1881,	" 102-4.
"	March 1882,	" 27-30.
"	April 1882,	" 112-15.

Ghaut and on to the plateau of the Nilgiris has been under consideration. The distance from Mettapollium, the terminus of the branch from the Madras Railway to Coonoor, is about 12 miles; part of this distance is easy, while the remainder is very steep. A

line of railway similar to that constructed up the slopes of the Rigi mountain, in Switzerland, seemed the most appropriate, and overtures were made in 1876 to M. Riggerbach, the inventor of the central *rack-rail* system for mountain rail-roads, regarding the construction of a line up the Coonoor Ghaut. MM. Riggerbach and Young of Aarau, Switzerland, responded, and offered to get up a Company with a capital of £400,000 for the construction of the line within 6 years, if Government would admit certain rates and fares, would give the land free, and guarantee for 10 years after opening to traffic interest at the rate of 4 per cent. on £400,000. The gauge was to be the standard gauge of 5 feet 6 inches, with an ascent of 1 in 50 for 5 miles, and for 7 miles of from 1 in 6 $\frac{2}{3}$ to 1 in 8—the steep part being on the central rack-rail principle.

Towards the close of 1877 the Madras Government received a report on the feasibility of making a rope railway up to Coonoor. A site was selected near a spot called Lady Canning's Seat, from whence a straight and steep incline to the plains was practicable. This incline would not be more than 2 miles long, with a rise of 4,000 feet; and as far as gradients were concerned, it could be arranged with three gradients of about $\frac{2}{3}$ of a mile each, the lower third having a maximum slope of 1 in 4 $\frac{1}{2}$, the central third 1 in 1 $\frac{1}{2}$, and the upper third 1 in 4. The distance from Mettapollium to the bottom of the incline would be a little over 7 miles, and along which the maximum gradient would only be 1 in 20; from the upper end of the incline into Coonoor the distance would be 6 miles, with a descending gradient not steeper than 1 in 20. The estimate for the 2 miles of incline with stationary engines and rolling stock amounted to £152,000; and as the upper and lower approaches presented considerable difficulties in construction, it was estimated that those 13 miles of line would require £240,000 more for a 5 feet 6 inch gauge line; consequently the whole project would require £400,000, an equal sum to that required under the original proposal, and be rather more than 3 miles longer in distance.

Neither of these projects was looked upon by the Government of Madras as possessing sufficient merit to justify so large an expenditure, either in actual capital or in guaranteed interest, and the project fell through for the time.

Early in 1880 M. Riggerbach visited the locality for the purpose of selecting a practicable line, and of making a reliable estimate; and a Company, called the Nilgiri Rigi Railway Company, was formed to guarantee the preliminary expenses. The result of this investigation showed that the existing cart-road could be utilized throughout most of its length between Mettapollium and Kullar, a distance of 5 $\frac{1}{2}$ miles for a metre gauge railway; that a rack-rail line could be laid up the ghaut between Kullar and Coonoor, a distance of 6 $\frac{1}{2}$ miles, without difficulty; and that the total cost should not exceed £132,000. The ruling gradient on the lower length would be 1 in 50; and the steepest on the ghaut 1 in 6 $\frac{2}{3}$. The line should not take more than two years to construct.

The Company to make the line has not been floated yet, although it has received several concessions from Government, but it is believed that the difficulties have been at last arranged, and that the project will be at once commenced.

BEYPORE TO CALICUT.

In September 1881 the principal inhabitants of the West Coast of India memorialized the Governor of Madras for better railway arrangements on the Madras Railway between Podanur and Beypore, and also

References.

P. W. D. Pros.	November 1881,	Nos. 105-12.
"	January 1882,	" 48-9.

asked for the continuation of the Railway from Beypore to Calicut. The Madras Railway Company has always been anxious to undertake this short extension, and the Madras Government recommended that the surveys should be entrusted to the officers of that Company. But as the Secretary of State has ruled that he is unwilling to extend in any shape the undertakings of the present guaranteed Railways under their existing guarantees, it was settled that the work should be done by the Madras Railway Company's officers at the expense of the Madras Government, and without any claim to its construction hereafter. This line, which will be about 7 miles long, was roughly estimated in 1866 to cost Rs. 11 lakhs. If built it will provide the Madras Railway with a suitable terminus on the West Coast, a want which the Madras Government considers has seriously interfered with the success of the Madras Railway.

SHORANUR TO COCHIN.

The surveys and estimates of this line were originally made by the Madras Railway Company and paid for by Government.

Reference.

P. W. D. Pros. June 1882, Nos. 89-111.

The line would connect the Shoranur station of the south-west line of the Madras Railway with Ernacollum on the east side of the Cochin harbour, and distant about 2 miles from Cochin. Its length is 59½ miles, and the estimates for a 5 feet 6 inch gauge line amount to Rs. 66 lakhs. The estimate seems large, amounting to Rs. 1,10,000 per mile, as the country traversed presents no great engineering difficulties, and the necessary bridging is not excessive. Moreover, the estimate does not provide rolling stock, as all schemes for working it assumed that it should be worked as a branch of the Madras Railway, and by the stock existing on that line.

With the exception of the two termini and about half a mile of road which are within British boundaries, the whole of the line lies within the territories of the Native States of Cochin and Travancore. These States were asked to assist in the construction of the railway, and they consented as follows:—

Cochin will guarantee 2 per cent on Rs. 66 lakhs (but limited to a maximum payment in any one year of Rs. 50,000) for a term of 15 years.

Travancore will guarantee 1 per cent. on the same sum for a similar period, but subject to a maximum yearly payment of Rs. 35,000.

A proposal is now under consideration by the Secretary of State to construct this line by a private Company, who asked for a guarantee for 15 years of 3½ per cent. on a maximum capital outlay of Rs. 66 lakhs. If this is agreed to the British Government will have to bear that portion of the interest not covered by the guarantees of the Native States.

Cochin is perhaps the only natural harbour in the Madras Presidency, and as there is considerable interchange of traffic between the east and west coasts of Southern India, this traffic would be much increased by the aid of this railway, and would also add considerably to the earnings of the Madras Railway.

BEYPORE TO MYSORE.

Looking at the nature of the country to be traversed, a line of railway to connect the Wynaad with the Western Coast must be an expensive work. There are apparently six possible routes by which a railway may be taken, viz., (1), the Karkur Ghaut; (2), the Tholadi Ghaut; (3), the Tamracheri Ghaut; (4), the Terriote Ghaut; (5), the Kutiadi Ghaut; and (6), the Periar Ghaut. Of these the Karkur Ghaut is known to be a difficult one, and will involve a heavy amount of bridging; but little is known of the country, and extensive surveys will be necessary before a practicable line seems likely to be found. The Tamracheri Ghaut is apparently 8 miles in length, with an average gradient of 1 in 18;

References.

P	W. D. Pros	July	1881,	Nos.	2-3.
"	"	September	1881,	"	10-13
"	"	December	1881,	"	39-43.
"	"	May	1882,	"	63-5.
"	"	June	1882,	"	86-8.
"	Comns.,	August	1882,	"	1-3.

a ruling gradient of 1 in 50 can be obtained both below and above it. The Karkur Ghaut is apparently steeper, but the country between Gudalur and Mysore is more open, and a metre gauge line between those two places can probably be made for about Rs. 50,000 per mile. Between Gudalur and the coast the rate per mile will be considerably higher, and probably the "rack-rail" principle will have to be introduced on the Karkur Ghaut.

A line *viâ* the Tamracheri Ghaut was proposed by the Wynaad Planters' Association, but it was not supported by the Madras Government, as they desired to see other lines constructed first. The line has not been reconnoitred, but it is known that it would be an expensive one. Its length would be 120 miles, of which 70 miles would be in the Madras Presidency and 50 miles in Mysore territory.

Another project for this Railway was started by Messrs. Burchell, who are interested in the Wynaad. Their line would run some 15 or 20 miles to the eastward of the above-named line. Messrs. Burchell have undertaken to make a survey of the line from Beypore to Gudalur at their own expense, and it will probably run up the Karkur Ghaut, or generally take that direction, and be about 65 miles in length. If such a line were made it would naturally be continued on to join the metre gauge system of Railways in Mysore. Its length would be about 128 miles, 77 miles in British and 51 miles in Mysore territory. The extension of the Mysore Railway to Gandulpetta, 35 miles, is under consideration, and if carried out, railway communication will be carried within about 28 miles of Gudalur, of which distance about 12 are in British and 16 in Mysore territory.

The Madras Government now hold out no hope that either the Mangalore or Beypore harbours can be made into first class harbours, except at a cost absolutely prohibitive; they state that "a late joint inspection (1880-81) of these two places by the Chief Engineer and the Master Attendant has satisfied the Government that all attempts to do more than facilitate the present system of landing and lading the cargoes of ships in the offing by boats must be finally abandoned as altogether impracticable."

TINNEVELLY TO TRIVANDRUM AND QUILON.

The South Indian Railway Company being desirous of extending their system into the province of Travancore, applied to the Secretary of State for permission to make the requisite surveys. The Secretary of State objected, however, to that

<i>References.</i>	
P. W. D. Pros.	October 1881, Nos. 222-4.
" "	February 1882, " 170-7.
" "	July 1882, " 114-7.

Company adding further to its system under its present guarantee; but as it was desirable to know if railway extension was economically feasible in that direction, it was arranged that the necessary surveys should be undertaken by the South Indian Railway Company, the expenditure being borne by the Imperial exchequer.

Owing to the intervening range of hills there seems to be only two routes practicable for railway communication between Tinnevelly and Travancore; and these are—

- 1st. Across the Western Ghats, through a depression at the Ariankavu pass, which is about 1,135 feet above the sea level, and 68 miles north of Cape Comorin.
- 2nd. Across the Western Ghats through the Aramboly pass, which is only 235 feet above sea level, and 12 miles north of Cape Comorin. The two principal roads from Tinnevelly into the Travancore State go over these passes; the northerly one running *viâ* Tenkasi, Shencotta, Ariankavu pass, Yaroor, to Quilon and Trivandrum; while the southern one runs *viâ* Nanguneri, Aramboly pass, Nagercoil, Kotar to Trivandrum.

At present only the route *viâ* the Ariankavu pass has been surveyed, but the other route is being done in order to frame comparative estimates. The preliminary report submitted by the Chief Engineer of the South Indian Railway shows that the main line from Tinnevelly to Quilon over the Ariankavu would be

102 miles in length—45 in British and 57 in Travancore territories—with a branch of 35 miles from Ayoor to Trivandrum all in Travancore territory. The reconnaissance shows that between Tinnevely and Shencottah (the frontier station), a distance of about 45 miles, a ruling gradient of 1 in 150 can be obtained at reasonable outlay. From Shencotta to the summit and down to Yaroor (about 20 miles), the gradients will vary from 1 in 100 to 1 in 75, and necessitate sharp reverse curves and a tunnel about 1,200 feet in length near the summit. The remaining 27 miles between Yaroor and Quilon, and the 35 miles of branch from Ayoor to Trivandrum, will be very winding, in order to get a good location among the tumbled hills and broken country.

The southern route *viâ* Aramboly pass will be about 92 miles—36 in British and 56 in Travancore—from Tinnevely to Trivandrum; and 132 miles if continued to Quilon. It is anticipated that along this route no gradient steeper than 1 in 100 will be necessary, while over the greater portion of the length the gradients will be much easier. Also the country being more open there will be no necessity for sharp curves or much winding about.

The Chief Engineer considers that a metre gauge line along the southern route should not cost more than that on the southern section of the South Indian line, *i. e.*, about Rs. 53,700 per mile, inclusive of a fair amount of rolling stock; whereas he estimates a metre gauge line along the northern route at least at Rs. 5,000 a mile more. Accepting these figures for the sake of comparison, the various estimates work out thus—

	<i>Viâ</i> Ariankavu Pass.		<i>Viâ</i> Aramboly Pass.	
	Miles.	Rs.	Miles.	Rs.
Tinnevely to Quilon,	102	59,87,400	132	69,98,400
„ to Trivandrum,	117	68,67,900	92	48,50,400
„ to Quilon and Trivandrum,	137	80,41,900	132	69,98,400

These estimates would show that the southern route is much the more feasible; it requires a less mileage, and avoids working up and down an ascent of 800 feet, the difference in level between the two passes. Moreover, Travancore being long and narrow, would be better served by a line of railway traversing it longitudinally rather than transversely. The southern line would do this; would run along a well cultivated and populous belt of country; and could easily be made to serve Colachel, a seaport with a better harbour than Quilon. On the other hand the line *viâ* Ariankavu has to cross a much higher pass, traverses for miles most dense jungle, and does not serve the Travancore State nearly so well.

MAYAVERAM TO TRANQUEBAR.

The construction of this short line, 15 miles in length, from the South Indian Railway at Mayaveram to the coast was proposed by the Tanjore Local Funds Boards. A land cess of one anna per rupee has for sometime been assessed under the Madras Local Fund Act [Act IV. of 1871] in the Tanjore and Negapatam circles of the Tanjore district; and this sum is being set apart to form the requisite guarantee fund for the construction of a branch line of Railway from Mayaveram to Tranquebar. The surveys of the line are complete, and its cost as a metre gauge line will be Rs. 6,66,000, or about Rs. 44,400 per mile. The country traversed is rich, open, wet land, and there are no engineering difficulties of any description. It seems probable that this branch line will shortly be made, though the class of railway is not yet decided upon. The inhabitants of Tranquebar petitioned the Duke of Buckingham to allow a steam tramway on a 2 feet gauge to be made, but this proposal was not approved of by the Madras Government; so if the line is made at all it will probably be on the metre gauge.

VIZAGAPATAM TO JAIPUR AND RAIPUR (CENTRAL PROVINCES).

The construction of a line of Railway from Bimlipatam in the direction of Raipur in the Central Provinces was mooted on several occasions by the late Maharajah of Vizianagram; and moreover, he promised substantial aid in its construction. The proposed line would start from Vizagapatam or Bimlipatam on the east coast and probably run through Vizianagram, Jaipur, Raigarh on to Raipur, where it would probably form connection with the line of railway connecting the Central Provinces with Bengal.

References.

P. W. D. Pros. July 1881, Nos 2-3
 " " November 1881, " 118-31.

The Famine Commission dwelt strongly on the fact of this tract of country being specially marked out for the establishment of protective lines of railway, and the Government of India in a despatch to the Secretary of State [Railway despatch No. 3 of 12th January, 1881] drew attention to the "large area of the Empire that is in this neighbourhood unprotected by railways." The Government of Madras also attaches much political importance to the construction of this line, as it will not only form the first link of communication from the east coast with the interior, but will also "open up for the passage of troops a wild and frequently disturbed district, which is at present without any means of communication either by road or railway."

In December 1880 the Maharajah of Vizianagram asked the Madras Government to make a survey for a line of railway from Bimlipatam or other port to Raigarh in Jaipur, and said he was prepared to guarantee the cost of the survey to the extent of one lakh of rupees. The money was not accepted, as it was decided to make the surveys take a wider scope than was at first contemplated, so that any line of railway decided upon might form a part of a system connecting the eastern coast with the Central Provinces.

As the country was known to be difficult, very wild and rugged, a reconnaissance in some detail was ordered as a preliminary to settle how the Eastern Ghats could be best ascended. The work was left to the Madras Government to do, the Government of India merely expressing an opinion on the general route the railway line should if possible take.

There are apparently two alternative routes—

- (1), that starting from Parvatipur and passing *via* Rayaghada through either Bandisor or Dadpur east of the Nawagarh hills to Raipur; or
- (2), that starting from Salur and passing through Nawagarh west of the above hills to Raipur;

and to carry out a thorough reconnaissance of these the Madras Government directed special attention to the following sections of the lines:—

- (a), the route from Rayaghada through Bisemkattak and Ambodala towards Dadpur;
- (b), the alternative route from Rayaghada through Singapur to Bandisur and Dadpur;
- (c), the best route from Dadpur, east of the Nawagarh hills to Araing and Raipur;
- (d), the best route from Raipur, through Dhamtari if possible west of the Nawagarh hills to Naorangpur;
- (e), the route from Naorangpur to Jaipur and Kurapati;
- (f), the route by the eastern road to the same place;
- (g), the best route from Kurapati to Salur.

When this reconnaissance is complete, it is probable a regular survey will be undertaken.

MADURA TO PAUMBEN.

During the famine of 1877-78 this line was partially surveyed and a rough estimate made.

References.

P. W. D. Pros. July 1881, Nos. 2-3.

As a productive project there does not seem much to say in its favor; but it was suggested as a famine protective work, as it would bring the Paumben harbour in direct connexion with the Railway system at Madura. The Paumben harbour is understood to be capable of great improvement at moderate cost, and consequently the construction of such a line with the improved harbour would provide another means of throwing food supplies into the interior of the country in times of scarcity.

The length of the line would be about 94 miles, and the approximate estimate for construction on the metre gauge 30 lakhs of rupees.

CUDDAPA TO NELLORE.

Part of this line was examined during 1878, but no part of it has been properly surveyed or estimated for. Its length may be taken at 94 miles, and the approximate estimate on the broad gauge at 76 lakhs

Reference.

P. W. D. Pros. July 1881, Nos. 2-3.

of rupees. By taking this branch from the Wontimitta station of the Madras Railway, the length can apparently be shortened by about 15 miles; and if it be possible to run it from any one of the stations, Nandalur, Rajampet, Redipali, Orampad, or Kodur, the length would not be more than about 75 miles, and an expensive bridge over the Cheyer river avoided. But a line from any of these stations is dependent on the feasibility of getting through the Eastern Ghauts.

The construction of the line was mainly considered as a protective work, its object being to bring the great northern delta of the Madras Presidency into more direct communication, by means of the Buckingham Canal, with Cuddapa, Bellary, and Kurnool; and so provide a much wanted means of supplying those districts with grain in time of scarcity.

ADONI TO KURNOOL.

The construction of this line was proposed during the famine of 1877-78, but nothing has as yet been done towards surveying it or estimating its cost. Its length would be about 55 miles, and a rough estimate gives

Reference.

P. W. D. Pros. July 1881, Nos. 2-3.

about 36 lakhs of rupees for a broad gauge line.

During the discussion regarding the extent of light railways required throughout the Southern Mahratta country and adjacent districts as protection against the recurrence of famine, it was proposed to extend the metre gauge system eastwards from Bellary, and crossing the Madras Railway at or near Adoni, carry it through the Kurnool district, and on as far as Guntoor in the delta of the Kistna. The distance from Bellary to Adoni is about 40 miles, and that from Kurnool to Guntoor about 185 miles; so the entire distance from Bellary will be about 280 miles. Some difficulty will be experienced probably in getting the line through the Eastern Ghauts, and in some places the amount of bridging to be provided will be extensive; but on the average the line should not, with a small amount of stock, cost more than Rs. 55,000 per mile for a metre gauge line, or in all Rs. 154 lakhs. Railway extension into these districts was strongly insisted upon by the Famine Commission, so it is probable that this line will be undertaken as a protective work at no distant date.

PALGHAT TO DINDIGUL.

The Madras Government considers that a line joining Palghat on the Madras Railway with Dindigul on the South Indian is one of great local importance, and would doubtless be a paying concern, but as yet no steps have been taken to survey it. The line would be about 100 miles in length,

Reference.

P. W. D. Pros. July 1881, Nos. 2-3.

and it is not considered that there would be any great engineering difficulties to encounter.

SURVEYS IN MYSORE.

In August 1881 a line between Bangalore and Tumkooor following the direction of the great northern road towards Bombay was surveyed and located. The old surveys of 1870 were utilized, and the route finally selected corresponded to a great extent with the original survey run by the Madras Railway Company in 1863.

Reference.
P. W. D. Pros. August 1882, Nos. 177-8.

The detailed plans and estimates show that the total length to Tumkooor is 43 miles 2,030 feet, and the total cost for a metre gauge line will be Rs. 17,80,588 including rolling stock, or Rs. 41,255 per mile.

Routes for lines were also investigated round the city of Mysore, and which hereafter will be extended towards Gandelpetta to the south and Periyapatna to the west of Mysore.

BOMBAY.

The lengths of railway within this Presidency open to traffic, under construction, or under preparation, were on the 1st January, 1882, as follows:—

<i>Open to traffic.</i>				Miles.
Great Indian Peninsula Railway,	..	broad gauge,	..	617
Bombay, Baroda and Central India Railway,	..	..	..	421
Patri Salt Branch,	..	..	..	22
Rajputana-Malwa Railway,	..	..	..	106
Dhond-Manmad Railway,	..	..	..	146
Bhavnagar-Gondal Railway,	..	..	..	192
Gaekwar's Railway,	..	..	..	60
Total,				1,564
<i>Under construction.</i>				Miles.
Southern Mabratta Railway,	..	metre gauge,	..	451
West of India Portuguese Railway,	..	..	..	49
Godhra Extension.				
<i>Under preparation.</i>				Miles.
Western Deccan Railway,	..	metre gauge,	..	254
Surat-Bardoli-Nandurbar,	..	light broad gauge,	..	91
Broach-Jambusar	..	2 feet 6 inch gauge,	..	31

The following is a short narrative of the several projects which have been proposed from time to time:—

WESTERN DECCAN RAILWAY.

The Bombay Government was long desirous of testing the practicability of running a line of railway from Poona southwards towards Sattara, Kolhapur and Belgaum. Such a line would have to cross the drainage of the eastern slopes of the Western Ghauts; and, moreover, if traced in a fairly direct line, it must cross two or three difficult ranges of hills, spurs running eastwards from the Western Ghauts. Several lines were proposed to accomplish this object, the principal being—

	Miles.
1st. From Dhond <i>via</i> Phaltan Miraj, and Gokak, to Dharwar,	.. 194
2nd. From Pandharpur to Miraj,	.. 74
3rd. From Poona <i>via</i> Sattara, Kolhapur, to Belgaum, ..	.. 254

Of these the Bombay Government resolved to make surveys along the third route; and as soon after the rainy season of 1881 as practicable, a survey party took

the field to reconnoitre for a metre gauge line of railway, starting from Poona, passing somewhat to the eastward of Satara, Kolhapur to Belgaum, but through the important centres of Miraj and Gokak. This party was to search for lines *viâ* the Katraj Ghaut and Shirwal, also *viâ* the Bapdeo or Deweh Ghaut and Sassoor to Koregaon and Miraj, and if the spurs from the ghauts could not be crossed with a practicable line, an alternative one skirting them was to be sought for. Such an alternative would perhaps take off from the Great Indian Peninsula Railway at a station or two to the east of Poona, and run *viâ* Baramati, Phaltan and Vite, or *viâ* Supe and Koregaon, to Miraj.

The results of the reconnaissance showed that three ranges of hills would have to be crossed between Poona and the head waters of the Krishna river, but that by following the Saswad-Jejuri route, they can be easily surmounted by gradients no steeper than 1 in 70. No serious difficulty has been found in crossing the Deweh Ghaut, and a fair line found to Koregaon, a distance of about 88 miles. A route through Khed and Wai seems a more desirable one if practicable, but such a line would entail the passage of the Katraj Ghaut, a very difficult and expensive piece of work, involving heavy tunnelling near the summit, and grades on either side of 1 in 40. This ghaut is about 600 feet higher than the Deweh Ghaut; so probably the more easterly route to Koregaon will be selected.

The Kamatki Ghaut was also tried, but found to be impracticable, except at an expense incommensurate with the value of the project. The valley of the Krishna will have to be followed for some distance, and being a well watered valley, bridging the numerous affluents will be somewhat expensive. After the Krishna valley is left no difficulties of any serious nature are expected to be met with, but it seems probable that the best location of the line will pass to the eastwards of all the main stations of Sattara, Kolhapur and Belgaum, and so necessitate branches to those places.

The Bombay Government is anxious that this line be pushed on as certain portions of it, if not throughout its whole length, are likely to bring in an immediate and profitable outlay. The Secretary of State has given the Southern Mahratta Railway Company a preferential option to construct this line, but not necessarily under the guarantee. Their guarantee includes a branch to Belgaum; whereas the line joining Belgaum with Poona will add an additional 254 miles.

The most recent approximate estimates work out as follows:—

Poona to Koregaon,	..	88	miles,	Rs.	71,53,838,	or	Rs.	81,294	per mile.
Koregaon to the Krishna river,		103	"	"	77,34,396,	or	"	75,091	"
Krishna river to Belgaum,		62½	"	"	46,01,626,	or	"	73,544	"
Poona to Belgaum, whole line,		253½	"	"	1,94,89,860,	or	"	76,883	"

KARWAR-HUBLI.

In 1867 Messrs. Nicoll and Co. of Bombay offered to construct a line from Karwar to Hubli if Government would grant them interest at 5 per cent. on the Capital outlay; but this was not accepted, as there were other projects of much greater importance which should have the preference of Government aid. It was at that time generally considered that such a line would naturally be extended towards Bellary, and should thus form part of the Madras Railway system, the Bellary branch of which was then actu-

ally in progress. Messrs. Nicoll and Co. were much interested in this scheme, and subsequently repeated their offer more than once.

In 1869 the Secretary of State permitted a Mr. Buchanan to make a survey for a line of railway from Karwar to Hubli, and he prepared estimates on two gauges, *viz*, 5 feet 6 inches and 3 feet 6 inches—the latter at the special instance

References.

P. W. D. Pros.	October	1867,	Nos. 71-8.
"	"	January	1868, " 42.
"	"	May	1869, " 32-6.
"	"	February	1870, " 95-104.
"	"	January	1871, " 77-8.
"	"	May	1872, " 31-48.
"	"	May	1873, " 1-18.
"	"	January	1874, " 23.
"	"	February	1879, " 241-57.
"	"	October	1880, " 1-21.
"	"	August	1881, " 56-103.

of the Government of India, as they desired to ascertain the probable effect on the first cost by considering the requirements of a narrower gauge, with slower speed and light trains. The direction proposed by Mr. Buchanan apparently ran for the first 18 miles through open country close to the sea-shore; it then entered dense jungle, through which it continued for 57 miles without interruption; but after that the country again became open and well cultivated. This location seems to have followed the general direction of the Arbyle Ghaut road. The distances were—Karwar to Yellapur $55\frac{1}{2}$ miles, Yellapur to Hubli 40 miles, and the gradients in consequence very steep. The more recent surveys have flattened the slopes considerably, but have increased the distance from Karwar to Yellapur from $55\frac{1}{2}$ to $67\frac{1}{2}$ miles.

Including rolling stock in both instances, the estimates for the $95\frac{1}{2}$ miles amounted to Rs. 163 lakhs for a line on the 5 feet 6 inch gauge, and Rs. $134\frac{1}{2}$ lakhs for one if constructed on a gauge of 3 feet 6 inches. The Government of Bombay was not satisfied with this trace, as there seemed little doubt that further investigation would find out a line less objectionable as to curves and gradients and more economical both in first cost and in maintenance.

During 1870 the country was further investigated, the operations being principally confined to searching for a better trace, *via* the Arbyle Ghaut, and also to an investigation of the Wadi Ghaut. This latter route was soon given up, as it was found to be 141 feet higher than the passage by the Arbyle Ghaut; was likely to be much longer, and had not the advantage of a made road near it: moreover, a much more promising trace than Mr. Buchanan's had been found up the Arbyle Ghaut. In the working season of 1870-71, the line was carefully surveyed and estimated for; the surveys, &c., extending from Karwar through Hubli to Gadag, 36 miles east of Hubli. The distance was $144\frac{1}{2}$ miles, and total estimate for a metre gauge line was Rs. 90 lakhs. This was considered low by the Government of Bombay, who raised the estimate to Rs. 99 lakhs, or about Rs. 69,000 per mile; and this was further increased to Rs. $112\frac{1}{2}$ lakhs by a Committee appointed in 1872 by the Government of Bombay to investigate the matter. This included Rs. $2\frac{1}{2}$ lakhs for improving the harbour at Karwar, an absolutely essential part in any railway scheme, having Karwar as its seaport. The scheme was favorably reported on as a feasible project, and one likely to be commercially successful; but it was not sanctioned, as owing to the uncertain prospects of the Indian cotton trade (1873), the Secretary of State did not consider that its commercial prospects were sufficient to justify the line being made as a Government undertaking under the rules then in force for the expenditure of loan funds on public works in India. Many changes have taken place since then, and it is possible that the line would have been commenced ere this, but the matter was complicated in consequence of the treaty engagements between British India and the Portuguese Government in respect to their Goanese territory: and the result is that this project is held in abeyance to advantage of the project from Marmagao to Hubli.

The final route selected is the result of the work of four different seasons. The conditions were that the line was to be on the metre gauge; the sharpest curve was not to have a less radius than 330 feet on the ghaut section, or 528 feet elsewhere; and the limiting gradients were to be 1 in 40 on the ghaut, and 1 in 100 elsewhere. The line is practically traced along a watershed until it descends into the valley of the Baidli, up which it runs into Hubli; consequently the drainage met with is very slight. From Karwar to the foot of the ghaut is 43 miles, and in this length the line traverses the Ugsoor range of hills, thus necessitating an ascent and descent before the main ghaut is reached.

Omitting the $8\frac{3}{4}$ miles through the Ugsoor range, the line below the ghaut consists of $21\frac{3}{4}$ miles of straight line and $12\frac{1}{2}$ miles of curves. The number of curves of less radius than 1,200 feet is 51; of these 13 have the limiting radius of 528 feet, and 23 a radius of 660 feet. There are $11\frac{1}{4}$ miles with the limiting gradient of 1 in 100. The waterway required is slight. Through the Ugsoor range, $8\frac{3}{4}$ miles, the length of line on the straight and on the curve is about the same. There are 45 curves of less radius than 1,200 feet, of which 26 have the

minimum radius, and aggregate in length $2\frac{1}{2}$ miles. The gradients ascending from Karwar are not steeper than 1 in 100, of which there are nearly 4 miles; but the descending gradient towards the foot of the main ghaut is 1 in 80 for a length of $3\frac{3}{4}$ miles.

The section up the Arbyle Ghaut may be considered to extend from mile 43 to Yellapur at mile 67, a length of $24\frac{1}{2}$ miles, of which very nearly one-half is on the curve. There are 39 curves with a less radius than 800 feet, aggregating $8\frac{3}{4}$ miles in length; of these there is only one curve of 330 yards in length, with the minimum radius of 330 feet, (which however can be flattened,) 17 of 528 feet, with a total length of $5\frac{3}{4}$ miles, and 10 of 660 feet for a length of $1\frac{1}{2}$ miles. Of the gradients—nearly 8 miles have the limiting gradient of 1 in 40, there is a length of $1\frac{1}{2}$ miles of 1 in 45, and another of nearly 2 miles of 1 in 50, and also $7\frac{1}{2}$ miles of line varying between 1 in 60 and 1 in 100. Unfortunately no line could be found with a fairly continuous ascending grade, so there are 3 miles of gradients in the contrary direction varying from 1 in 70 to 1 in 100, and $3\frac{1}{2}$ miles of level line. The waterway required is only 44 lineal feet per mile, and the length of tunnelling on the ghaut only 979 lineal yards.

On the upper section from Yellapur to Hubli, miles $67\frac{1}{2}$ to mile 109, out of the $41\frac{1}{2}$ miles, $9\frac{3}{4}$ miles are on the curve, and nearly 16 miles with the ruling gradient of 1 in 100. Of the 18 curves under 1,200 feet radius, there are 16 of 792 feet radius, but none sharper.

The estimates worked out as below :—

	Distance.	Total cost.	Cost per mile.
Karwar to Mile 43,	43	25,11,458	58,406
Mile 43 to Yellapur,	$24\frac{1}{2}$	32,05,555	1,30,839
Yellapur to Hubli,	$41\frac{1}{2}$	22,19,295	53,477
Karwar to Hubli,	109	79,36,308	72,810

As in order to assert its superior merits, this line has often been compared with that from Marmagao to Hubli now under construction, the following table, giving approximately the leading characteristics of the two lines, is added for purposes of comparison :—

	Marmagao-Hubli Railway.	Karwar-Hubli Railway.
Length,	124 miles.	109 miles.
Ruling gradients,	1 in 40	1 in 40
Length of gradients—1 in 40,	$9\frac{1}{4}$ "	8 "
" " 1 in 45 and 1 in 50,	$3\frac{1}{4}$ "	$3\frac{1}{4}$ "
" " 1 in 100,	14 "	$11\frac{1}{4}$ "
Summit level of ghaut,	1,694 feet.	1,633 feet.
Sharpest radius of curve,	800 "	528 "
Length of curves,	$56\frac{1}{4}$ miles.	34 miles.
Percentage of curve to total length,	45.3	31.2
Lineal feet of large waterway,	3,337	2,242
Length of tunnelling,	2,216 yards.	1,192 yards.
Total cost of railway, metre gauge,	1,49,60,727 Rs.	79,36,308 Rs.
Average cost per mile,	1,20,651 "	72,810 "
Average cost per mile on ghaut section,	2,65,680 "	1,30,839 "

The Karwar line is 15 miles shorter, and its cost per mile considerably less, but were it laid out with the same limiting curves, it would require an entirely new location in several places, and probably could not be kept so completely on

the watershed, and thus add considerably to its expense. It does not pass through Dharwar, an important centre, and is also further away from Belgaum. The country through which the Karwar line passes is more open, and is probably more healthy, and it has the advantage of a good road along its whole length; on the Marmagao line there is no road, but water carriage is available to within 8 miles of the foot of the ghaut. There are no bridges of any magnitude on the Karwar line, whilst on the Marmagao line there are several, including two large ravine viaducts, 115 feet and 77 feet high, respectively. In ruling gradients the two railways are on an equality, but the Marmagao route has an advantage both in having its incline more concentrated, and in having all the ruling gradients in one direction.

As regards the harbours for shipping, the Karwar port may have an advantage but both require a heavy expenditure on a break-water and other harbour works to protect the shipping from the south-west monsoon.

The Karwar line lies wholly in British territory: whilst 49 miles of the Marmagao line are in Portuguese territory.

BARSI ROAD STATION, (GREAT INDIAN PENINSULA RAILWAY,) TO PANDHARPUR AND MIRAJ.

A survey of this line as far as Pandharpur was made in 1880 by the Bombay Government, and a favorable location obtained.

References.

P. W. D. Pros. August 1881, Nos. 89-90
 " " April 1882, " 107-10.
 " " August 1882, " 118-21.

It will be 33 miles long, and is proposed to terminate for the present at the Bhima river, the town of Pandharpur being on the opposite bank. The approximate estimate on the 5 feet 6 inch gauge was Rs. 15,52,877, or Rs. 47,057 a mile exclusive of rolling stock; but if only a light line is contemplated, it is considered that by using second-hand rails and omitting most of the permanent buildings the estimate might be much reduced.

To bridge the Bhima and take the line into Pandharpur would add about Rs. 5 lakhs to the estimate. The river is impassable in the rains except by ferry.

Pandharpur is a place of pilgrimage of large resort; and although a line to it would serve as a valuable feeder to the Great Indian Peninsula Railway, the Board of Directors of that line did not consider that the prospects of such a branch sufficient to construct it. Another line to Pandharpur from the Mohol station, Great Indian Peninsula Railway, was surveyed and estimated for, but was rejected by the Bombay Government in favor of the branch from Barsi road. This branch would have been only about 26 miles in length, but Mohol is 29 miles farther from Bombay than Barsi road.

Now that it has been decided to construct a system of metre gauge lines throughout the Southern Mahratta country, the line from Barsi road station through Pandharpur to Miraj on the projected line between Poona and Belgaum, will naturally form part of that system, rather than a mere branch to the Great Indian Peninsula Railway. The distance between Pandharpur and Miraj is about 74 miles, and no difficulties of construction are believed to exist. Miraj is a trade centre, and is likely to become a manufacturing town of some importance.

BARSI ROAD STATION, (GREAT INDIAN PENINSULA RAILWAY,) TO BARSII TOWN.

This is a proposed branch to an important town lying to the north of the Great Indian Peninsula Railway, and distant $20\frac{1}{2}$ miles.

Reference.

P. W. D. Pros. August 1882, Nos. 118-21.

The survey for a light line of railway to be laid on the existing road was made by the Government of Bombay; and that Government was desirous that the line should be made and worked by the Great Indian Peninsula Railway Company as an integral part of their system and under their guarantee. That Government was willing to make over the portion of the existing road required for a railway for Rs. 4,00,000, provided the Company would make the line without avoidable delay,

and would fence off a footpath passable by pack animals. The road is about 23 feet wide, and would admit of 16½ feet being utilized as a light railway and 6 feet as a foot-path. This offer was accepted by the Company, but as the Secretary of State declined to sanction any extension of the Company's guaranteed system, the project has for the present fallen through.

It appears that this road has cost Government about Rs. 7,00,000 to construct, of which the expenditure on the Sina bridge was about Rs. 2,50,000. All the small bridges and culverts were reported as too weak for a railway, and would require reconstructing or strengthening at a cost of about Rs. 50,000.

ITARSI-BHOPAL-JHANSI-CAWNPORE.

This project is described in the notes for RAJPUTANA AND CENTRAL INDIA.

SURAT, BARDOLI, SONGAD AND NANDURBAR.

A branch from the Surat station, Bombay, Baroda and Central India Railway, has been proposed as a Provincial State Railway, on the 5 feet 6 inch gauge to Nandurbar in Khandesh, a distance of about 91 miles.

Reference.

P. W. D. Pros. August 1882, Nos. 118-21.

For about 36 miles of its length it will pass through the territory of the Baroda State, and will open up an important tract of country lying immediately to the south of the river Taptee. The line has been surveyed by the Bombay, Baroda and Central India Railway Company, at the joint expense of the Bombay Government and the Baroda Durbar.

The estimates for the section between Surat and Bardoli, a distance of 18 miles, work out approximately as follows:—

	Per mile.
	Rs.
Exclusive of stock, .. { 2 feet 6 inch gauge,	30,000
.. { Metre gauge,	36,000
.. { Light 5 feet 6 inch gauge (48 lb. steel rails),	45,000

and as the estimate for the 5 feet 6 inch gauge appears so little in excess of that for the metre gauge, the broader gauge has great advantages, as the Bombay, Baroda and Central India Railway Company's rolling stock can work its traffic.

It is believed that the section between Bardoli and Songad, 28 miles, can be constructed at about the same cost. The estimates for that section, and also for the extension onwards to Nandurbar, 45 miles, are under preparation.

BROACH TO JAMBUSAR.

This is proposed to be undertaken as a Provincial State line, gauge 2 feet 6 inches, and length 31 miles. The survey and estimates have been prepared by the Bombay, Baroda and Central India Railway Company, the present road being utilized as far as possible.

References.

P. W. D. Pros. August 1881, Nos. 89-90.
 " " August 1882, " 118-21.

sible.

The probable cost of the line per mile on the 2 feet 6 inch gauge would be Rs. 28,000 plus Rs. 3,000 for rolling stock, against Rs. 45,000 per mile on the 5 feet 6 inch gauge, and *exclusive* of rolling stock.

This is quite a local line and not capable of much extension; the amount of traffic to be expected is accurately known, and as no great development is anticipated, it is considered that a 2 feet 6 inch gauge line will answer all that is required.

The Bombay, Baroda and Central India Railway Company has raised the question whether such a line, although nominally a feeder to its line, would not be more of a competitor than a feeder, as the branch is required not only to connect with the main line at Broach station, but it is also to be taken through Broach city to accommodate the mills and also the wharves. The Local Funds Committee also object to the road being utilized for a railway.

ANNAND *via* PITLAND TO PIPLOE.

This line is in contemplation by the Baroda Durbar, as a feeder on the 2 feet 6 inch gauge to the Bombay, Baroda and Central India Railway. The success of these feeder lines on a narrow gauge has been most marked. They are really the substitute for roads in Guzerat, where owing to the absence of stone the construction and maintenance of metalled roads is very costly.

Reference.
P. W. D. Pros. August 1881, Nos. 89-90.

An approximate estimate, based on an old reconnaissance made by the Bombay, Baroda and Central India Railway officers, amounted to Rs. 4,50,000 for a line 23 miles long on the 2 feet 6 inch gauge.

The line would traverse Baroda territory almost through its entire length, so if made it will probably be made at the expense of that State.

GODHRA-RUTLAM-CAWNPORE.

This project is described in the notes for RAJPUTANA AND CENTRAL INDIA.

PAHLANPUR-DEESA.

A branch line on the metre gauge, 16 miles in length, and to cost Rs. 6 lakhs was proposed from the Pahlampur station, Rajputana Railway, to Deesa, a military station lying somewhat to the west of the line of Railway, and containing about 17,000 inhabitants.

References.
P. W. D. Pros. November 1879, Nos 126-8.
" " July 1880, No. 23.
" " November 1880, " 1.

Deesa is on the line of route of any railway which may be made to join Bombay with Sind, and is also at the southern end of the road through Western Rajputana running from Guzerat northwards to Ajmere, Delhi and Agra. There is practically no road between Deesa and the railway at Pahlampur; and as the soil is very sandy, it seemed that if a line of communication was to be opened out between those two places, the more economical arrangement would be to make a short branch on the metre gauge from the Rajputana Railway. The Army Commission recommended the withdrawal of European troops from Deesa, and it was considered that the trade along the high road would take to the Rajputana Railway when opened throughout; so this branch has never been constructed, as it was not thought it could be a financial success.

LINES FROM MEHSANA STATION, (RAJPUTANA RAILWAY,) TO PATTAN AND KHERALU.

There are two branches in Guzerat contemplated by the Baroda Durbar.

The Durbar desired to have them made on the 2 feet 6 inch gauge, and by the agency of the Bombay, Baroda and Central India Railway Company; but it was considered that the lines if made should be on the metre gauge, so as to be worked by the Rajputana Railway stock, and as the country was quite outside that influenced by the Bombay, Baroda and Central India Railway, the surveys and construction should be done by the staff of the Rajputana Railway.

The distances are—

Mehsana to Pattan, 16 miles, and west of the Rajputana Railway.

Mehsana to Kheralu, 15 miles, and east of the Rajputana Railway.

WADHWAN-MEHSANA.

Formerly there used to be a somewhat brisk trade between Kattiawar and Northern India *via* Pattan, and in order to again foster it the Kattiawar Chiefs have had under consideration a project for a metre gauge line from Wadhwan through Drangadra and Viramgaum to Mehsana on the Rajputana Railway. The

line would be an easy one to construct, and about 90 miles in length, of which 57 would traverse Kattiawar States and 33 lie in Baroda territory.

Mehsana and Wadhwan are already connected by railway, but goods going from the Rajputana to the Kattiawar line are subject to two breaks of gauge, one at Sabarmati and one at Wadhwan, owing to 76 miles of the Bombay, Baroda and Central India Railway (5 feet 6 inch gauge) intervening. No survey has yet been made of the route.

A LINE OF RAILWAY TO CONNECT THE SIND AND BOMBAY RAILWAYS.

With a view to see if a line of railway across the Runn of Cutch and the Sind desert to connect the Bombay Railways

<i>References.</i>				
P. W. D. Pros.	January 1878,	Nos. 33-8.		with the line of railway up the Indus Valley,
" "	August 1878,	" 134-51.		a strong party of Engineers were ordered to
" "	November 1878,	" 126-8.		make a reconnaissance of the country during
" "	December 1878,	" 156-64.		the working season of 1878-79. It was well known that such a line could not be

a success commercially, as the country throughout is poor, and a great deal of it absolute desert; but strategically the line has considerable importance, as it would enable troops from Bombay to be thrown into Sind or along the lower part of the Western frontier with a minimum of difficulty.

Four lines of country were examined—

- (a). From Hyderabad (Sind) *viâ* Omerkot, Chachra and Chitalwana to Deesa and Pahlanpur;
- (b). From Hyderabad *viâ* Ali Bunder, the edge of the Runn, Nagar-Parkar, Sooigaon to Dæsa and Pahlanpur;
- (c). From Hyderabad *viâ* Lakput, Bhooj and Mallia to Lakhtar or Wadhwan;
- (d). A combination of (b) and (c) *viâ* the Patcham and the Bunnee;

and several minor deviations were also examined.

The more northern line—line (a) *viâ* Omerkot is the route taken by the line of telegraph connecting Bombay with Sind, but it was found to be impracticable for a line of railway. The country to the west of Omerkot is under the influence of the floods from the Eastern Narra river. These floods in 1875 and again in 1876 were upwards of 30 miles wide. To the east of Omerkot, as far as Chachra, the country is a series of parallel ridges of sand-hills, the average height of which above the intervening valleys is about 150 feet. The sand is loose and the ridges not more than a quarter of a mile apart; it would therefore be impossible to avoid heavy cuttings which would probably be soon filled up again by the action of the strong winds, which blow very continuously during the long hot season. Between Chachra and the Loonee river the country is more open and practicable, but still difficult. The apparent channel of the Loonee river is only 300 feet wide and 5 feet deep, but upwards of 4 miles of country is under water even in years of ordinary flood, and indications show that in extraordinary floods the country is under water for 5 to 6 miles on either side of the channel. All along this line there is an entire absence of building material.

The line (d) also did not turn out so favorable as was expected. The Bunnee, which was considered a comparatively elevated tract of land, is in reality little, if at all, higher than the Runn in its eastern portion, and is often flooded several feet deep by floods from the Cutch rivers. The Runn also on each side of the Patcham is less elevated than in other parts, and the water flows with greater velocity. Both the routes (b) and (c) were considered practicable routes; they skirt the Runn of Cutch, the line (b) along its northern edge, and the line (c) to its south through Cutch itself.

A site for a bridge over the Indus at Kotri had long since been selected by the Engineers of the Sind, Punjab and Delhi Railway Company; and the same crossing was kept to in this reconnaissance survey. At Hyderabad there is a ridge of limestone hills which have to be skirted, and which will have to provide building material for the most part of the line if it is ever made. After skirting these hills

the northern route turns south and keeps between them and the Faleli river or canal, down to Mahomed Khan's Tanda. From thence it proceeds *viâ* Banda, Gulam Hyder and Badina to Ali Bunder, where the Eastern Narra river is met with. Throughout this part of the line—from starting point at Hyderabad to mile 87—the general character of the country is extremely level, and does not suffer from floods, except those caused by overflows from the inundation canals or local heavy rain.

The Eastern Narra river, crossed at mile 87, rises in the overflows from the Indus immediately above Sukkur, and may have at one time formed the main channel of the Indus itself. It overflows its own banks to a very great extent, and by thus exhausting its strength the floods down its channel are never very great. A bridge of 12 spans of 60 feet opening is considered to give sufficient waterway.

From the Eastern Narra to Ernialo—mile 87 to mile 187—the line follows for the most part the edge of the Runn, and along the base of the sand hills. Along this entire length water, varying from a few inches in depth to 18 inches, lies during the rainy season, but is said not to have any appreciable velocity. From Ernialo to Nagar-Parkar—mile 187 to mile 192—a branch of the Runn is crossed. Here there is sometimes a depth of 5 to 6 feet of water running with considerable velocity, caused by the flooding back of the Loonee river, and also by the heavy rainfall which occasionally takes place around Nagar-Parkar itself. A bridge of 15 feet spans of 60 feet is proposed here.

Through Nagar-Parkar to the Loonee river—mile 192 to mile 217—there is no difficulty; the ground is high and the waterways moderate. The hills are of a poor description of granite; this is the first stone met with after leaving the limestone hills near Hyderabad.

The Loonee river—mile 217 to mile 238—is the greatest obstacle met with in this route. When in high flood it spreads over a large tract of country, and is from 17 to 20 miles wide. Of these miles of water 13 miles may be assumed at about a foot deep and with no perceptible velocity; 3 miles about the same depth and with velocity of 1 foot per second; and $1\frac{1}{2}$ miles about $3\frac{1}{2}$ feet deep with a velocity of 3 feet per second. A bridge of 66 spans of 60 feet openings was proposed for this river.

From the Loonee river to the Bannas river—miles 238 to mile 297—no large works are required; the country rises gradually and no considerable streams are crossed. The Bannas river is subject to very heavy floods, and owing to its bed having a considerable fall the velocity of the flood waters is very great. A bridge of 15 spans of 100 feet is estimated for.

From the Bannas river into Pahlapur—mile 297 to mile 316—no large works are required, and the line would run through the military station Deesa, 16 miles from Pahlapur.

The estimates for this line, 316 miles long, work out to Rs. 2,66,50,000, to which must be added Rs. 50,00,000 for bridging the Indus at Kotri, making a total of Rs. 3,16,50,000, or at a rate of Rs. 1,00,250 per mile. The principal obstacles to the construction of this line of railway, and which raise the cost considerably are—

- (a). The total absence of lime along the entire distance except at Hyderabad, Deesa and Pahlapur;
- (b). The absence of all building material and the difficulty of obtaining good brick earth;
- (c). The absence of material for ballast except at Hyderabad, Nagar-Parkar and the Bannas river;
- (d). The difficulty of obtaining fresh water. Between Shera Lond (83 miles from Hyderabad) and Nagar-Parkar (192), small quantities of fresh water can only be obtained with the greatest difficulty.

Very little local traffic can be expected from such a line, as the country for the most part is a perfect desert.

This route follows much the same line from Hyderabad as far as Mahomed Khan's Tanda, from whence it takes a more southerly direction, till it strikes the Great Runn at Veyrwarra, at the 100th mile from Hyderabad. This part of the line will be subject to considerable floods from the bursting and overflowing of the inundation canals, and from overflows from the Indus a little below Hyderabad.

Between Veyrwarra and Lakpat—mile 100 to mile 129—is the crossing of the Great Runn; and during the monsoon the whole distance is frequently flooded to a depth of from a few inches to 2 feet, except at the Khoree Creek channel, the principal outlet and inlet, where the depth is much greater. A bridge spanning this outlet would be subject to tidal action from the one side, and to flood waters from the other, but it would appear that the velocity of the water can never be very great, and it is not considered that any very serious difficulty would be encountered in the construction of the bridge. One of 45 spans of 60 feet openings is proposed, a precisely similar design to that proposed for crossing the Loonee river on the northern route.

From Lakpat to the crossing of the Little Runn at Mallia—mile 129 to mile 273—the line will traverse Cutch. There are apparently three passable lines through Cutch, which would have to be more carefully investigated, if this route were adopted. But whichever route is chosen the works will be somewhat heavy, as the country is hilly and subject to heavy falls of rain. The rivers to be crossed are in reality mountain torrents, and the waterway required is consequently much larger than would otherwise be necessary. The probable line through Bhooj, the capital of Cutch, would cross the drainage of half of the country; while the southern line, which would pass through a slightly more populous country, would be much longer, and would have to cross streams of a more formidable nature.

The Little Runn is crossed near Mallia—mile 273 to mile 279. The usual height of the flood waters in this channel is from 3 to 3½ feet, but occasionally they rise for a very short time to between 5 and 6 feet. The velocity of the water is, however, never great. A bridge of 46 spans of 60 feet is considered sufficient.

From Mallia to Lakhtar, on the Wadhwan branch of the Bombay, Baroda and Central India Railway—mile 279 to mile 351—the only considerable work will be the bridge over the Bhambhan river. This river drains a large area of country subject to very heavy floods, so a bridge of 14 spans of 100 feet is proposed.

On this route, except between Mahomed Khan's Tanda to Lakpat, lime, building stone and ballast are tolerably plentiful. The approximate cost of a line following this route would be Rs. 3,47,34,000, to which must be added Rs. 50,00,000 for the Indus bridge at Kotri; making in all Rs. 3,97,34,000, or at a rate of Rs. 1,13,100 per mile. The supply of fresh water along this route will also be a difficulty, but not to so great an extent as on the northern route. Over the portion of line in Sind and Cutch, *i.e.*, between Hyderabad and the crossing of the Little Runn at Mallia, there would be practically no local traffic, as the country is either for the most part barren or else unfit for cultivation. But the 72 miles of line between Mallia and the Baroda Railway at Lakhtar passes through a rich country, well cultivated and populous.

A comparison between the two routes gives the following:—

Northern route,	315 miles long, and cost Rs. 316½ lakhs,
Southern „	351 „ „ Rs. 397½ „

showing a difference of 36 miles and Rs. 81 lakhs in favor of the northern route. The through distances from Bombay would be—

Bombay <i>via</i> Pahlapur to Hyderabad,	707 miles,
Bombay <i>via</i> Bhooj to Hyderabad,	727 „

giving a difference of 20 miles in favor of the northern route.

There is, however, no traffic on either route to demand the construction of a line of railway, nor is there much likelihood of any springing up; so if the line is ever constructed it will be made for political and military reasons only.

BENGAL INCLUDING ASSAM.

The lengths of railway open, under construction, and in course of preparation within these provinces were on the 1st January, 1882 :—

<i>Open to traffic.</i>				Miles.
East Indian Railway,	broad gauge,	{ double line,	..	410
		{ single line,	..	294
Eastern Bengal Railway,	" "	including (Poradaha branch),	172	
Calcutta and South-Eastern Railway,	" "	" "	..	28
Patna-Gya Railway,	" "	" "	..	57
Northern Bengal Railway,	metre gauge,	" "	..	245
Tirhoot Railway,	" "	" "	..	85
Naihati Railway,	4 feet gauge,	" "	..	27
Kaunia-Dhurla Tramway,	2 feet 6 inch gauge,	" "	..	21
Darjeeling-Himalayan Railway,	2 feet gauge,	" "	..	49
Total,				.. 1,388

<i>Under construction.</i>				Miles
Bengal Central Railway,	broad gauge,	" "	..	129
Calcutta and South-Eastern Railway extension to Diamond harbour,	" "	" "	..	28½
Tirhoot Railway extensions,	metre gauge,	" "	..	102
Northern Bengal Railway extension to Dinagepore,	" "	" "	..	20
Assam Light Railway, Dibrugarh to Sadiya,	" "	" "	..	75
Jorhaut Tramway,	" "	" "	..	6
Baidyanath-Deoghur Tramway,	" "	" "	..	6
Kaunia-Dhurla Tramway extension to Mogal Hât, 2 feet 6 inch gauge,	" "	" "	..	13½
Total,				.. 380

<i>Projects under preparation.</i>				Miles.
East Indian Railway, Hooghly bridge, broad gauge,	" "	" "	..	4
Dacca-Mymensingh Railway.				
From Bengal to the Central Provinces.				
Burdwan-Kutwah.				
Palamow to Barun.				
From Bengal into Assam.				
Daudkandi-Comillah-Chittagong.				
Kissenganj-Kotchandpur.				

The following is a short narrative of the several projects which have been proposed from time to time :—

BRIDGE ACROSS THE HOOGLHY.

The design of bringing the East Indian Railway across the Hooghly into

<i>References.</i>			
P. W. D. Pros.	July	1880,	Nos. 1-3
" "	December	1880,	" 47-52.
" "	July	1881,	" 57-61.
" "	February	1882,	" 33-52.
" "	April	1882,	" 35-9
" "	September	1882,	" 1-5.

Calcutta has been often seriously considered, very many schemes have been proposed and many Committees have assembled to consider them. At last a site for a bridge in the vicinity of the village of Hooghly, about 23 miles north of Calcutta, has been selected as the

most favorable position; and the connecting branch railway will run from the Hooghly station, East Indian Railway, to the Naihati station, Eastern Bengal Railway, a distance of 3½ miles. The exact height required for steamer navigation up the river has not yet been definitely settled; probably a maximum of 35 feet will be allowed, and this can be gained by a rising gradient of 1 in 444 on the right bank, and 1 in 300 on the left bank.

The first estimate for a bridge at this site, made by Mr. Bradford Leslie, the Agent and Chief Engineer, East Indian Railway, in August 1879, amounted to only Rs. 14,46,000. The design was original; and its great element of cheapness lay in the manner in which old rails were to be utilized in the construction of the girders. This design, however, was not accepted in England; and the present design, (for

which *see* Drawing at end of Chapter,) which is also a strikingly novel one, is the joint production of Mr. Leslie and Mr. A. M. Rendel, the Consulting Engineer to the East Indian Railway Company in England.

The following is a description of the bridge :—

The alignment formerly chosen for this crossing has been slightly altered at the request of the Government of Bengal, in order to avoid the Imambara premises on the right bank of the river; that now selected is clear of the Imambara garden, but skirts an old tomb beyond, and crosses a Mahomedan grave-yard situated on the left bank of the river. It has been arranged that no excavation will be made that will disturb the tomb and grave-yard.

The site selected for this bridge is a very narrow reach of the river, where the main stream flows under the right bank. The depth of the water in the main stream is considerable, the several cross sections taken in this locality showing a depth of from 65 to 70 feet below low-water or mean sea-level which here coincide. The depth of water at the sites of the two central piers is 24 and 36 feet below low-water mark. As the river is twice as wide above and below the village of Hooghly, the velocity and scour of high floods through this narrow strait will naturally be considerable. There is little information yet available on these points, and what the effect of scour may be on the central piers can at present only be conjectured.

The rise of flood at Hooghly from lowest to highest water marks is said to be 18·54 feet. This perhaps has been underrated, as the rise of river above at Culna is 20·91 feet, at Noaserai 20 feet, while that below Hooghly is 21 feet at Pulta, 22 feet at Cossipore, and 22·22 feet at Howrah. Careful inquiry is being made on this point, with reference to the headway required for steamers under the bridge. It is desirable to give a clear headway of 35 feet above extreme flood level; and if the latter should be more than 18·54 feet above mean sea-level, the abutments and piers of the bridge and of the side viaducts will have to be raised accordingly.

The bridge proper is to consist of a central double cantilever girder 320 feet long, resting on two piers placed 120 feet apart, centre to centre, in the middle of the channel; of two main girders each 440 feet in length, one on either side of the central cantilever girder, one end resting upon the latter, and the other end upon the shore abutment, and of two masonry viaducts each 450 feet in length extending inland from each shore abutment. The total length of the bridge is thus 2,100 feet, of which the middle portion between the two shore abutments 1,200 feet (less 50 feet of central piers, or 1,150 feet) spans the waterway of the main channel. The cross section shows the river to be 1,030 feet wide at low water, and 1,300 feet wide at highest water mark, with a further width of 450 feet over the adjoining low bank, when the latter is flooded. The two masonry viaducts are to consist of brick arches 11 feet clear span, that on the right bank will be built on ground above highest flood level, that on the left bank on lower ground about 5 feet under highest flood level, and will add $27 \times 11 = 297$ feet waterway inland in cases of maximum flood, when the low land on the left bank is submerged. By means of the cantilever girder, an additional 100 feet of opening is added to the clear spans of waterway, so that although the main girders are only 440 feet in length, there is a clear span of 540 feet of waterway provided on either side the two central piers.

A roadway 26 feet wide for a double line of rails is provided through the main girders of the bridge; the extreme breadth from outside to outside of the main girders being 35 feet 4 inches. A width of 38 feet is given on the side viaducts to admit of the girders being built upon them previous to launching. As the weight of each 440 feet girder is 1,400 tons, the masonry viaducts will be built of small spans with massive piers in order to carry this load. On the right bank of the river there is one span of 35 feet over the Strand road, across which ordinary girders will be placed to carry the railway, but across which very substantial extra arrangements will have to be made during the erection and launching of the main girder.

The wrought-iron caissons for the foundations of the central piers are 66 feet long by 25 feet wide, with semi-circular ends. They are lined with brick, but their main strength depends upon the wrought-iron casing. The floating and sinking of these caissons into place will be most difficult, and will tax the energy and ability of the Engineers. The iron pontoons used for floating and sinking the caissons will be again used with a staging for supporting one end of the main girders, when these are rolled forward for launching.

The two main girders and the central double cantilever girder are of steel; provision is said to have been made for withstanding the wind pressure. No foot-way is given outside the girders to allow of foot travellers crossing the river.

The estimate provides for sinking the foundations of the central piers to a depth of 60 feet below the existing bed of the river, or to 90 feet below mean sea-level. A deposit of 100,000 cubic feet stone blocks round these piers is proposed as a protection from scour. The depth to which these foundations will be sunk must depend partly upon the nature of the subsoil, of which nothing is as yet known, and partly upon the friction of the subsoil in which the caissons are imbedded, being sufficient to support the full load above. One boring has been commenced on the left bank, but has made little progress. If stiff clay should be met with underlying the river bed, and the scour be thus limited, the proposals may perhaps suffice; but if as is presumed, ordinary silt and sand will be met with, there will practically be no limit to the scour in a high flood of great velocity, and a greater depth may be found necessary. This, however, can only be ascertained experimentally; so when the pier caissons are sunk to the depth proposed, they will be loaded with rails up to 1,800 tons in weight, and the sinking will be continued until settlement ceases. This will occur when the pressure of the subsoil in which the piers are imbedded is sufficient to support the full load. The latter is now calculated at 8 tons per foot superficial of base.

The bridge is of a construction novel to India, appears to be well adapted to the conditions of the crossing, and will present an imposing appearance. The estimate for the bridge alone, independently of the approaches, amounts to Rs. 35,37,305, of which the ironwork, machinery, &c., will cost Rs. 12½ lakhs.

SYSTEM OF RAILWAY LINES THROUGH CENTRAL BENGAL.

In 1878 and 1879 the Bengal Government had several surveys made, in order to test the practicability of opening out by a system of light railways the districts north and east of Calcutta.

<i>References</i>			
P. W. D. Pros.	May	1878, Nos	58-62
"	"	May	1878 " 63-5.
"	"	July	1880, " 4-8
"	"	September	1880, " 14-21.
"	"	June	1881, " 1-27
"	"	November	1881, " 44-62.

The system of lines selected were all estimated for on the broad gauge, and may be divided into the following sections:—

1st.	Memari-Ranaghat,	length	34	miles,	estimated cost	Rs. 42	lakhs.
2nd.	Santipur-Bhagwangola,	"	81	"	"	72½	"
3rd.	Ranaghat-Khulna,	"	82	"	"	70½	"
4th.	Bongong-Dum'Dum,	"	44	"	"	34½	"
Total length, ...			241	miles, and to cost	Rs. 219½	"	

In 1881 a company—called the Bengal Central Railway Company—was formed in London, to construct and work the 3rd and 4th sections as detailed above, and need not be further alluded to here. The Secretary of State has also given to the Company a preferential option to construct either or both of the other two sections and any lines in Eastern Bengal. Such option, however, must be exercised within a period of 6 months from the time that Government declares itself ready to commence their construction.

The Government of Bengal submitted the Memari-Ranaghat project to the Government of India for sanction in January 1880; but the Government of India deferred submitting the project to the Secretary of State, as it involved a bridge over the

Hooghly at a site only about 30 miles higher up than that proposed for the bridge to bring the East Indian Railway into Calcutta. Owing to the probability of one bridge jeopardizing the early commencement of the other, it was considered that Government enterprise should be first devoted to the bridge at the lower site, or until private enterprise should come forward for the construction of the more northern link between the East Indian and Eastern Bengal Railways. The details of the Memari-Ranaghat line are as follows :—The line diverges from the Eastern Bengal Railway at Ranaghat by an easy curve of 3,000 feet radius, and by a rising gradient of 1 in 300 reaches within $1\frac{1}{4}$ miles the Churni (Matabhanga) river. A bridge of one span of 150 feet and 4 spans of 40 feet, or 310 lineal feet in all, is provided. At the 11th mile from Ranaghat the town of Santipur is reached. This is intended to be the junction with the section running due north to Bhagwangola. At the 17th mile the Bhagirathi river is crossed, and at the 19th mile the important town, Culna, is reached. [This must not be confounded with Khulna on the Bengal Central Railway]. The proposed bridge over the Hooghly is designed for one span of 150 feet and 11 of 137 feet, or in all of 1,711 lineal feet of waterway. From Culna to Memari no works of importance are needed. The line throughout has to be kept at a fairly high level owing to the delta nature of the country, but the only works of importance are the bridges over the Hooghly and the Matabhanga rivers.

Nearly due north of Calcutta the Ganges throws off three delta rivers—the Bhagirathi, the Jallinghi, and the Matabhanga—which all run into and from the Hooghly north of the site now selected for the East Indian Railway bridge. These rivers are all steamer routes from Calcutta to the Ganges proper, and consequently head-way for steamers has to be provided under any bridge thrown across them. The bridges over the Hooghly and Matabhanga rivers have, therefore, either to be raised sufficiently high for steamer traffic, or special arrangements have to be made. In the project a girder of 150 feet span has been arranged to be lifted so as to give a head-way of 38 feet when required. They are on the same principle as that where the Calcutta Port Commissioners Railway crosses the Eastern Canal at Chitpore. The bridge over the Hooghly near Culna is estimated to cost Rs. 8,61,707; and the one over the Matabhanga at Rs. 2,31,088.

This line would run north from Santipur through Kishnagar, Berhampore, and Moorshedabad to Bhagwangola on the Ganges. The only rivers of any size which have to be crossed are the Jallinghi near Kishnagar, and the Bhyrub near Bhagwangola. The proposed bridge over the Jallinghi consists of five spans of 138 feet each, but without a lifting span for steamers; that for the Bhyrub would be three spans of 60 feet, two of 40 feet, and one lifting opening of 45 feet.

This section was considered, according to statistics, the least remunerative of the whole proposed system, but there are many elements in its favour. It would tap the large trade of Berhampore and Moorshedabad, taking the traffic straight to Calcutta, and thus allow the present Nalhati-Azimganj Railway to be closed. This railway is in the wrong direction for the bulk of the traffic that it was sought to catch, as it takes passengers and goods 50 miles out of their way in getting to and from Calcutta. Moreover, the Nuddia rivers (Bhagirathi, Jallinghi, and Matabhanga) are partially closed to boat traffic for a great portion of the year, and boats have then to make their way to Calcutta by the Soonderbun route, a tedious and risky journey, or else discharge cargo into Eastern Bengal Railway wagons at Damukdia or Kooshtea, some 75 miles eastwards of Bhagwangola. The distance by rail from Bhagwangola to Calcutta would be 137 miles, and goods could get there in less than 24 hours, a considerable saving in time when it is remembered that only about one-third of the river-borne traffic in ordinary years can make use of the Nuddia rivers between the 1st December and the 1st June.

DINAGEPORE TOWARDS PURNEAH AND SAHIBGANJ.

During the cold season of 1881-82 a reconnaissance survey of two lines of railway were made from Dinagepore to the Ganges.

The southern route follows generally the direction of the Dinagepore-Maldah

road for a distance of 32 miles, from whence it takes a westerly direction, crossing the Mahanuddy River at Goalpara, and terminates at Monihari, a total distance of $75\frac{1}{2}$ miles. The estimated cost of this line is Rs. 68,000 per mile exclusive of rolling stock.

No large towns are served *en route* by the proposed Railway. Some traffic might be expected from Maldah, and a portion of the boat traffic would probably be caught at the crossing of the Mahanuddy and Kunkur rivers; but the whole country traversed from the 32nd mile to Monihari is a dense jungle and swamp, from which no traffic could be expected, and this route can only be looked upon as a means for conveyance of coolies and through passengers and goods to Assam from the Sonthal and Chota-Nagpur districts, and from the north-west. The northern route runs from Dinagepore westward to Saifganj, and from thence southward to Monihari, a considerable village on a limestone hill immediately opposite Sahibganj on the East Indian Railway. From Saifganj it is proposed to run a branch line to Purneah.

The length of the main line from Dinagepore to Monihari *via* Saifganj is $81\frac{1}{2}$ miles, and is estimated to cost Rs. 70,350 per mile, exclusive of rolling stock.

The branch from Saifganj to Purneah is 19 miles in length, and is estimated to cost Rs. 50,900 per mile, also exclusive of rolling stock.

This northern line runs through a country intersected by numerous streams necessitating considerable waterways, hence its high estimate per mile, but it traverses a rich district, thickly populated and highly cultivated for the greater part of its length, and will intercept the boat traffic of four large rivers. The principal towns *en route* are Raiganj, Barsae, Saifganj and Purneah, all of which are centres of considerable trade, especially Raiganj and Purneah.

This northern track will be somewhat longer for the coolie traffic, being $81\frac{1}{2}$ miles against $75\frac{1}{2}$ by the southern route, but this small extra distance will be more than compensated for by the richness of the country served:—

The estimates work out as follows:—

Southern route,	..	..	$75\frac{1}{2}$ miles at Rs. 68,000 =	Rs. 51,34,000
Northern route,	..	..	$81\frac{1}{2}$ " " 70,350 =	" 57,33,500
Branch to Purneah,	..	..	19 " " 50,900 =	" 9,67,100

In connection with this line, it is proposed to carry the extension northwards to the banks of the Kosi, opposite Baluah, near the Nepal frontier, and thus complete the connection with the Tirhoot and Northern Bengal Railway systems. The Kosi river is a most formidable obstacle to cross, and as it spreads over a large extent of country on emerging from the Himalayas, it will have to be crossed at the only practicable place as yet found, close to the Nepal frontier. This connection, when made, will serve a vast tract of country at present ill-supplied with means of disposing of its produce, will provide direct communication between Assam and Western Bengal and Behar, and thus open out these provinces for emigration to Assam, a policy advocated strongly by the Labor Emigration Commission.

BURDWAN-KUTWAH.

A line of Railway on a gauge of 2 feet 6 inches has been proposed between Burdwan station, East Indian Railway, and Kutwah, an important town on the Bhagirathi estuary of the Ganges, and situated about 12 miles south of the historical place, Plassey. The distance is about 40 miles; and the proposal is to lay the rails on one side of the existing metalled road, but leaving sufficient for cart and passenger traffic. From Kutwah it is also proposed to have a branch to Dainhaut, another mart on the Bhagirathi about 5 miles lower down.

The road is 20 feet wide, and the bank varies in height from 2 to 10 feet at bridge sites. The country traversed is not subject to inundation or spill from any river. The waterway is sufficient, and there is no record of the banks ever having been breached by floods. There are four bridges and 64 culverts on the road between Burdwan and Kutwah, and one river, the Khurry, remains unbridged. The four bridges will have to be partially if not wholly re-constructed,

and about half the culverts strengthened; the Khurry will require a bridge of 8 spans of 45 feet each.

The estimate which has been prepared by Messrs. Burn and Co. of Calcutta, amounts to Rs. 14 lakhs, or at a rate of Rs. 35,000 per mile. A steel rail of 35 lbs. to the yard is proposed. There are no engineering difficulties of any description to be encountered.

Owing to the silting up of the river for several miles above and below Kutwah, boat traffic is almost entirely suspended during the dry season months; the traffic which would have gone by water will it is presumed naturally take the railway. The local projectors, who seek for no concession except the grant of the land at a nominal rent, and a concession from the Burdwan District Road Cess Committee, hope to get an annual income of Rs. 1,28,690, or about 9 per cent. on a capital of Rs. 14 lakhs.

KISSENGUNGE-KOTCHANDPUR.

A line of railway between the Kissengunge station, Eastern Bengal Railway (65 miles from Calcutta) and Kotchandpur, an important mart in the district of Jessore, has been projected, and the Government of Bengal has been asked for certain concessions. The distance is 19 miles; the projectors propose to lay their rails on one side of the existing cart road which is metalled throughout, and sufficiently wide to admit of the passage of trains without interfering with the existing cart traffic. The gauge proposed is 2 feet, and as the traffic is fairly well known, a tramway on that gauge will probably carry all the traffic without difficulty.

A capital of Rs. 4,00,000 is considered sufficient to construct the line, and leave sufficient for working the traffic.

MOZUFFERPORE TO HAJIPUR, OPPOSITE PATNA.

This branch line, which has been long considered as forming an integral portion of the Tirhoot Railway system, has now been surveyed, and is being permanently located and estimated for.

References.
P. W. D. Pros October 1879, Nos 33-48.
" " September 1881, " 1-9
" " Genl No. 8548.

The total distance from Mozufferpore to Hajipur is 34 miles, but as the *dearah* land on the north bank of the Ganges is high and only covered at high floods, a temporary line will have to be constructed to the nearest available point for the ferry crossing. This distance is taken at an average of 10 miles, thus making the distance from Mozufferpore to the ferry 44 miles. No difficulties of construction are likely to be experienced, and allowing for 20 miles of permanent way for temporary *dearah* lines, it is estimated that the line will cost Rs. 22,00,000. To this must be added another Rs. 4,00,000 for the necessary steam ferry plant; and a short branch of about 4 miles on the broad gauge from the Bankipore station to the river south bank will also be required at a cost of Rs. 3,25,000.

Another part of this project is to carry the line westwards from Hajipur, cross the Gandak river at a short distance from its junction with the Ganges, and join the Patna-Bahraich Railway at its south-easternmost point. There appears to be an excellent site for the bridge with good foundations, and it is expected that a bridge can be constructed for Rs. 12,00,000. Such a bridge would save two expensive and troublesome ferries over the Ganges and Gandak rivers, and it is probable that a more permanent landing place can be found on the north bank of the Ganges to the west of its junction with the Gandak, and thus save a considerable amount of temporary *dearah* line.

BEHAR RAILWAY.

The Commissioner of Patna, in March 1881, submitted to the Bengal Government a memorial and proposal for a railway from Bukhtiarpur on the East In-

dian Railway to Behar. The line was examined, but after careful consideration the memorial was returned to the Commissioner, with the intimation that the prospects of success of the undertaking were not such as would justify the Lieutenant-Governor in sanctioning its construction. Since then the Collector of Patna has proposed that a line should be constructed from Masaurhi, on the Patna-Gya line, to Behar. The Road Cess Committee will make their feeder road in this direction in such a manner that rails can hereafter be laid on it, and they will submit their bridge designs to Government for approval.

CUTTACK RAILWAY.

A memorial was presented by certain zemindars of Balasore and others, praying for a railway from Raniganj to Pooree, *via* Bankoora, Midnapore, and Cuttack; but the projectors very much under-estimated the cost of the line, which presents abnormal difficulties in construction, and it has consequently been abandoned. The Commissioner of the Province was, however, requested to collect statistics of the traffic, and has since submitted proposals for a line from Cuttack to Pooree only. The traffic on this section would be enormous, and although the estimated cost is Rs. 51,00,000 for 48 miles of metre gauge railway, there are hopes that the investigations now in hand will result in showing that it would prove a remunerative undertaking.

The length of the present road between Cuttack and Pooree is 53 miles, and the width of the crest varies from 21 to 24 feet. The road is, however, so full of curves, that it is quite unsuited for a railway of more than 2 feet or 2 feet 6 inch gauge. To make a metre gauge line on a new bank will only be 48 miles in length, but it will be very expensive, the earthwork alone costing about Rs. 8,000 per mile. The waterway to be crossed is also very great, and the bridging alone will probably cost nearly Rs. 20 lakhs. The principal streams to be crossed are—Dowrea nallah (100 feet waterway); Kushbutia (1,500 feet waterway); Bargui (2,270 feet); Bagrat (700 feet); and Bargui No. 2 (950 feet). With a proper ferry across the Mahanuddy at Cuttack, the whole project would probably cost Rs. 54 lakhs.

TARAKESHWAR RAILWAY.

Two projects are proposed for this railway—one from Bidyabatti, on the East Indian Railway, length 22 miles, and the other direct from Howrah, 30 miles.

The Commissioner of Burdwan remarks, with reference to the latter route, that the line would pass through swampy and low grounds. It would certainly be very expensive, and would only serve pilgrims to Tarakeshwar from the south, whereas the Bidyabatti line would be cheaper to construct, and can be used by pilgrims from the north and east, as well as the south. It is proposed to construct the line on the broad gauge, and to ask the East Indian Railway to work it, under the terms now being considered by Government for working such branch lines. Judging from statistics received, the prospects of traffic are highly satisfactory, and the undertaking should prove very remunerative. A survey and estimate of the line will probably be made next working season.

SONTHAL RAILWAY.

Messrs. Burn and Company have asked for the concession of land required for a railway from Bhagalpur to Bowsee, on the Nya-Doomka road, the funds for which would be provided by residents of the district. This project is now under the consideration of the Government of Bengal.

BENGAL-NAGPUR RAILWAY.

During the cold season of 1881-82, a strong survey party was placed at the disposal of the Government of Bengal for the purpose of examining the country between Barakur station on the East Indian Railway, and Bilaspur in the Central Provinces, with a view of fixing the best line for a railway to open out the coal-fields, &c., of Chota-Nagpur, and to accommodate the rich grain

References.

- P. W. D. Pros. November 1881, Nos. 139-62.
- " " April 1882, " 51-6
- " " May 1882, " 107-17.
- " " July 1882, " 90-104.

districts of Chhattisgarh. Several different routes were tried, and the results are confined to three principal ones. The statistics for a 5 feet 6 inch gauge line are as follows:—

Lines of Railway from Barakur or Sitarampur to Bilaspur.

Route.	Length.	Cost of construction excluding land.	Cost of land.	Total cost.	Cost per mile including land.	Cost per mile excluding land.
		Lakhs.	Lakhs.	Lakhs.	Rs.	Rs.
Northern,	393	292	4½	296½	75,421	74,321
Intermediate,	375	290	4	294	78,428	77,328
Southern,	366	292	4	296	80,958	79,858

From these figures it appears that the southern, although the shortest, is the most expensive, but more recent information seems to show that the northern and intermediate routes have been under-estimated. Also without excessive cost the southern route is the only one on which a ruling gradient of 1 in 100 can be obtained.

The *Northern route* leaving Barakur on the East Indian Railway, traverses the northern part of the district of Manbhoom through the middle of the Jharia coal-field, ascends the Chota-Nagpur plateau a little to the south of Chola, passes close to Ranchi, from thence through the northern part of Lohardugga district, into Jushpur territory, passes north of Lakhanpur and Sirgujah, and thence *via* Uchlanga and Katghora to Bilaspur. The country traversed is generally one of high ridges and deep depressions; the principal rivers to be crossed being the Barakur (1,800 feet waterway), the Damooda (1,000 feet), Koel (600 feet), Sunk (600 feet), Eib (500 feet), Rer (400 feet), Hésdoo (700 feet), Tan (400 feet). The ascent to the Chota-Nagpur plateau is about 650 feet in height and 13 miles long, of which 6 miles would be very expensive, involving a tunnel through gneiss rock, heavy cuttings and embankments, and possibly curves of 500 feet radius. But with this a gradient of 1 in 100 is obtainable. The descent from the plateau would probably be by the Kastura Ghaut, involving a descent of about 550 feet in 11 miles, with gradients of 1 in 70 and 1 in 80. Between the Eib and the Maini rivers there is an ascent of 400 feet, up which a gradient of 1 in 100 can be obtained without difficulty; but the descent of 235 feet on the southern side would be very circuitous.

The length of this route is about 393 miles, of which it may be said that 200 pass through fairly populous and cultivated country, 113 through narrow cultivated valleys surrounded by hill and forest, and 80 miles through almost uninhabited country covered with forest. Coal is obtainable in Sirgujah State, but has not been worked.

The *Southern route* would leave the East Indian Railway at the Sitarampur station, and thus avoid the two crossings of the Barakur and Damooda rivers. At the 5th mile it crosses the Damooda (1,800 feet waterway); passes through Rangunathpur (20 miles); Perulia (45 miles); crosses the Cossye river (700 feet) at 45 miles; and work is easy up to the 57th mile. The country then gets rocky and undulating, the Dalma range is crossed at 78 miles, and the Suburnarekha river (1,100 feet) at 81 miles. The descent to the Suburnarekha is 206 feet, but a gradient of 1 in 100 can be obtained; from thence to the 90th mile the country is rocky and covered with forest, crossing several spurs from the hills forming the watershed of the Suburnarekha and its tributary the Sanjai. From the 90th to the 135th mile the valley of the Sanjai is ascended: the valley is well cultivated up to the 120th mile when it gets contracted; the river is crossed at the 128th mile (400 feet); and the watershed between the Sanjai and Koel rivers at the 138th mile. Crossing this ridge will require heavy work, as it is 263 feet above the Sanjai, and 176 feet above the Gogra, which is crossed at the 132nd mile; and somewhat heavy work will be experienced up to the 163rd mile, as the country is

thick forest and very hilly, rising and falling very considerably as ridges and streams are crossed. From the 163rd mile to Kutnia (200th mile) the valley is wider and the work much easier, the only work of any magnitude being the bridge (1,800 feet) over the Brahmini river at the 183rd mile. [The Brahmini river is the continuation of the Koel and Sunk rivers of Chota-Nagpur]. At the 205th mile a ridge 200 feet higher than Kutnia is crossed; and at the 220th mile a broad open plain, well cultivated and populous, is reached. From here to Rajpur, 245th mile, there are no difficulties; the Eib river (1,800 feet) would be crossed here; and there are no difficulties up to Doolunga (255th mile). [This is the junction with the intermediate route].

From Doolunga to Raigarh it was proposed to run the railway *viâ* Hingir, the centre of a large coal-field, but great difficulties were experienced, as Hingir lies in a high valley between two ranges of hills. The most probable route is a little to the north *viâ* Tekripara, Patrapali, and Tiparia; but any route will involve about 15 miles of difficult and expensive work. Raigarh is at the 283rd mile, and from there to Bilaspur the route lies in the valley of the Mahanuddy, a broad open plain; and the only difficulties to be met are the crossings of its numerous tributaries, the principal being, 292nd mile Maud (1,500 feet); 315th mile Borai (600 feet); 335th Hesdoo (1,000 feet); 337th Son (300 feet); 355th Lilagur (300 feet), and 362nd Arpa (500 feet). Of this length of line, 366 miles, 200 run through cultivated populous country, 86 miles through narrow valleys partially cultivated and varying from 2 to 5 miles in width, and 80 miles through forest and barely populated country. It is the shortest of the three lines, but the extent of the bridging, and the rough work crossing the Suburnarekha valley, and from the Sangai into the Koel and Sunk valleys make it expensive, as ascents of some 200 feet to cross the ridges in these parts are not infrequent. A ruling gradient of 1 in 100 is, however, practicable throughout.

The *Intermediate route* follows the northern route as far as Ranchi (110 miles), and joins the southern route at Doolunga, the distance to the point of junction by the intermediate route being 264 miles, by the southern one 255 miles. From Ranchi this line would run to the south-west and continue along the Chota-Nagpur plateau, amongst rice cultivation to the Karo river (400 feet) at the 145th mile. From this river to the Koel river (800 feet) the country is hilly, and there is a sudden fall of 150 feet down which the location will be difficult. From the Koel crossing (157th mile), the line would run to the north of Lasia, 162nd mile, and then to Agarma, 167th mile, and from there to Kolabira. Between the 175th and 182nd miles the country falls 400 feet; the work here is very heavy and expensive, and it seems uncertain if a gradient of 1 in 100 can be obtained. From Kuchung, 183rd mile to the Sunk river (800 feet) at the 204th mile, the country is easy and the work light. The range dividing the Sunk and the Eib rivers has now to be crossed, and from the 204th to the 230th mile, the country is very rugged and rocky, covered with forest and scarcely populated, and about 4 miles of it very expensive work. At the 230th mile the line would emerge into rich land and comparatively flat country; the Eib river (1,600 feet) would be crossed at the 250th mile, and from there into Doolunga, 264th mile, there are no difficulties.

The length by this line to Bilaspur is 375 miles, of which 245 may be considered through fairly cultivated land, 82 through narrow cultivated valleys, and 48 through country barely inhabited.

GYA TO LOHARDUGGA OR RANCHI.

This line would be an extension of the present broad gauge Patna-Gya branch, and would form a connecting link between the East Indian Railway and the projected line between Barakur and Bilaspur, if the trace of the latter is carried by the "northern route" over the Chota-Nagpur plateau. But even if the "southern route" is adopted for the latter line, it may be soon found commercially practicable to extend the Patna-Gya Railway southwards, in order to serve the produce of the Lohardugga and Hazaribagh

Reference.

P. W. D. Pros. June 1882, Nos 154-6.

plateaus, and also to open out the Karanpura coal-fields, which are situated at the foot of the south-western end of the Hazaribagh plateau between Balumath, Tandwa, and the Damooda river.

A rough reconnaissance of some of the routes which seemed practicable was made in the cold season of 1881-82, and the approximate distances are—

Gya-Lohardugga,	::	::	::	::	::	::	::	120 miles.
Gya-Ranchi,	::	::	::	::	::	::	::	129 "

Sherghotty is a large and important centre of trade, and the line would have to be taken round by that village, necessitating a detour of about 2 miles. No difficulties are met with along the first 45 miles from Gya, but the bridging would be somewhat expensive. The first 30 miles are quite level through richly cultivated country; the next 15 are along the valley of the Lelajun river, up which a gradient of 1 in 300 may possibly be obtained. This also is a fine cultivated valley, well watered and well populated.

At the 45th mile the ascent of the Chattra Ghaut commences. The total rise is 1,100 feet, which at 1 in 100 requires a length of 23 miles on that gradient. This distance can be obtained by following up the valley of the Lelajun, and the gradient also is feasible, but it would necessitate extremely heavy work in deep rock cuttings, tunnels, long culverts and heavy banks. The first 16 miles of this ghaut is through dense jungle, and the country at present almost impassable, being cut up by cross ravines in every direction. The summit is reached at the 68th mile near the village Bagra on the road from Simuria to Hazaribagh, which latter place is 35 miles distant along a fair road without ghauts.

From the summit of the Chattra Ghaut (68th mile) the line would pass for 15 miles along the western edge of the extensive and well cultivated plain lying below the western scarp of the Hazaribagh plateau, and in which are situated the important centres of trade, Tandwa and Balumath. No difficulties exist here, although here and there short gradients of 1 in 100 will have to be resorted to. From the 83rd to the 100th mile the line passes through the valley of the Damooda, and runs through the Karanpura coal-field. Here there will be a good deal of careful setting out required, as extensive drainage has to be crossed.

It is probable the Chattra Ghaut can be avoided by carrying the line from Sherghotty more towards the south-west into the Palamow district, and so tapping the Daltonganj coal-field. This route could probably go by Emanganj and Manatu, and would give an easier ascent, being 12 miles longer.

If the line is taken to Ranchi, it would probably go from Balumath down the valley of the Haharu branch of the Damooda to the village of Rai, and then ascend to the plateau *via* Bamui, a route which seems feasible for gradients of 1 in 100. This line would go through the centre of the Karanpura coal-field.

Any line of railway through this country must of necessity be expensive, owing to the large amount of ghaut work and drainage to be passed.

PALAMOW-BARUN RAILWAY.

Messrs. Burn and Co. of Calcutta applied in 1881 to the Government of Bengal for concessions to construct, through the aid of a private Company, a metre gauge line of Railway from the Daltonganj coal-fields, situated in Western Bengal, to Barun, a village at the head of the Sone Canal system. The line will be about 56 miles long, through somewhat hilly country, and is estimated to cost Rs. 27,60,000. The proposal also includes a system of towing barges between Barun and Buxar on the East Indian Railway along the Sone Canal, by means of a clip drum and submerged wire rope. To move 200,000 tons of coal annually down the canal, it is estimated that a proper complement of steam tugs, barges, steel ropes, &c., would require an outlay of Rs. 4,70,000.

To work the coal mines would require an initial outlay of about Rs. 1,20,000,

and with a working balance of about half a lakh of rupees it is thought that the whole project could be done for Rs. 34,00,000.

The estimated receipts, allowing only for a sale of 100,000 tons per annum, are Rs. 12,20,000, and the total working expenses at Rs. 8,30,000, giving a net balance of Rs. 3,90,000, or equivalent to 11½ per cent. on a capital of Rs. 34 lakhs.

AIRCHA-DACCA-MYMENSINGH.

Careful surveys and estimates of this line have been made. The system may be divided into two distinct parts—the line from Aircha, a point on the Pudda opposite Goalundo, to Dacca and its port Narainganj ; and the line from Dacca to Mymensingh.

<i>References.</i>			
P. W. D	Pros.	February	1881, Nos. 1-13
"	"	July	1881, " 129-30.
"	"	May	1882, " 179-89.

The line from Aircha to Dacca is 43 miles long, and is estimated to cost Rs. 62 lakhs on the metre gauge, equal to Rs. 1,45,000 per mile. This is an expensive portion of line, as the Dhullasery river has to be crossed, for which a bridge of 30 spans of 150 feet each is allowed, and estimated to cost Rs. 19 lakhs. This river is the course at present taken in the rains by the steamers plying between Goalundo and Dacca, but in the cold weather there is not sufficient depth of water at its head for steamer traffic, where it takes off from the main stream of the Brahmaputra. Only 16 feet of headway has been allowed in the design for this railway bridge, which is sufficient for native craft: as it is considered that the steamer service would be removed after the railway was open. Trial surveys were made with a view to avoid the crossing of this river, and a line was run from a point on the Brahmaputra just above the upper mouth of the Dhullasery to Dacca. This line was reported to be a very unsatisfactory one, as the country is subject to most violent floods, caused by the spill waters from the Bunsee and Garael rivers; consequently a line in this direction would always be very unsafe.

The section of line between Mymensingh and Dacca is not so costly, as it follows generally the lie of the country. It is 74½ miles long, and estimated to cost Rs. 52,62,742, or Rs. 70,612 per mile. The Satooa river is the only one of any size which has to be crossed, and for that 350 feet of waterway is provided.

The section from Dacca to Narainganj, 10½ miles in length, offers no great engineering difficulties. Its cost is about the same as the average for the Mymensingh line, viz., Rs. 70,612 per mile, and if its terminus is made at Hajiganj on the Lakye river, where a wide and deep channel is constant, this portion should not cost more than Rs. 7 lakhs.

The Government of Bengal has applied for sanction to construct as a provincial work the section, Narainganj-Dacca-Mymensingh, leaving the portion between Aircha and Dacca for future consideration. Preference to construct new railways in Eastern Bengal has, however, been assigned to the Bengal Central Railway Company, and it is not known yet if that Company is prepared to assert its preference.

Narainganj is about 110 miles from Goalundo, and is connected by a steam ferry, the journey taking on the average about 7 hours.

It would seem advisable to extend this railway northwards through Mortagacha to Jamalpur, a further distance of about 30 miles. The line would run through a well populated part of the Mymensingh district, and would serve the jute-producing tract round Jamalpur and Sherpur, the produce from which at present goes down the Jamuna river, the navigation of which is a good deal hampered, late in the season, by the drying up of the Jeenai river. This short extension could be very cheaply made, and would bring a good through traffic to the line. The proposal for a line from Chittagong to Daudkandi, with a ferry service to Narainganj, has an important bearing on the Dacca-Mymensingh Railway, the traffic on which it will materially develop, if, as may safely be assumed, Chittagong eventually becomes the port for Eastern Bengal.

DAUDKANDI-COMILLA-CHITTAGONG.

In 1869 surveys and estimates were made for a line of railway between Chit-

tagong and Bhyrub Bazaar at the confluence of the rivers old Brahmaputra and Megna. The present trunk road to Chittagong starts from Daudkandi and runs *via* Comillah, so the former surveys can be utilized for a new project from Chittagong to Comillah. Daudkandi is most favorably situated as a starting point, as it is situated on the bank of a wide and deep river; is nearly opposite Narainganj, the southern end of the Mymensingh-Dacca line of railway; and has excellent water communication with Goalundo, the eastern terminus of the Eastern Bengal Railway.

Reference.

P. W. D. Pros. October 1882, Nos. 61-80.

A line of railway between Daudkandi and Chittagong would generally follow the line of the trunk road; would present no engineering difficulties; and there is only one bridge of importance, the cost of which is estimated at a little under Rs. 5 lakhs. The distance is 125 miles, and the estimate amounts to Rs. 86,00,000, or at the rate of Rs. 68,800 per mile. To this sum an extra Rs. 6,00,000 must be added for ferry steamers and plant to form the connection between Narainganj and Daudkandi, making a total of Rs. 92,00,000 for the whole project.

Such a line would work in extremely well with the Dacca-Mymensingh railway project, and throw into Chittagong an immense increase of trade. The line may also in progress of time be carried southwards to Akyab; while to the north Comillah is perhaps the best starting point for any line into the Cachar valley.

RAILWAY ROUTES INTO ASSAM.

If a line of railway were made up the valley of the Brahmaputra, it would either start from Singamari on the left bank of that river and a little south of Dhubri, and follow the present line of road to Gauhati, or else it would be continued south of Singamari round the corner of the Garo hills

References.

P. W. D. Pros. November 1881, Nos. 163-9.
 " " December 1881, " 16-26.
 " " January 1882, " 84-90
 " " October 1882, " 61-80.

and connect at Mymensingh with the proposed railway Narainganj-Dacca-Mymensingh. It does not appear that the Singamari-Gauhati project is likely to be constructed, as that would involve very expensive ferry arrangements between the present Northern Bengal Railway and Singamari, and the line itself would not benefit the province much. Moreover, the arrangements now made by the Northern Bengal Railway to carry goods and passengers to Dhubri on the right bank of the Brahmaputra although expensive, work fairly well, and as soon as the fast steamers from Dhubri up the Assam Valley are running, it is considered that that communication will satisfy for some time all the wants of the lower part of the province.

The project for continuing the Dacca-Mymensingh line round the Garo hills and up to Gauhati has often been mooted, but no surveys of the line between Mymensingh and a point opposite Dhubri have been made. Such a line would be tortuous and very expensive, owing to the enormous extent of bridging which would be required.

Another line between these two places over the Garo hills has been advocated by the Agent of the Eastern Bengal Railway Company, and supported by the Calcutta Chamber of Commerce. The Chief Commissioner of Assam considered that the advantages of the line would be considerable, but pointed out that a line of railway stopping at Gauhati would only accomplish a very small part of what is required for the proper development of the province, and considered that a line much farther to the eastward, through Cachar and over the North Cachar hills into the upper provinces of Assam, would be of far more value to the province.

The proposed line over the Garo hills between Mymensingh and Gauhati is being reconnoitred. The line from Mymensingh to the foot of the hills (33 miles) would not be difficult, but somewhat expensive, as it would have to cross the old bed of the Brahmaputra, to bridge which is estimated at Rs. 10 lakhs. This portion would probably cost about Rs. 1,00,000 per mile. From the foot of the

hills the line would probably run up the valley of the Somessari river (in which coal is known to exist), cross the watershed at an altitude of about 1,800 feet, and descend into the Assam valley, striking the trunk road between Goalpara and Gauhati at a point 37 miles from the latter place. This distance is calculated at 113 miles from the southern foot of the hills; and by utilizing the Assam trunk road, it is estimated that the line should not cost more than Rs. 75,000 per mile through this length. The hilly portion, however, is scarcely known, except as being most difficult and rugged country, so it is believed that this estimate for a metre gauge line is much too favorable.

Such a line would be of little or no use to Sylhet and Cachar, as a branch from Shushung, at the foot of the Garo hills, would not touch the wealthy parts of those districts; and, moreover, would cross the drainage of the wettest country in the world.

A line to enter the Cachar valley must, if it is to have any chance of success, be located much further to the eastward. There is excellent water communication between Goalundo, the terminus of the Eastern Bengal Railway at the junction of the Ganges and Brahmaputra rivers and Bhyrub bazaar on the Surma, the river which drains the Cachar valley; and the rivers between these two places are of such huge magnitude, that to attempt to bridge them would be commercially impracticable. Steamers take two days to make this trip; but the time could be reduced to one if the Daudkandi-Comillah-Chittagong Railway is ever constructed. A railway into Cachar would then start northwards from near Comillah, and by skirting round and under the Tipperah hills, would escape most of the inundated country, and avoid the excessive drainage from the Khasia and Jaintia hills. This line would pass near all the tea industries in Sylhet and Cachar; and the population and wealth of Sylhet are such as to make the portion of line of railway into that valley a paying investment very shortly after opening.

The Chief Commissioner of Assam considers that such a line could be without extreme difficulty carried across the North Cachar hills by some pass not more than 2,000 feet above the sea level, and then run down the Dhansiri valley to Dimapore and Golaghat, and so on to Jorhaut, Sibsagar and Dibrugarh.

The approximate distances from the end of the steamer route at Daudkandi along such a line of railway would be—to Comillah 30 miles; Cachar 210 miles; Golaghat 370; Jorhaut 390; Sibsagar 420; and Dibrugarh 460 miles. Without a special reconnaissance of the line, it is impossible to form anything like an approximate estimate of the cost; the portion between Daudkandi and Comillah is very easy, that between Comillah and Cachar would probably cost on the metre gauge about Rs. 1,00,000 per mile; while beyond it is not yet known whether a passage through the hills is practicable except at inordinate cost. From Golaghat onwards to Dibrugarh the country is fairly well known, and no extraordinary difficulties on that part present themselves.

NORTH-WESTERN PROVINCES AND OUDH.

The following gives the lengths of railway open, under construction and under preparation on 1st January, 1882, within the Provinces :—

		<i>Open to traffic.</i>				Miles.
East Indian Railway,	broad gauge, ..	..	..	..	..	632
Oudh and Rohilkhand Railway,	" " ..	..	..	..	..	547
Sind, Punjab and Delhi Railway,	" " ..	..	..	..	..	112
Dildarnagar-Tari Ghaut branch,	" " ..	..	..	..	..	12
Sindia Railway,	" " ..	..	..	..	..	22
Rajputana-Malwa Railway,	metre gauge, ..	..	..	..	..	26
Cawnpore-Farukhabad Railway,	" " ..	..	..	..	..	86
Muttra-Hathras Railway,	" " ..	..	..	..	..	29
Muttra-Achnera Railway,	" " ..	..	..	..	..	24
Total,						1,490

Under construction.

	Miles.
Northern Extension of the Oudh and Rohilkhand Railway from Moradabad to Saharanpur,	115
The Bridge across the Ganges at Benares,	6

Projects under preparation.

The Bridge across the Jumna at Muttra.
Lines in Bundelkhand.
Farukhabad-Khasganj-Hathras line.
Trans-Gogra system, from Patna to Bahaich.

The following is a short narrative of the several projects proposed from time to time:—

SCHEME FOR A SYSTEM OF LIGHT RAILWAYS IN THE NORTH-WESTERN PROVINCES AND OUDH.

The failure of the rains in 1877 in the North-Western Provinces necessitated the opening of famine works throughout those Provinces and Bundelkhand. The consideration of what works were the best on which to employ famine relief, and also the consideration of the best means to mitigate

the evils due to long continued drought, led the Lieutenant-Governor to propose a vast network of light railways throughout the Provinces. The scheme, which was submitted to the Government of India early in 1878, contemplated the construction of 1,312 miles of metre gauge railway, at an approximate cost of little short of Rs. 500 lakhs; and was to take 7 years to complete. The scheme was as follows:—

No.	Name of Railway.	Length in Miles.	Rate per Mile.		Total cost.
			Rs.	Rs.	
I	Saharanpur, <i>via</i> Roorkee and Hardwar to Dehra,	66	40,000		26,40,000
II	Roorkee to Moradabad (to join Oudh and Rohilkhand Railway,)	92	50,000		46,00,000
III	Moradabad to Ramnagar,	49	40,000		19,60,000
IV	Bareilly, <i>via</i> Pilibhit to Purnanpur,	52	40,000		20,80,000
V	Achnera to Muttra,	22	30,000		6,60,000
VI	Hathras Road Station, East Indian Railway, to Khasganj and Soron,	43	35,000		15,05,000
VII	Farukhabad to Cawnpore,	87	35,000		30,45,000
VIII	Farukhabad to Khasganj,	64	30,000		19,20,000
IX	Cawnpore, <i>via</i> Kalpi and Orai to Mau-Ranipur,	121	40,000		48,40,000
X	Manikpur, East Indian Railway, to Banda,	78	40,000		31,20,000
XI	Junction between Banda and Gursarai,	74	40,000		29,60,000
XII	Kheri, <i>via</i> Lucknow to Rae Bareli,	138	30,000		41,40,000
XIII	Junction between Kheri and Purnanpur,	60	40,000		24,00,000
XIV	Byramghat, Bahaich, Gonda to Gorakhpur,	175	40,000		70,00,000
XV	Jaunpur, <i>via</i> Azamgarh to Gorakhpur,	91	40,000		36,40,000
XVI	Jaunpur, <i>via</i> Pertabgarh to Rai Bareli,	100	30,000		30,00,000
Totals of proposed scheme,		1,312	37,736		4,95,10,000

This scheme was never considered as a whole, but it was found desirable to have surveys made of most of the lines, and to push on to completion the more promising or productive works and the more necessary as protection against famine. Of these lines—the Achnera-Muttra and Farukhabad-Cawnpore, are

completed and open to traffic; the Saharanpur-Roorkee-Moradabad is now under construction by the Oudh and Rohilkhand Railway Company as a broad gauge line; the Hathras-Khasganj-Farukhahad is under construction as a Provincial work; the Trans-Gogra system having a main line from Patna-Gorakhpur-Basti-Gonda to Bahraich, with branches to Fyzabad and Byramghat has been surveyed, and construction work is about to commence; the Jhansi-Mau Ranipur-Banda-Bargarh (not to Manickpur) will probably be commenced at once as a famine protection work; and it is believed that before very long the Cawnpore-Kalpi-Orai-Jhansi line will be commenced on the broad gauge.

The few remaining lines of the system and the more recent proposals will be found described below.

JHANSI-CAWNPORE.

Several projects have been investigated for extending railway communication south from Cawnpore, but their construction has been always more or less deterred by the formidable crossing of the Jumna

References.			
P. W. D. Pros.	January	1881,	Nos. 87-99
"	October	1881,	225-30.
"	January	1882,	" 1-7
"	June	1882,	" 8-11.
"	July	1882,	" 132-5.

at Kalpi. The question of making a branch as far as the Jumna river opposite Kalpi has also been worked out, and if made on the broad gauge, the branch would naturally take off from the station of Rura or Bhowpur, the next stations on the East Indian Railway west of Cawnpore. The relative distances are:—

Cawnpore to Kalpi,	...	...	...	...	...	43 miles.
Bhowpur to Kalpi,	...	...	...	...	...	33 "
Rura to Kalpi,	...	...	...	...	...	25 "

and there are no engineering difficulties. The branch, however, would have to terminate some distance from the river bank opposite, as the country is much intersected with ravines, and would thus keep the terminus some miles from Kalpi itself. Without rolling stock, this branch on the 5 feet 6 inch gauge, was estimated to cost Rs. 50,000 a mile.

But it was considered that such a line should not stop opposite Kalpi, but be continued on either to Jhansi or to Mau-Ranipur in Bundelkhand; and then it had further to be considered—as the lines would naturally be further extended to Bhopal on the south, Gwalior to the north-west and Banda eastwards—whether Jhansi or Mau was the best focussing point for these lines. A bridge over the Jumna at Kalpi, which is estimated to cost at least Rs 30 lakhs on the metre gauge, is common to both lines going either to Jhansi or Mau; but the direct line from Kalpi to Jhansi would get rid of a costly bridge over the Betwa river, which the line from Kalpi to Mau would have to cross. Any extension eastwards or southwards would, however, have to cross the Betwa, so it became a question as to the best crossing to be obtained. A fair but very costly crossing on the Kalpi-Mau line can be got, and an excellent one on the Jhansi-Mau line near Oorcha; the latter will also be somewhat costly, but the position of Jhansi is more geographically convenient as a focussing centre; so in all probability Mau will be placed on the branch line from Jhansi eastwards to Nowgong, Banda and Bargarh.

A line on the metre gauge between Cawnpore and Jhansi must obviously run into Cawnpore itself, where it can form a junction with the metre gauge system already running into Cawnpore; and this necessitates the crossing of the East Indian Railway. The trace for the metre gauge line has been taken along the East Indian Railway nearly as far as Bhowpur station, and then crosses it on a skew bridge involving a bank of about 24 feet in height for nearly $2\frac{1}{2}$ miles. The Rind nuddee is crossed at the 17th mile, the Singur at the 31st mile, and the Jumna at the 48th mile. The important villages of Akbarpur (25th mile), Deegh (35th mile), and Bhognipur (41st mile) are well accommodated. The bridge over the Jumna will be very costly, as the river when in flood has a depth of 63 feet of water opposite Kalpi. The line after crossing the river curves round the south of the town of Kalpi passing it at the 49th mile, and from there it follows the line of the made road to Orai (70th mile), meeting with no obstacles of any

difficulty. From here to Jhansi (139th mile) the trace runs parallel to the river Betwa, but keeping sufficiently far from it to be clear of the effect of its ravines. There are no serious difficulties met with, and the only town of importance passed is Mote at the 107th mile. At Jhansi the line is taken round the east side, and then curves round by the south to the junction station for lines running south to Bhopal and north to Gwalior.

The most recent estimates for this line on the metre gauge amount to Rs. 51,400 per mile without a permanent bridge at Kalpi, and Rs. 72,300 with a bridge; for the 139 miles, therefore, the total amounts to Rs. 100½ lakhs, of which Rs. 29 lakhs have been allowed for the Jumna bridge. This estimate allows for rolling stock at the rate of Rs. 9,000 per mile, but makes no provision for workshops.

JHANSI-GWALIOR.

This line was reconnoitred in the cold season of 1880-81, and again in 1881-82. The route selected follows throughout the line of the metalled road from Gwalior

<i>References.</i>			
P. W. D. Pros.	November	1880,	Nos. 12-15.
"	"	March	1881, " 28-34.
"	"	January	1882, " 1-7.
"	"	July	1882, " 132-5.

to Jhansi, and will have the convenience of the road during construction. The line will not be a difficult one, and the only large works on it will be the rock cutting through the Jowrassi pass and the bridge over the Sind river.

The line is laid out to start from the Gwalior station of the Sindia line, and so arranged that it is a direct continuation of that line. The Jowrassi pass occurs between the 9th and 12th miles, and was found to be much easier than at first expected. A gradient of 1 in 100 is obtainable without great expense for rock cutting, but would be greatly increased if a flatter gradient were adopted. The pass can be turned by a detour to the west; but this would require some very sharp curves in getting past the Lashkar at Gwalior, and would be 8 miles longer, so the direct route is to be preferred.

Three large bridges will be required; viz.—at the Sind river (31st mile), Anguri (49th mile), and at the Pahuj (56th mile). The Sind river has no road bridge over it; its banks are well defined, and high floods rise to a height of 48 feet. A bridge of 5 spans of 150 feet is proposed, with rails on lower boom and roadway above,—a bridge similar to the Agra-Jumna bridge. It is doubtful whether rock foundations can be found for a bridge crossing over this river anywhere in the neighbourhood of the line, so wells will probably be required.

The Anguri and the Pahuj rivers are both bridged by the road, the former by 7 arches of 30 feet, the latter 7 arches of 36 feet, both with 10 feet headway. These waterways appear small, and the road gives indications of being topped at times by the flood waters, it is therefore proposed to bridge both these streams by 3 spans of 100 feet. The Pahuj crossing will have rock foundations; the Anguri will require wells.

The steepest gradient required is 1 in 100, and is only used for short lengths in the Jowrassi pass, at Duttiah, and in the approach to Jhansi; and the sharpest curve has a radius of 1,432 feet, but this can be flattened a little if necessary. Stone ballast is obtainable for the whole line, but for some sections will have to be trained out some distance. Kunkur is scarce.

Duttiah is passed between the 42nd and 43rd miles. It is a place of small importance and with no trade. The station is proposed to be placed at the 40½ mile in order to accommodate as well as the town, a sacred tomb, a place of Hindoo pilgrimage. The site selected for the station of Jhansi is at the 62nd mile from Gwalior, and lies to the west of cantonments and between Jhansi city and new Jhansi. The site is approved of by both the Civil and Military authorities, and it is conveniently situated as a junction for lines from the south-east and north-east, as it is probable that lines will run from there to Bhopal on the south, to Banda and Bargarh station (East Indian Railway) on the east, and to Cawnpore to the north-east. All the ground about Jhansi is undulating and rocky, it is therefore impossible to find a quite flat site for a station; the one chosen though not flat

longitudinally, has the advantage of being fairly good transversely, and will allow for a large station being built when required. The site is high and healthy, and the water good.

The estimate for a metre gauge line has been worked out in some detail, and amounts to Rs. 38½ lakhs, giving for the 62 miles a mileage rate of Rs. 62,400. This makes provision for rolling stock at Rs. 9,000 per mile, but allows nothing for workshop accommodation. A line on the broad gauge sufficiently stocked would probably cost Rs. 90,000 per mile.

JHANSI-BARGARH (EAST INDIAN RAILWAY).

This line when constructed will be made more for its use as a protection against famine than a purely productive line. It will, however, serve to open out the Hamirpur and Banda districts of Bundelkhand, and give an impetus to the trade in cotton, gram and linseed.

		References	
P. W. D. Pros.	March 1881,	Nos. 28-34.	
" "	October 1881,	" 39-43.	
" "	October 1881,	" 225-30.	
" "	January 1882,	" 1-7.	
D. G. Rys. Pros.	August 1882,	" 95-108.	
" "	October 1882,	" 164-90.	

The general direction of the line runs eastwards from Jhansi *via* Mau-Ranipur, Nowgong and Banda to join the East Indian Railway at Bargarh. To make the junction at Manickpur will shorten the line appreciably, but the country around Manickpur is somewhat difficult, and owing to the East Indian Railway passing that station on a high ridge of land, the gradients near the junction would have to be exceedingly steep.

Except at the two ends where rocky hills are met with, the country may be said to be very flat and easy. A great deal of drainage has to be crossed, and at the river crossings the country is much broken up by ravines. Skirting round the south of Jhansi cantonments, the line will cross the river Betwa at the 7th mile. A good crossing with rock foundations has been found near the ruins of Oorcha. This river is a formidable obstacle on account of its magnitude, the velocity of its current, and the sudden floods which come down it, some rising as high as 60 feet above ordinary water level. The estimates provides for 15 spans of 150 feet opening.

At the 40th mile the line runs to the north of Mau-Ranipur, distant about a mile from that important centre of traffic, and then bends to the south to serve the military station of Nowgong (63rd mile). From there its direction is straight to Banda, passing Mahoba, a large and important town at the 96th mile, and Banda at the 129th mile. A detour of about 12 miles to the south is made to accommodate Nowgong; there is no difficulty in locating a line straight from Mau-Ranipur to Banda, but that would place Nowgong from 10 to 12 miles off the line and necessitate a branch to it. At Banda the line is taken between the Cantonment and the City. From there to Bargarh (203rd mile) no difficulties are met with, and the line is very straight until just at the junction with the East Indian Railway, where a ridge of hills has to be turned and short lengths of 1 in 100 gradients have to be resorted to.

Besides the Betwa the principal streams crossed are—

At the 42nd mile,	Sooknee,	.. .. .	5 spans of 100 feet.
" 50th "	Dussan,	.. .. .	12 " 100 "
" 126th "	Cane (Ken),	.. .. .	1 of 250 and 11 of 100 feet.
" 161st "	Baghan,	.. .. .	7 spans of 100 feet.
" 164th "	Pysauni,	.. .. .	4 " 100 "
" 177th "	Ohan,	.. .. .	3 " 100 "
" 184th "	Kewal,	.. .. .	3 " 100 "

Of these the Cane is the principal, and its nature is very similar to the Betwa. It has near Banda well-defined banks and a rocky bed, and its dry season channel is a well-defined deep narrow channel, over which it is proposed to place a girder of 250 feet span. The river has a rise of 60 feet when in flood. At the other rivers well foundations will generally have to be resorted to.

Of the total length of 203 miles, 37 miles are in Native States, and the remaining 166 in British territory. The estimate for a finished line on the metre

gauge amounts to Rs. 1,20,03,871, giving a mileage rate of Rs. 59,130. The Betwa bridge is estimated at Rs. 7 lakhs; the Cane at Rs. 3 lakhs; the Dussan at Rs. 2 lakhs; and the Baghan at nearly Rs. 4 lakhs.

JUMNA BRIDGE AT MUTTRA.

The line from Hathras to opposite Muttra has been opened for some years, and a provincial branch from the Rajputana-Malwa Railway at Achnera to Muttra was opened to traffic at the end of 1881. It is desirable that these should be connected by a bridge over the Jumna at Muttra, and so connect the Rajputana Railway system with that of the North-West Provinces.

Reference.

P. W. D. Pros. August 1882, Nos. 16-31.

The width of the channel usually occupied by the Jumna opposite Muttra is about 850 feet; with a steep bank on the Muttra side, and a shelving one on the other. In flood, the channel scoured out does not exceed 600 feet in width apparently, and the depth of scour from 24 to 30 feet. The maximum flood level is recorded at 19 feet; and the maximum flood discharge is estimated at 200,000 cubic feet per second.

As at first designed the bridge was to have 6 spans of 150 feet of clear opening; but as the piers with their stone apron protection would contract the waterway, it was considered advisable to add an additional land span of 150 feet, in order to allow ample waterway, and so not to risk any heading up and flooding the city which lies close along the river bank. A bridge of 7 spans of 150 feet has, therefore, been sanctioned at an estimated cost of Rs. 8,76,340, and will probably be commenced after the rains of 1882. The estimate includes the approach roads as well. The foundations will be on a double well sunk about 90 feet below low water level, and the piers will be about 30 feet from low water level to the under side of the girders. On the Muttra side about 70 feet of river wall and 60 feet of wings will be provided to connect with the present line of masonry ghauts along the river bank. The girders are on the Warren principle, with the rails and roadway at the same level on the lower boom. A footway is provided on either side by a cantilever.

FARUKHABAD-HATHRAS.

The extension of the Cawnpore-Farukhabad railway to Hathras to join the Hathras-Muttra line formed from the first part of the system of railways through the North-West Provinces. The extension line has now been surveyed and estimated for. It passes through a district which affords great facilities for an exceedingly cheap line of railway, keeping as it does for nearly the whole of its length on the watershed between the Boodh and the Kulundra rivers, two small feeders of the Ganges. The bridging, therefore, is very small and comparatively unimportant. The bridges are—the Kalanuddi, 6 spans of 60 feet; over Lower Ganges Canal at Nadrai 4 spans of 60 feet; over Cawnpore branch of Ganges Canal 3 spans of 40 feet; over Etawah branch of Ganges Canal 3 spans of 40 feet; and over East Indian Railway at Hathras road station 3 spans of 30 feet.

It was at one time arranged to carry this line along the southern bank of the Fatehgarh branch of the Ganges Canal for a distance of about 34 miles, but as no good was really gained by this, and as it added about 2 miles to the length, that alignment was given up. The line is 103 miles in length, with a possible branch of 7 miles from Khasganj to Soron.

The only place of importance passed through is Khasganj, 68 miles from Farukhabad and 35 from Hathras. It is proposed to have the passenger station at Hathras on the bridge over which the line will cross the East Indian Railway line.

The total estimate for the 103 miles of metre gauge line amounts to Rs. 35 lakhs, giving an average of Rs. 34,000 per mile; but this only allows for a very

limited amount of rolling stock and makes no provision for workshops. It is probable, therefore, that the cost will be nearer Rs. 40 lakhs when the line is open and doing a fair amount of traffic.

BAREILLY-PILIBHIT.

This project was surveyed in 1878 and an estimate made. It generally followed the line of the metalled road between Bareilly and Pilibhit, leaving it only to avoid obstacles and sharp curves. The distance is 33 miles, and the estimate for a metre gauge line amounts to Rs. 17½ lakhs, or Rs 53,000 per mile. The bridge-work on the line is very heavy, amounting to over Rs.

References.

P. W. D. Pros.	August	1879,	Nos. 1-24.
"	December	1880,	" 105-19.
"	January	1881,	" 63.
"	January	1881,	" 100-16
"	July	1881,	" 65-72.
"	February	1882,	" 1-4
"	April	1882,	" 40-5.

4 lakhs; this arises from the fact that the line directly crosses the drainage of the country, and which, being so near the Himalayas, is considerable. There are no engineering difficulties, and the bridges and culverts have the same waterway as the existing bridges on the road, and which have proved sufficient during a long term of years. Close to Pilibhit is the Dewah river, a badly defined erratic mountain torrent of considerable size, and over which no bridge has yet been built. Road communication has hitherto been kept up by a bridge-of-boats which is maintained throughout the year. This river requires about 1,200 feet of waterway, and is the only piece of engineering work of any magnitude on the line. The success of the line would mainly depend on its being carried across the river into Pilibhit, so that a bridge is essentially necessary.

The estimate of Rs. 17½ lakhs is for a first class metre gauge road and stocked up to Rs. 8,000 per mile, but if only a light line is required, the estimate is susceptible of reduction by about one-half. By the aid of a little strengthening most of the road bridges could be utilized for a light engine, the rails being placed over the centres of the bridges and the roadway metalled up to rail level. At the bridges, therefore, the railway would occupy the centre of the road, but elsewhere it would be quite off the road. For a light railway it was also not intended to bridge the Dewah, but stop short on its right bank near the bridge-of-boats.

If this short line were to be constructed as a feeder to the Oudh and Rohilkhand Railway, and as nothing else, it seemed doubtful whether it should not be constructed on the standard gauge, and worked by the Oudh and Rohilkhand Railway rolling stock. It was considered that a broad gauge line without stock could be made as cheaply and worked more economically than a narrow gauge line requiring its own stock and workshops, and comparative estimates were made. Even under these circumstances, the broader gauge estimates were Rs. 8,000 a mile in excess of the metre gauge, and as the North-West Provinces Government desired to construct this length only as a first section of a line which would eventually extend through Puranpur, Kheri, Sitapur, to Lucknow, the question of the gauge had to be considered with reference to these possible extensions.

This question was definitely decided in favor of the metre gauge when the project for the line from Bareilly to Ranibagh near Naini Tal was started. To accomplish the construction of this line, the North-West Provinces Government was prepared to give several substantial concessions; it would run for the first 4½ miles out of Bareilly over the Pilibhit line, and as a metre gauge line was of ample gauge to serve the traffic, that gauge was also settled for the Pilibhit line.

The construction of the line to Pilibhit has not yet been sanctioned, but owing to the engagement of the North-West Provinces Government to the Bareilly-Ranibagh Railway Company to make the first 4½ miles of line out of Bareilly, an estimate amounting to Rs. 2,59,000 has been sanctioned, and work is progressing.

BAREILLY-RANIBAGH.

In 1879 a Local Committee was formed at Naini Tal to try and start a Com-

pany to construct a line of railway from Bareilly to the foot of the Himalayas below Naini Tal, and to obtain certain assistance from Government towards the completion of the project. The distance from Bareilly to Katgodam, the furthest point the railway could be conveniently taken without going into very steep gradients and heavy work, is about 65 miles. Of this the first $4\frac{1}{2}$ miles out of Bareilly would be common to the proposed provincial railway between Bareilly and Pilibhit, and for the rest the line would run along the side of the present cart road between Bareilly and Haldwani.

The present road in most places follows a watershed, and consequently no heavy bridging would be required; but the heavy rains of recent years have shown that some parts of the road are submerged during heavy falls of rain, so in places the line will have to be raised and some flood openings provided which are now wanting on the road. Between Bareilly and Baheri, at the 9th mile, considerable flood openings will have to be provided to pass the flood waters of the Durunia river. The present road is for the most part straight, and can be utilized almost throughout its length, the only diversions required being at the Kitcha river, in order to get easier approaches, at the town of Haldwani, and at the tortuous parts of the road through the Kumaon Bhabar. It is also considered that most of the bridges and culverts on the road are sufficiently broad and substantial to carry the weight of the present metre gauge locomotives without much additional strengthening.

The line is to be on the metre gauge, with rails and stock of the present State Railway patterns. The first provision of stock will only be sufficient to run one passenger train each way daily, and occasional goods trains, with a spare engine to assist over the last 4 miles near Bamauri, where the gradients are stiff. To lessen the initial cost it is proposed to use ordinary jungle-wood sleepers, and not to build any permanent buildings for stations; also by taking off from the Bareilly-Pilibhit line $4\frac{1}{2}$ miles out of Bareilly the necessary junction works with the Oudh and Rohilkhand Railway are avoided. The terminus of the line would be 16 miles by road from Naini Tal, but the present road can be shortened by $3\frac{1}{2}$ miles, by making a new portion 8 miles in length at a cost of about Rs. 81,000.

The capital required by the Company is about Rs. 25 lakhs, but they have as yet been unsuccessful in raising it. The maxima rates which have been sanctioned for the line are—

Passengers	{	Upper class,	..	..	..	..	3 annas per mile.
		Lower	..	..	..	..	$4\frac{1}{2}$ pies
Goods (excepting edible grains),	..	..	..	..	..	..	$1\frac{1}{16}$ "
Edible grains,	..	..	..	..	..	..	$\frac{1}{2}$ pie

LUCKNOW TO SITAPUR— $54\frac{1}{2}$ MILES.

LUCKNOW TO RAI BARELI—48 MILES.

Both lines have been surveyed by the North-West Provinces Government, and their direction generally follows the lines of existing metalled roads, the line of railway being kept close on one side, but not actually on the road embankment.

Reference.

P. W. D. Pros. October 1881, Nos. 85-200.

The estimates for metre gauge lines work out as follows:—

Lucknow-Sitapur,	..	..	Rs. 23,20,906, or Rs. 42,198 per mile.
Lucknow-Rai Bareli,	..	..	Rs. 18,96,635, or Rs. 39,513 "

These lines may be considered as portions only of a large system of metre gauge provincial lines; the line northwards through Sitapur being proposed to be extended towards Pilibhit, and the one through Rai Bareli towards Pertabgarh and on to Jaunpur.

It was at one time thought that the two lines would be constructed by private enterprise, but it seems open to doubt if these short sections would of themselves be a financial success, although the country traversed is very favorable to railway construction, and extremely populous and well cultivated.

PATNA-BAHRAICH.

In March 1881 orders were issued to the Director General of Railways to make a reconnaissance survey in some detail for a line of Railway on the metre gauge starting from the north bank of the Ganges opposite Patna, running between the rivers Gogra and Gandak, and passing through or near Chapra, Kalianpur, Gorakhpur, Basti

and Bahraich.

The following possible branches were also to be studied :—

- (a). Gorakhpur to opposite Soharia, on river Gandak.
- (b). Basti to Bansi.
- (c). A branch to the Gogra river opposite Fyzabad.
- (d). A branch to the Gogra at Byramghat.
- (e). A continuation of the main line beyond Bahraich towards the Nepal frontier at Nipalganj.

Projects for branch railways from Byramghat to Bahraich, Byramghat to Gonda, Bahraich to Gonda, Gonda to Gorakhpur, and Gorakhpur to Jaunpur, had previously been considered by the Government of the North-West Provinces and Oudh; these surveys, &c., were accordingly utilized in preparing this large project. The whole system would be about 400 miles in length; and although known that a railway up the Doab should bring in a fair return, it was originally commenced as a protective work against famine.

The estimates are now complete, and the system embraces :—

	Miles
A main line from Sonapore to Bahraich,	277
Continuation of main line to Nipalganj,	32
Branches—Gorakhpur to Nichloul on Gandak,	52
" Basti to Bansi,	27
" Mankapur to Nawabganj, opposite Fyzabad,	14
" Gonda to Byramghat,	30

giving a total of 277 miles as main line, and 155 miles in branches.

Owing to the severe floods experienced in the Gorakhpur and adjacent districts by the overflowing of the river Rapti, the estimates for the main line average throughout Rs. 55,000 per mile, while those for the branches average Rs. 46,000. This makes up a grand total of Rs. 223½ lakhs for the whole 432 miles, and includes ample provision for rolling stock and workshops.

The estimates are not framed on designs to pass all the spill waters from the Rapti and other hill streams through the railway; if that were considered necessary the average mileage cost of the main line would probably be about Rs. 66,000. Only exceptional floods, and which only occur once in a series of years, would require this large increase of waterway, so it is proposed to lay at suitable places in the valley of the Rapti an almost surface line with heavy cast-iron sleepers, so designed as to allow a large quantity of water to pass between the sleepers, and in the event of that being insufficient, the flood water would pass over the rails. The flood waters being distributed over a large area, and the fall of the country being slight, there is little tendency to scour, so the country will admit of such an arrangement being tried with advantage. The permanent way at these depressions will be somewhat costly, but by its adoption the first cost of the line will be considerably diminished; and though high floods through these relief spills may necessitate the temporary stoppage of traffic for a day or two, the mischief done is not likely to be great, as no work of magnitude would suffer. The estimates therefore provide for a length of 4 miles of such permanent way, at different places in the valley of the Rapti, and for about 25 miles in all for the area of country impounded between the railway and the river Gandak.

The proposed line starts from a point near the junction of the Gandak with the Ganges at Sonapore; and if the proposal to bring the Tirhoot Railway to Hajipur across

Main Line.

the Gandak at Sonapore is sanctioned, these two lines will have a common terminus just above the junction of the two rivers, where deep water near the north bank of the Ganges is usually found, and where semi-permanent arrangements can be made for the northern end of the ferry to Patna. There is an excellent site for the bridge over the Gandak close above its junction with the Ganges, and a bridge can be made at comparatively small cost. From here it runs for about 31 miles in a westerly direction along the left bank of the Ganges to Chapra, and generally follows the line of the main road. This distance is much subject to floods, chiefly back-water from the Ganges, and which remains several feet deep for many months in the year; consequently a high bank and a good deal of bridging is necessary.

The principal bridges are—11 spans of 40 feet over the Gandaki; 2 of 40 feet over the Kutaha, and 2 of 40 feet over the Niraha.

Chapra is a large and important city of 52,000 inhabitants, and has a considerable river trade, but Revelganj, at the 35th mile, and situated at the confluence of the Gogra and Ganges, is the principal centre for the river-borne traffic.

From Chapra the line runs north-west to Sewan (mile 68½), a town of 13,000 inhabitants and the centre of a densely populated and exceedingly rich district. The population is as high as 862 per square mile. Between Chapra and Sewan there is a considerable amount of standing water, but few streams; a good deal of earthwork is therefore required, but the bridging is very light, only 5 spans of 20 feet being estimated for in this section.

From Sewan the line takes a more westerly direction, and crosses the Daha (70th mile) by a bridge of 4 spans of 60 feet, a sluggish stream with high banks. At the 75th mile the Sukna nullah (7 spans of 60 feet) is crossed, and the Sona nullah (5 of 40 feet) at the 80th mile. At Mairwa Ghaut the Jhurahi and Sahi rivers meet, and will be crossed below their junction by a bridge of 8 spans of 60 feet. The little Gandak, a river of considerable magnitude, is to be crossed at Majhauri by a bridge of 12 spans of 60 feet. From this river to Deoria (110th mile) the ground is favorable, and little or no cross drainage has to be passed. Here again for about a mile the ground is subject to floods, but beyond to Gorakhpur (143rd mile), a distance of 33 miles, the ground is higher. On this length there are six streams requiring bridges of from 3 spans of 20 feet to 4 spans of 40 feet. The main road, which the line generally follows along this length, was at one time bridged throughout, but two bridges have been completely washed away, and in high floods the water generally flows over the road.

Gorakhpur (143rd mile) is a town of 52,000 inhabitants, and is the centre of a large and richly cultivated district, with a population of over 500 to the square mile. Around Gorakhpur are a series of large lakes caused by the Rohin river which here flows into the Rapti. Two channels of this river have to be crossed, each requiring a bridge of 13 spans of 60 feet; and 5 miles beyond Gorakhpur, at the 148th mile, the Rapti is crossed. To cross the valley of the Rapti will be the most difficult engineering work to be undertaken. Its course is extremely tortuous, it has frequently changed its course, and is at present doing so to a slight extent. A bridge of 9 spans of 130 feet for the Rapti has been estimated for, besides about 4 miles of special permanent way designed for flood spills, which will be laid in the valley of this river. At the 12th mile from Gorakhpur high land is again reached, and the railway follows the direction of the road as far as Basti (183rd mile) without encountering any engineering difficulties.

Basti is not a town of any importance, and has of late years declined. From Basti to Bahraich two lines were proposed, one through Gonda, the other farther to the north and more direct and accommodating Bulrampur. Gonda, being an important place, and being situated at the junction of the roads leading from Bulrampur and Utrauli to Byramghat, was selected, although the line would be 2 miles longer:

Six miles beyond Basti the Kohana river (189th mile) is crossed, (3 spans of 60 feet), and high ground is then met with up to Matkipur (220th mile,) where

the Manawar river will require some 400 lineal feet of waterway. The 17 miles between this and Gonda (237th mile) presents no difficulties; nor do the 40 miles on to Bahraich (277th mile), as the country is extremely favorable, no rivers of any size to be crossed and no high banks required.

The country throughout is so flat that the question of a maximum gradient does not arise; the steepest put in is 1 in 300 at some bridge approaches, but these can be flattened without much extra cost. As for curves, the usual one has a radius of 5,730 feet, and none need be put in with a less radius than 2,865 feet.

The great expense of this line is due to the large amount of bridging required. The country is close to the Himalayas, and receives a large amount of drainage from them, all the principal streams rising far in the interior of the hills. But the actual country traversed is extremely flat, and its fall varying only from 8 inches to 2 feet per mile, the rivers are mostly sluggish. Well foundations have been estimated for, but it is possible that screw piles will be found less costly and quite as efficient. On no portion of the line is rock or any material of a hard description met with. Good brick clay is obtainable everywhere, and kunkur in most parts. Stone ballast is not to be had at any of the river crossings, it will therefore have to be brought from the hills by boat or by tramway.

Gorakhpur-Nichloul.—The branch from Gorakhpur northwards to the right bank of the Gandak is $51\frac{1}{2}$ miles. As far as Nichloul (45 miles) only one bridge of 3 spans of 40 feet is required; but the 6 miles between that village and Gahanaghat on the Gandak would have to cross the Chota Gandak, a river requiring 4 spans of 40 feet at least. There is apparently considerable traffic *via* Nichloul, but it takes to the river and goes straight to Patna; the railway would not catch much of this owing to the long detour.

Basti-Bansi— $27\frac{1}{2}$ miles. Country extremely flat. The bridging required would be—at 12th mile, 2 spans of 40 feet; at 14th mile, 3 of 40 feet; 16th mile, 4 of 40 feet; at 18th mile, 3 of 40 feet, and at 25th mile, 2 of 40 feet. Brick earth procurable everywhere, but kunkur only at some little distance.

Mankipur-Nawabganj—14 miles to left bank of the Gogra opposite Fyzabad. The Gogra, however, is not easily approachable here, so the permanent station would have to be some $2\frac{1}{2}$ miles from the river, and from here a semi-permanent line would have to be laid to the ghaut. The Chamnai river, 3 spans of 40 feet, is the only river to be crossed.

Gonda-Byramghat—length 30 miles to left bank of the Gogra, and crossing considerable drainage running parallel to the main river. The river Gogra is also so variable that the last 2 miles would have to be of a temporary and moveable character. A bridge of 12 spans of 40 feet is required over the Theri nullah at the $7\frac{1}{2}$ mile from Gonda; one of 3 of 40 feet over the Nakaha nullah at mile $17\frac{1}{2}$; one of 12 spans of 40 feet over the Sarju at mile 19; and one of 5 of 20 feet over the Karia at mile 25.

Bahraich-Nipalganj—length 32 miles, easy line; the only bridging required being 7 spans of 40 feet over the Sohti near Bahraich, 5 spans of 40 feet over the Bamanjotea at the 8th mile, and 2 spans of 40 feet over the Dharmsothi at the 18th mile.

No hard material is found on this branch, although the country rises somewhat towards the hills.

AKHBARPUR TO BUXAR.

In the original contract with the Oudh and Rohilkhand Railway Company that Company was empowered to make a line of railway from Buxar on the East Indian Railway to Moradabad, or other point in Rohilkhand to be determined upon, with branches to Benares, Cawnpore, Byramghat, Fyzabad and the foot of the hills near Naini Tal. They, however, never commenced that portion of their main line between Akhbarpur and Buxar, and the main traffic has always been

conducted down the branch to Benares. After a time the Company was very desirous to be allowed to bridge the Ganges at Benares, and form a junction with the East Indian Railway at that point instead of at Buxar; and to accomplish this they were willing to forego their concession as regards the line between Akhbarpur and Buxar, 110 miles in length. This was permitted in 1880; and it was also arranged that the short branch of the East Indian Railway between Mogul Serai and Benares should be made over to the Oudh and Rohilkhand Railway Company when the bridge is completed. Consequently the Akhbarpur-Buxar length no longer forms a part of the lines to be made by the Oudh and Rohilkhand Railway Company.

The approximate estimate for this line of 110 miles in length, on the broad gauge, with a bridge over the Ganges at Buxar was put down at £1,700,000.

MORADABAD TO RAMNAGAR.

This line also formed a branch line within the original contract with the Oudh and Rohilkhand Railway Company; but as the Board of Directors were very desirous to make their main line join the East Indian Railway at Benares and not at Buxar, and also to effect a junction with the Sind, Punjab and Delhi Railway at Saharanpur, or some neighbouring station, they offered to give up the lines Akhbarpur-Buxar and Moradabad-Ramnagar if they were allowed to make the other connections.

Both of these they have been allowed to make, but as the Moradabad-Saharanpur line has not been admitted within the original guarantee, and is now being made by the Railway Company for Government pending negotiations for a modified but separate guarantee, it is not quite certain whether the Secretary of State has consented to the branch to Ramnagar being omitted from those lines to be made under the Company's original guarantee.

It was estimated that the branch to Ramnagar on the broad gauge, 49 miles in length, would cost £400,000. On the metre gauge the rough estimate in the North-West Provinces scheme for light railways put it down at Rs. 19,60,000, or Rs. 40,000 per mile; but this is probably too sanguine, and if worked as a separate undertaking and requiring separate stock, the estimate must be raised to at least Rs. 25 lakhs.

RAILWAY INTO THE DEHRA DUN.

In 1862 Mr. A. Campbell, the Superintendent of the Ganges Canal Workshops at Roorkee, submitted a project for a light railway from Deobund station, Sind, Punjab and Delhi Railway, through Roorkee and Hardwar to Dehra. It was proposed that this line should be laid on the

bank of the Ganges Canal between Roorkee and the headworks of the canal at Myapur, a distance of 18 miles. In the provincial scheme for light railways submitted by the North-West Provinces Government in 1878, a line from Saharanpur station, Sind, Punjab and Delhi Railway, *via* Roorkee and Hardwar to Dehra, was proposed; this was put down at 66 miles in length, and estimated to cost Rs. 26,40,000, or Rs. 40,000 per mile.

In 1880 a provisional Committee of gentlemen interested in or connected with the Dún and the adjacent hill stations (Mussoorie and Landour) attempted to raise a company to make a railway from the Deobund or Nagul station of the Sind, Punjab and Delhi Railway, through Roorkee, Hardwar, and Dehra to Rajpore, at the foot of the ascent to Mussoorie and Landour. The gauge of the railway was left open, but the rough estimates were made on the assumption that it would be metre. Its length from Deobund was estimated at 75½ miles, and its probable cost at Rs. 30 lakhs. It was considered that the line between Roorkee and Hardwar would be permitted to be placed along the canal

References.

P. W. D. Pros	July	1879, Nos	195-254.
"	"	September 1881,	" 38-60.
"	"	January 1882,	" 142-3.
"	"	February 1882,	" 71-2.

bank, and thus save a large expenditure in bridging the various hill torrents flowing southwards from the Siwalik range of hills, but if that was not permitted it was considered that the saving in distance (about 2 miles) by taking the railway along the more direct route would go far to counterbalance the extra bridging. To build and work such a railway it was considered that it would be necessary to raise a capital of Rs. 35 lakhs. The concessions which the provisional Committee proposed to ask Government for were large, and practically amounted to a guarantee of 5 cent. to the shareholders; but even this did not tempt offers to subscribe sufficient capital.

The question of constructing such a railway was also complicated by the fact that the Oudh and Rohilkhand Railway Company had been striving for years to get the line between Saharanpur and Moradabad added to their guaranteed system. This they have not accomplished, but they have been allowed to commence the construction of the line pending negotiations for a modified guarantee. As a branch from Roorkee to Hardwar on the same gauge (5 feet 6 inches) has always formed part of the project, the provisional Committee of the Dehra Dún Railway project, finding that about half their proposals, (*i. e.*, from the Sind, Punjab and Delhi Railway to Hardwar, about 38 miles) would be constructed by another Company, gave up further interest in the matter.

The project for a railway into the Dehra Dún is, however, being revived, and estimates are being prepared with a view to see if a direct line from Saharanpur through the Siwaliks is not feasible except at inordinate expense. The present cart road crosses the Siwaliks by the Mohun Pass, and it is considered that a line of railway can be got over that pass with no steeper gradients than 1 in 30 in the most difficult parts. It is also suggested that the line might be taken over the Timli pass on the road to Chakrata, as that pass would admit of easier gradients; but that route would be very circuitous.

GODHRA-GWALIOR-CAWNPORE.

For this scheme see notes on RAJPUTANA AND CENTRAL INDIA.

PUNJAB INCLUDING SIND.

The following gives the lengths of railway open, under construction, and in course of preparation on the 1st January, 1882, within the Punjab and Sind.

					<i>Open to traffic.</i>	Miles.
Sind, Punjab and Delhi Railway, broad gauge,	{ double line,	..	..	..	4½
	{ single line, ..	..	..	..	547
Indus Valley Railway,	" "	..	..	..	653
Punjab Northern Railway,	" "	..	..	..	301
	metre gauge,	..	..	..	54
Rajputana-Malwa Railway,	" "	..	..	..	68
Total,					..	1,619½
<i>Under construction.</i>						
					Miles.	
Attock to Peshawar,	broad gauge,	..	..	..	47
Miani to Bhera,	metre	"	..	..	10
Amritsar to Pathankot,	broad	"	..	..	65
Rewari to Hissar,	metre	"	..	..	89
<i>Projects under preparation.</i>					Miles.	
Hissar to Ferozepore,	metre gauge,	..	..	..	204
Umballa Cantonment to Kalka,	broad	"	..	..	41
Rawalpindi to Murree,	2 feet 6 inch gauge,	..	..	..	46
Miani to Khewra (Salt Mines),	metre gauge,	..	..	..	12

The following is a short narrative of the several projects proposed from time to time:—

INDUS BRIDGE AT SUKKUR.

The river Indus, after flowing through an alluvial plain for several hundred miles, meets at length an obstruction in the limestone range at Sukkur, through which it now passes through two gorges—the Rohri channel and the Sukkur channel—which are separated by the island of Bukkur. It is

<i>References.</i>			
P. W. D	Pros.	August	1878, Nos. 181-95.
"	"	November	1879, " 20-1.
"	"	April	1882, " 102-3.
D. G. Rys.	"	April	1882, " 23-40.
"	"	June	1882, " 201-2.

evident that in past times the river has not always taken this course, but that its waters have at some remote period passed to the east down the Eastern Narra valley into the Runn of Cutch, and at another period to the west by Jacobabad and the Munchar Lake. The period at which it burst through the limestone range at Sukkur is not definitely known, but from an inscription on a shrine it is believed that the change took place about 930 years ago.

It is difficult to give a decided opinion whether the Indus may at some future time leave its present channel between Rohri and Sukkur, as the limestone range does not extend far on either side, and there is quite sufficient low ground towards Jacobabad on the one side and down the Narra valley on the other, to account for the changes in its bed noticed above; but the Commissioner of Sind, from an experience of 33 years, states (1882) that within that period the river has rectified itself three times, spilling alternately over the right and left bank above Sukkur, whilst showing no tendency to abandon the main channels through the limestone range. Major Browne, who resided for a time at Sukkur for the purpose of thoroughly investigating all the local conditions which might affect the construction of a bridge over the Indus at that point, states that there is reason to believe that the river takes periodic sets from east to west and *vice versa* at intervals of about 10 years.

Any tendency to outflank the limestone range must of course be carefully watched and checked from time to time; but the construction of the river embankments on both sides of the river will have the effect of checking any tendency of the river to leave the present channels. The river Indus, after passing through the Rohri and Sukkur channels, unites below the island of Bukkur into one channel, and then gradually widens out until it again attains the ordinary condition of a river in an alluvial plain.

Above the passes the river wanders about over very wide limits, and it would be impossible to place a bridge there; but for a comparatively short distance below the passes the river is kept within certain fixed points, from which it cannot escape, unless the river should leave the cleft in the limestone range altogether.

At first sight the natural position for a bridge appears to be that which is marked as the "original" crossing on the accompanying plan (*see* Plan of Indus at Sukkur at end of Chapter). This site was originally selected by Mr. Brunton, who made the first surveys for the Sind Railway Company in 1858, and it was afterwards adopted by Colonel Peile, then Director of the Western System of State Railways; though Mr. Campbell, the Engineer-in-Chief of the Indus Valley Railway, suggested the adoption of a longer crossing through the alluvial portion of the river below the town of Sukkur. This crossing is marked on the plan as "Campbell's" crossing.

Mr. Campbell's suggestion was, however, discarded on the ground of expense, and a project based on the design of a stiffened suspension bridge was worked out. This design comprised a stiffened suspension bridge, 675 feet from centre to centre of towers, over the Rohri channel, with an ordinary girder bridge of two spans of 250 feet clear span over the Sukkur channel. But on careful local investigation it was discovered that the town of Rohri, which had hitherto been supposed to have been built on solid rock, was situated on soil which, for a depth of 36 feet, was made up of stable refuse, old bricks, sewage and other rubbish—a fact which materially increased the difficulty of anchorage; also the existence of a vein of yellow clay, soluble in water and from $2\frac{1}{2}$ to 3 feet in thickness, was noticed to dip in such a direction as to throw serious doubts on the stability of the foundations at the "original" site.

In order to avoid these difficulties, Major Browne suggested the adoption of an alternative site for the bridge at a point marked the "Haji Motu" crossing (*see* Plan). This crossing necessitated an increase in the span from 676 to 786 feet from centre to centre of the towers; but in consideration of the difficulties of anchorage and approaches, the cost of a bridge at the Haji Motu crossing was estimated at a lower figure than one at the "original" crossing.

Mr. Ramsay, then an Executive Engineer at Sukkur, with the view of reducing the cost by introducing piers in the stream, proposed an alternative site, which is marked as the "Sutteen" crossing; but as the river at that point runs with a velocity of 13 feet per second, and the sand in high flood is scoured out 85 feet deep to the bare rock, and as the rock even at that depth is probably not sound, the risks and difficulties involved in founding piers in such a position appeared to be too great to be undertaken.

The Haji Motu crossing proposed by Major Browne was at the time adopted, and that officer prepared detailed drawings for a stiffened suspension bridge at that site. The estimate of this bridge, with its approaches, as deduced from the working drawings, amounted to £437,000, and this cost was so high that Mr. Molesworth was induced to consider whether some other plan might not be designed by which the cost could be reduced. He consequently prepared a design for a braced steel arch having a span of 750 feet and a rise of 200 feet,* with a suspended roadway and railway, the rough estimate for which showed that a saving of about £130,000 would be effected by a bridge so designed when compared with the cost of the stiffened suspension bridge. This design was favorably looked upon, and in the year 1879 Mr. Molesworth was deputed to England to confer personally with Mr. Rendel, the Consulting Engineer to the Secretary of State, and to settle with him the details of such a structure.

In discussing the details, Mr. Rendel was anxious, if possible, to effect a reduction of span; and as Mr. Molesworth considered that the saving effected by the better foundations of the Haji Motu crossing would be nearly balanced by the saving on the superstructure of the smaller span at the "original" site, it was agreed that if on further investigation the difficulty of foundations should not prove to be very formidable, the adoption of the shorter span should greatly diminish the difficulty of erection.

Meanwhile, however, financial difficulties intervened, and the Government of India considered it impossible to undertake the bridging of the Indus until other and more important works in hand or in contemplation had been advanced nearer to completion. It was therefore decided that the traffic of the railway should be temporarily worked by means of a steam ferry. Subsequently the question of constructing a bridge was again raised, and in 1880 Mr. J. R. Bell, Executive Engineer, was deputed to make borings, sink wells, and otherwise investigate the "original" site.

The results of this investigation showed a very unsatisfactory condition of the rock. The river just above the proposed site may be described as passing over a submerged waterfall, the crest of which is about 20 feet below low water, and is of horse-shoe form, nearer to the Bukkur than to the Rohri side of the channel. The pit at the foot of this crest is certainly 80 or 100 feet deep, but there is no certainty whether even at this depth the bottom is rock. The crest is, moreover, cut through by an oblique rift about 0 feet deep, the effect of which is to throw the rush of the under-current on the Bukkur side of the channel. Further investigation also showed the existence of other clay bands than that discovered by Major Browne, as well as pot-holes of irregular occurrence.

The action of the water has washed the clay from the pot-holes and from the veins of clay, and the limestone being undermined has fallen in irregular masses, so that there seems no doubt that much that has been hitherto considered solid rock consists of nothing but detached masses which have fallen in consequence

* Subsequently modified to 150 feet.

of this action. The action is still going on, and Mr. Bell considered that it would not be safe to found on the "original" site at a depth less than 50 feet below low water; but there is no guarantee with a rift of 100 feet in depth and probably more, that the current rushing by may not undermine to a greater depth than this by eroding veins of clay which possibly exist at a still lower level.

Under these circumstances it seemed doubtful whether a bridge of such magnitude could be placed at this site; and the existence of more clay bands and irregular pot-holes generally throws some doubt also on the Haji Motu site, although the channel there is wider and both the rush of water and the depth of scour probably less. It is possible that a bridge erected at either site might stand for centuries, but there is an element of uncertainty which prevents either being recommended for adoption if another site could be found.

All these facts and inferences led to the reconsideration of the bridging of the Indus lower down stream, where the increased sectional area of the river and the reduced velocity of the current seemed to admit of the construction of an ordinary girder bridge consisting of comparatively short spans supported by piers.

The first site that commended itself was that which is marked as the "Point crossing" on the plan, and the necessary borings and soundings to determine the practicability of bridging the river at that point were accordingly undertaken. Another crossing marked on the plan as the "Island crossing," appearing to offer advantages was also investigated, but the results were not so favorable as were anticipated.

The borings taken showed that the difficulty of founding piers at the "Island" crossing would be very considerable, as there was rock in very irregular shape swept bare in time of flood at considerable depths. At the "Point crossing" also a shoal promontory of rock jutted out into the river, obstructing the channel and rendering the founding of piers a difficult task, though by no means so difficult as in the case of the "Island" crossing.

Under these circumstances a site about 800 feet lower down stream was investigated. The site is marked as the "Bunder" crossing in the plan; and though it necessitates a somewhat greater length of bridge than either the "Point" or "Island" crossing, yet it appeared to be free from most of the difficulties to which the other crossings are exposed. But further investigations in an abnormally high flood during 1882 has proved that the scour at that crossing is far greater than was originally supposed, and rendered doubtful the success of a bridge at that site.

The different crossings that have been proposed may be here enumerated—

- 1—The "Original" crossing. One span of 650 feet in the clear over the Rohri pass with two spans of 250 feet in the clear over the Sukkur pass = 1,150 lineal feet of waterway;
- 2—The "Haji Motu" crossing. One span of 740 feet in the clear over the Rohri pass and two spans of 250 feet over the Sukkur pass = 1,240 lineal feet of waterway.
- 3—The "Suttee" crossing. One span of 300 feet and three spans of 250 feet over the Rohri pass with one span of 250 and one span of 300 feet over the Sukkur pass = 1,600 lineal feet of waterway;
- 4—The "Island" crossing. Six spans of 250 feet = 1,500 lineal feet of waterway;
- 5—The "Point" crossing. Eight spans of 225 feet = 1,800 lineal feet of waterway;
- 6—The "Bunder" crossing. Eight spans of 250 feet = 2,000 lineal feet of waterway;
- 7—"Campbell's" crossing. Thirteen spans of 250 feet = 3,250 lineal feet.

These are all clearly shown in the Plan to be found at the end of the Chapter, and sections at the several sites are also given in another Plan.

Sites Nos. 3, 4, 5 and 6 may be considered inadmissible on account of the difficulty of founding piers; the choice is, therefore, practically narrowed down to Nos. 1, 2 and 7.

“Campbell's” crossing admits of the construction of a bridge on the principle that has been adopted with great success for many of the rivers of the Punjab; this plan consists of protecting with loose stone cylinders sunk through soft strata, the stone being allowed to settle as acted upon by the current and being supplemented by additional stone to allow for change in the stones that are underscoured and consequently alter their position until the regimen of the river is reached when no further action appears to take place.

Before the adoption of this principle many piers of the bridges of the Sind, Punjab and Delhi Railway were overthrown; but the deposit of loose stone around the piers effectually secures them from danger, by transferring the deep scour to the centre of the span; and although in some cases the piers are sunk to depths of only 40 feet, and the scour is often considerably below this depth, and although the spans are comparatively short so that the deep scour cannot be very far from the pier, yet they stand remarkably well. Moreover, in the case of many of the bridges of the Punjab, the protection is effected by means of round boulders from about 4 to 9 inches in diameter, or by blocks of brickwork-concrete of light specific gravity, and the material in which the piers rest is often a light micaceous sand little better than quicksand.

The investigation of “Campbell's” crossing shows that the condition will be far more favorable to safety at this crossing than in the majority of the Punjab bridges. The piers are to be sunk from 80 to 90 feet, the foundation probably rock, and the spans are much greater than in the case of those in the Punjab rivers, and consequently the deep scour can be removed to a greater distance from the piers. Moreover, the protection available is of dense limestone of considerable specific gravity and angular in form.

It has been found by experience that loose stone protection under the action of the current assumes a natural slope of about 1 to 1. In the case of the Punjab bridges the procedure usually adopted is to pile the stone evenly around the pier, and then if the top of the cone of loose stone falls below a certain fixed level, it is supplemented by the addition of more stone, until it reaches the standard height fixed, which is generally just above low-water level. As regards the bridges on the Punjab Northern Railway, the amount of stone protection varies from 40,000 to 60,000 cubic feet of stone around each pier; but this amount should probably be doubled for a bridge at “Campbell's” crossing. The velocity of the current near the Sukkur bank of the Indus at Campbell's crossing is comparatively low, and this is very favorable for navigation by native boats, which always pass by the Sukkur bank. This low velocity of current allows of the adoption of a much lower headway than is necessary for the purposes of navigation in the Rohri channel, where the velocity of the current is very great. For a bridge at this crossing a bridge of 13 spans of 264 feet in the clear, supported on cylinders of steel or of brick or masonry when practicable, is proposed.

It would be necessary to provide a narrow roadway on each side of the railway and on the same level as the railway; these may be made very narrow, and as it is desirable to keep the railway as low as possible with the view of obtaining the best gradient for the approaches, the cross girders should be slung beneath the bottom boom of the main girders. The estimate for a bridge at “Campbell's” crossing amounts to Rs. 41½ lakhs in round numbers.

In considering sites Nos. 1 and 2, some modification of the original proposals is necessary in consequence of the uncertain character of the rock to which allusion has already been made. It has been suggested that an increase of span at those sites might be adopted with advantage, so as to diminish the risk even at an enhanced cost. The altered span would be nearly the same at both sites—namely,

820 feet at the "Original" crossing and 830 feet at "Haji Motu" crossing. The rock at the latter crossing is more sound, and the former crossing has the disadvantage of having its approaches through the heart of the town of Rohri, which not only entails heavy compensation, estimated at more than one lakh of rupees, but also seriously limits the space for erection. The preference therefore seems to be in favor of the "Haji Motu" crossing.

Comparing this crossing with "Campbell's" crossing, the relative cost of the two bridges is in the proportion of $36\frac{1}{2}$ lakhs of rupees for the "Haji Motu" crossing to $41\frac{1}{4}$ lakhs for "Campbell's" crossing. The "Haji Motu" bridge is exposed to more risk during erection, whilst "Campbell's" bridge is exposed to more risk after erection. The "Haji Motu" crossing is less favorable than "Campbell's" crossing for the navigation of native craft above Sukkur, but it does not interfere at all with the larger native craft plying below Sukkur. The "Haji Motu" crossing does not necessitate any remodelling of the present station at Sukkur, whilst "Campbell's" crossing will necessitate a complete change. The two crossings appear to be nearly balanced so far as their relative advantages are concerned, except in the matter of cost, in which the "Haji Motu" crossing has the advantage by about $4\frac{3}{4}$ lakhs of rupees. But a bridge at "Haji Motu" will probably require more time for its erection than one at "Campbell's" site; and being novel in character and unprecedented in magnitude, greater uncertainty in the amount of its estimate is involved.

RAIWIND-FEROZEPURE-LUDHIANA.

As far back as June 1866 the Agent of the Punjab Railway applied for permission to make a survey for a branch railway from Raiwind station to a point on the

<i>References</i>			
P	W. D	Pros.	July 1879, Nos 366-9
"	"	"	July 1880, " 127-8.
"	"	"	January 1882, " 94-6.

way from Raiwind station to a point on the Sutlej opposite Ferozepore. The line would be about 25 miles in length, would probably cost about £8,000 per mile, and should form part of the Punjab Railway under its guarantee. The survey was made but charged against "ordinary" funds; and as the Secretary of State did not consider the construction of the branch a matter of primary urgency, the proposal remained in abeyance.

The Committee appointed by the Punjab Government in December 1867 to consider the question of railway extension in the Punjab, reported that the Raiwind-Ferozepore branch would cost £8,300 per mile exclusive of rolling stock, and that it would only pay from 1.8 to 2.4 per cent. on its capital cost. The estimate of traffic, however, did not include the increased traffic which would be thrown on the main line if the branch were made. In reviewing the report of this Committee, the Lieutenant-Governor of the Punjab could not recommend the construction of this branch.

In December 1876, the Agent, Sind, Punjab and Delhi Railway Company, was permitted to make a survey of the line from Ludhiana to Ferozepore, with a view of preparing estimates, &c., of a loop line from Ludhiana *via* Ferozepore to Raiwind. The results of this survey may be summed up as follows:—

Raiwind to Kasúr—16 miles through a flat, well-cultivated and fairly populated district. Earthwork light; and for bridgework the chief bridges required are one of 100 feet span over the Bari Doab Canal, and one of 6 spans of 40 feet over the old bed of the Beas.

Kasúr to Sutlej River right bank— $8\frac{1}{4}$ miles. Earthwork very light and only two bridges required, one of 40 feet span and one of 2 spans of 20 feet.

The Sutlej bridge— $4\frac{3}{4}$ miles from Gunda Singh Wala, on right bank, to Ferozepore on left bank. Two main channels, each proposed to be bridged separately, the bank on the island being securely faced with stone. The aggregate waterway proposed was 4,800 lineal feet; girders 250 feet span, roadway on lower boom; piers of brick on two wells 18 feet diameter sunk 80 feet; abutments same as piers with wing-walls on wells varying from 10 to 15 feet in diameter and sunk 50 feet. Stone protection for the Sutlej bridge and necessary training works was estimated for to the extent of 3,828,000 cubic feet.

Ferozepore (Sutlej left bank) to Ludhiana—80½ miles, through exceedingly populous and cultivated country. Earthwork very light; no streams or nullahs to be crossed, and only entailing most trivial bridging.

The estimate was framed for a single line on the 5 feet 6 inch gauge, with double-headed rails weighing 68 lbs. per yard, laid with Greaves' bow sleepers weighing 84 lbs. each, and amounted to Rs. 90,55,279 for the whole line, but as it was found to have been under-estimated in several important items, it was revised as follows:—

	Rs.	or	Rs.
Ludhiana to Ferozepore (Sutlej left bank), ..	43,31,097		53,802 per mile.
Sutlej bridge and island (from left to right bank), ..	56,55,627	"	11,90,658 "
Gunda Singh Wala (Sutlej right bank) to Raiwind, ..	14,35,276	"	59,187 "
or right through, Ludhiana to Raiwind, ..	1,14,22,237	"	1,04,313 "

This estimate is exclusive of rolling stock, and gives large provision for protection to the Sutlej bridges, and for training works. The estimate for permanent way was, however, made at a time that iron was expensive, and so it is probable that about Rs. 5 lakhs can be taken off the whole estimate without altering its value.

It seems that even as late as May 1877, when these estimates were forwarded to the Board of Directors, Sind, Punjab and Delhi Railway Company, no reliable statistics of the trade to be accommodated at Ferozepore and its surrounding districts had been amassed; and consequently the Railway Company could not undertake the loop line without having it included in its guarantee. This the Government of India was not prepared to accept. It was known that the distance from Ludhiana to Raiwind was 32 miles shorter *via* Ferozepore than *via* Lahore; that Ferozepore was the great arsenal for the supply of the wants of the Punjab frontier; and that the wreck by flood of the existing bridges of the Sind, Punjab and Delhi Railway over the Sutlej and the Beas had been several times imminent; yet the enormous cost of bridging the Sutlej at Ferozepore (below its present junction with the Beas) and its annual maintenance presented a serious difficulty. There is apparently no decided channel opposite Ferozepore through which the Sutlej runs, and so it is quite possible that any extreme flood that would wreck the existing bridge at Phillour would also wreck a similar bridge at Ferozepore, the intervening distance being less than 100 miles.

When the project of extending the Rajputana Railway from Rewari through Hissar to Ferozepore began to take a tangible shape, so it was considered that the construction of the Raiwind branch without bridging the Sutlej would suffice; but when the traffic estimates came to be enquired into, there did not seem sufficient to warrant the line being classed as a productive public work. That Ferozepore is a mine of wealth to any Railway Company that will seek its traffic has since been proved; but the stringent orders regarding the extension of any guarantee to the present guaranteed Railway Companies are against the project being taken up by the present Sind, Punjab and Delhi Railway Company, and the branch line is too short for any other Company to take it up as a separate concern.

HISSAR-FEROZEPORE.

This will be a continuation of the protective railway from Rewari to Hissar now in progress. The direct route would be *via* Fatehabad and Faridkot, but the object being to protect a tract of country peculiarly exposed to the effects of drought

References.

P. W. D. Pros.	March	1881,	Nos. 62-80.	by connecting it by rail with grain-producing tracts, it was considered advisable to carry
"	"	June	1882, "	112-37.
"	"	July	1882, "	125-7.
"	"	July	1882, "	136-7.
D. G. Ry.'s Pros.	August	1882,	"	124 5.

the surveys more westward through Sirsa, Bhatinda, and Maktsar towards Fazilka and Ferozepore. The late Lieutenant-Governor of the Punjab, Sir R. Egerton, was also in favor of this route, as it threw the line almost entirely into British ter-

ritory, and reduced to a minimum the length of the obligatory branch to Fazilka, an important trade centre on the Sutlej.

The Maharajah of Faridkot has represented that the more direct line, which would pass through a part of his territories and run from Bhatinda *via* Kotkapura and Faridkot, would serve a much more favorable tract of country, and still be quite within reach of the more inaccessible parts of the country. Such a line would increase the length of the branch to Fazilka considerably. The present Lieutenant-Governor of the Punjab, Sir C. Aitchison, is in favor of the more direct line from Bhatinda *via* Faridkot to the detour *via* Maktsar, as the direct line from Ferozepore, the great grain mart, to Rajputana, would be much shortened, a consideration to which His Honor places considerable importance in a famine protection railway. The Lieutenant-Governor has accordingly requested that this line be also surveyed and an approximate estimate made. This will be done in the working season of 1882-83. The detour by Maktsar adds about 15 miles to the length of the line, but otherwise shortens considerably the length of the branch to Fazilka.

The Guggur river is the principal stream to be crossed, and will probably require a bridge of 15 spans of 40 feet openings. While within the influence of the Guggur the water supply is of fair quality, and attainable at moderate depths; but generally the water supply is very inferior and often positively bad for locomotive purposes.

The line *via* Maktsar has been carefully reconnoitred and estimated for. It is 204 miles in length, made up as follows:—

Hissar to Ferozepore <i>via</i> Sirsa, Bhatinda and Maktsar,	Miles,
Branch Fazilka-Maktsar,	165
River side branch at Ferozepore,	30
" " Fazilka,	3
	6
Total,	<hr/> 204 <hr/>

The estimate for a metre gauge line excluding rolling stock works out to Rs. 85,72,032, or at a rate of Rs. 42,019 per mile.

From the statistics of trade of those districts published by the Punjab Government, it would seem that the prospects of this line are very promising.

DELHI-ROHTAK.

A project for a steam tramway between Delhi and Rohtak was at one time seriously considered, and about Rs. 1½ lakhs locally subscribed towards it; the Government of the Punjab offering a strip, 15 feet wide, of the outer part of the trunk road which runs between Delhi and Hissar, at a nominal rental of Re. 1 per mile per annum.

The distance to Rohtak is 44 miles, and the works would be extremely easy except close to Delhi, but most of the expensive work would be avoided by forming a connexion with the Rajputana Railway about 1½ miles out of Delhi.

It was considered that for an initial outlay of about Rs. 3 lakhs the tramway could be constructed and stocked, but the money has not been subscribed, and so the project has been abandoned for the present.

WAZIRABAD TO SIALKOT.

A project for a branch line on the 5 feet 6 inch gauge from the Wazirabad Station, Punjab Northern Railway, to Sialkot has been submitted by the Manager of the Railway. The length of the line would be 27½ miles to the Cantonment, or if in the first instance stopped short at the city of Sialkot, it would only be 25½ miles. Sialkot is a large and important trade centre with a population of 35,000 in the native City and with 12,000 more in the Cantonment; and the population of the district averages 513 per square mile, almost the most densely populated district in the Punjab.

References.

P. W. D. Pros. June 1882, No. 54.
" " August 1882, Nos. 2-15.

The present road between Wazirabad and Sialkot is wide and metalled, and there is abundance of room for a line of railway along the berm on one side without interfering with the road traffic. But the country is wide and open; the line would only have a slight rise of about $1\frac{1}{2}$ feet per mile throughout its entire distance; no drainage of any extent has to be crossed; and as the country is only flooded to the extent of a few inches on the occurrence of extremely high floods, a separate alignment off the road will add very little to the initial cost. By using partly worn rails in its construction, and laying it on the berm of the present road, it is considered that this branch can be made for about 9 lakhs of rupees, or Rs. 35,300 per mile for $25\frac{1}{2}$ miles. An alignment of the road will not add much more to the expense, but even admitting that it would add an extra lakh, the initial cost even then would be under Rs 40,000 a mile for a 5 feet 6 inch gauge line.

The Punjab Government considers that such a branch line would be very favorably circumstanced, and would prove a profitable undertaking as it could not fail to attract and develop a large traffic of both goods and passengers. Whether it would carry any appreciable portion of the present traffic between Kashmir and its great trade centre at Amritsar, is open to question, as the distance between Sialkot and Amritsar, *viâ* Wazirabad and Lahore is 125 miles, whereas by the direct road *viâ* Pasrur it is only $67\frac{1}{2}$ miles. This difference is so great that it seems a question if the convenience of railway carriage would be sufficient inducement to the Amritsar merchants to break bulk at Sialkot rather than bringing their wares straight to their doors in carts without a break of bulk.

Detailed plans and estimates of this branch line are under preparation.

UMBALLA-KALKA-SIMLA.

In April 1866 the Maharajah of Pattiala intimated to Government a desire on the part of that State to construct a line of railway at its own expense from Pattiala to Kalka, crossing the Sind, Punjab and Delhi Railway at the Rajpura station. In the cold season of 1866-67 a survey of the line

<i>References</i>			
P. W. D. Pros	March	1869, Nos.	141-51.
"	"	September 1873,	" 65-85.
"	"	June 1878,	" 149-66
"	"	August 1881,	" 79

was made by Mr. W. C. Furnivall, then in the Sind, Punjab and Delhi Railway Company's service, and the location was mainly dependent on the wishes of the Maharajah and his Councillors. Early in 1867 the Pattiala State, after paying for the expenses of the survey, intimated that it was not prepared to go further with the project; and this put a stop to all further action on the part of Government. In November 1871, it was proposed to make over free of cost to the Pattiala State for the railway to Kalka the 40 miles of rails—weighing 60 lbs. to the yard—that were then in use for the construction of the Sirhind Canal, and which it was thought would be available in 2 or 3 years time. But nothing came of this, and the rails are still in the branch line from the Dauraha Station, Sind, Punjab and Delhi Railway, to Rupar, the head of the Sirhind Canal.

Mr. Furnivall's survey showed that the line from Pattiala to Rajpura would be little over 17 miles in length, and very easy of construction. The bridging required was very light, and the average gradient 1 in 1,320.

Of the line from Rajpura to Kalka, the work would be easy as far as Bunnor, and even from there to the Sukha nullah the average gradient is only 1 in 420. From there to the Kussulla nullah at $21\frac{1}{2}$ miles the work would be more expensive, and the gradient severe, but nothing very great. From the configuration of the country this mountain torrent would have to be crossed twice.

There would be no difficulty in getting a ruling gradient of 1 in 100 over the $21\frac{1}{2}$ miles up to the Kussulla nullah; but from there into Kalka, a distance of 6 miles, the rise is 870 feet, necessitating an average gradient of 1 in 36. By making detours and adding $1\frac{1}{2}$ miles to the length, an average gradient of 1 in 45 was obtained, but the steepest rise was 1 in 28. On this length without excessive cost it seems that a gradient of less than 1 in 40 is not obtainable.

A line from the Rajpura Station is not a convenient one for the bulk of the traffic to and from Simla, as Umballa must be said to be an obligatory point. The distances between Kalka and Umballa and Rajpura are much the same, whereas Rajpura is 18 miles from Umballa Cantonment, over which increased distance all traffic to or from the east would have to go. This is the main traffic, and has therefore to be specially considered.

A line of railway from the Umballa Cantonment station to Kalka, and following generally the line of the present cart road, would have to cross the spill drainage of the Tangra mountain torrent, and would require an extension and costly bridge over the Guggur river, an impetuous mountain torrent. Both of these difficulties can be diverted by utilizing the present bridges of the Sind, Punjab and Delhi Railway, and branching off after the Guggur bridge is crossed. The relative distances by these two lines would be—

Umballa Cantonment direct to Kalka,	39½ miles.
“ “ <i>via</i> Sind, Punjab and Delhi Railway Guggur bridge to Kalka, 44½ “	“

The longer line would lie to a great extent in Pattiala territory, and about half of the shorter line, so one would not serve British territory much more than the other. The original estimates framed for a broad gauge line worked out approximately thus—

	Rs.
Direct line <i>via</i> present road,	36,00,000
Line <i>via</i> Sind, Punjab and Delhi Railway Guggur bridge,	30,00,000
Difference, ...	6,00,000

a sufficient saving apparently to outweigh the detour of 5 miles. If the branch line is stopped at the Kussulla nullah, *i. e.*, if 7½ miles are taken from the above lengths, the estimates would be respectively Rs. 28 lakhs and Rs. 21½ lakhs, or a difference of Rs. 6½ lakhs against Rs. 6 lakhs.

A line on the metre gauge, practically taking the route of the present road, but apart from it, was estimated to cost at least £6,000 per mile, and as its length would not vary appreciably in such country from that for a broad gauge line, its cost in rupees would approximately amount to Rs. 28½ lakhs. There would, therefore, be a saving no doubt if built on the metre gauge; but when the question of working a short branch on a different gauge is considered, the initial saving is not always found to be a saving in the long run.

The Punjab Government is now getting out a new scheme and estimates of a line closely adhering to the present line of road, but stopping short at Pinjore, about 4 miles from Kalka. This will avoid the worst part of the ascent, and if carried out will only add 4 miles more to the journey to Simla in a tonga cart; but it would necessitate the transfer of Kalka to Pinjore, a transfer that would take a long time to carry out. This point would also be the point from which a narrow gauge line would start for Solon if the present cart road to Simla were not followed, as a much easier gradient can be found by going round to the eastward of the Dagshai hill. The length of such a line would, however, be increased by more than 50 per cent. on the present distance by the cart road.

The practicability of a mountain line of railway to connect Simla with the Sind, Punjab and Delhi Railway, has several times been carefully considered. The country between Kalka and Simla is a most difficult one, not merely from its rugged character, but because the lines of natural drainage run across the direct line between the plains and Simla. The present cart road runs through three systems of drainage—the Sutlej, the Jumna, and the Guggur, the last river being a mountain torrent with a confined catchment area, and flowing between the courses of the Sutlej and the Jumna rivers eventually loses itself in the Bikanir desert. The first 16 miles of the cart road from Kalka runs through the valley of the Guggur; from that point onwards the road may be said to run on the watershed between the Sutlej and the Jumna all the way to Simla, 58 miles from Kalka and for a further distance of 40 miles beyond Simla.

The first idea that suggests itself for a railway to Simla is to creep up one of the natural lines of drainage, and thus by a gradual ascent to reach Simla; but a glance at a map illustrating the lines of drainage, shows that this is impracticable. A line up the valleys draining into the Sutlej would entail a length of railway of about 250 miles in the hills before the plains are reached, and of about 150 miles if a line up the Jumna valleys be attempted. Considering that the old road from Kalka to Simla *viâ* Kasauli is only 42 miles in length, and that the present driving road is only 58 miles, a line of railway up one of the natural lines of drainage is out of the question. If, therefore, a railway is ever made, the best route is apparently one keeping generally to the line of the new road.

The gradients on the cart road are roughly as follows:—Between Kalka and Dharampur—15 miles—the road rises very steadily on a gradient of about 1 in 18 to 1 in 20. Between miles 15 and 16 the road is fairly level; 16 to 17 a rise of 1 in 21; 17 to 19 under Dagshai, the slopes are somewhat easier; but from 19 to 21½ miles there is a steady rise of 1 in 20; and for the next 3 miles there is a steady fall with gradients averaging less than 1 in 20. [It is believed that a good deal of this ascent and descent could be avoided by a tunnel of moderate length, and indeed a short tunnel for the purposes of the present road was at one time contemplated]. From the 25th to the 36th mile the gradients are neither very steep nor long, but in the next 2 miles there is a long steep ascent of about 1 in 20, after which the gradients are very irregular until the 48th mile is reached. Between the 48th and the 53rd mile the gradients are good, but from there into Simla, 5 miles, the road rises with a gradient of 1 in 20.

It is estimated that a line of railway of the same character as the Darjeeling line, and taking generally the line of the present cart road, would cost at least 35 lakhs of rupees, and would be an extremely expensive line to maintain, as the hills are formed of decomposing rock, and slips are constant during the rainy season.

RAWALPINDI TO MURREE.

An influential meeting of persons interested in the welfare both of Rawalpindi and Murree was held at Pindi in November 1881 to discuss the project of a railway to Murree, and the idea was warmly supported. The Punjab Government was also much in favor of the project, and at once appointed a small engineering staff to survey the line.

References

P W. D. Pros. December 1881, Nos 37-8
 " " August 1882, " 77-87.

The results of the survey are these. For the first 14 miles from Rawalpindi the country is fairly level, and the cart road, or else its general direction, can be followed, but beyond that the hills begin, and the cart road is so steep and tortuous as to be impracticable for a railway. The line selected between the 14th and 20th miles lies up the valley of the Kurrung river up to Chuttur; there are no heavy works on this portion, the steepest gradient is 1 in 40, and with the exception of one of 100 feet radius, the curves are easy. At Chuttur there is a convenient site for a station, with a plentiful water supply.

At Chuttur the railway crosses the cart road and follows the Chuttur valley for 5 miles, when it again crosses into the Kurrung valley nearly opposite Tret. At this point the railway has attained the same elevation as the cart road, with grades nowhere severer than 1 in 30, compared with 1 in 17 on the cart road.

Generally from Chuttur to Gora Gully (37th mile) the gradient is almost continuously 1 in 30, never greater, and with no curves sharper than 100 feet radius. At Gora Gully the line crosses into the Murree Valley without cutting or tunnel, and from there into Murree (46th mile) there are no heavy engineering works of any kind.

All along the route lime and building material are plentiful, and an inexhaustible supply of hard disintegrated limestone at hand ready prepared for ballast.

Approximate estimates for a line on the 2½ feet gauge show that the lower 20 miles of the line ought to be constructed for about Rs. 25,000 per mile, and the remaining 26 miles at about Rs. 55,000 per mile. This gives a total of Rs. 19,30,000 for the cost of the whole project.

The distance by the present cart road is 39 miles, so that the line of railway will only be 7 miles longer. But the proposed terminus is nearly 2 miles from the centre of Murree, and about 400 feet below the Mall.

BHERA TO SHAHPUR, WITH POSSIBLE EXTENSION.

In October 1881 sanction was given to prolong the Salt Branch of the Punjab Northern Railway from Miani to Bhera, a distance of 10 miles, and it is further proposed to extend it southwards to Shahpur, another 30 miles.

References.

P. W. D. Pros.	December 1879,	Nos. 45-6.
"	January 1880,	" 22-3
"	December 1880,	" 30-4.
"	March 1881,	" 57-8.
"	November 1881,	" 81-6.

Since the opening of this metre gauge branch down the valley of the Jhelum, a comparatively large traffic both in passengers and goods (omitting salt the traffic in which was known) has developed quite beyond expectation. This line has been built very cheaply, as the works are very light, and partly worn light rails have been utilized. The probable cost of the line from Miani to Bhera is only about Rs. 27,600 per mile, and its extension to Shahpur would be at about the same rate. The only further extension in this direction southwards would be to Khushab, 16 miles, where the main route westwards towards Dera Ismail Khan crosses the Jhelum. At this place there is a favorable site for a bridge if the line was ever carried on across the desert towards Dera Ismail.

It has, however, been mooted several times to make a permanent bridge over the Jhelum at Pind Dadun Khan, and thus allow the salt to be filled into railway trucks at the mines. If this scheme is ever carried out most of the difficulty in getting railway communication to Dera Ismail would be removed, as the line of railway could be taken almost along the surface of the ground; and as the rainfall in that part of the Punjab is very light, the bridging required would be almost nil. The present Salt Branch has sidings down to the banks of the Jhelum from Miani to opposite Pind Dadun Khan, so if the bridge were built over the river for the accommodation of the salt traffic, any extension need only be considered from the right bank of the river. From Pind Dadun Khan the line would run down the right bank of the Jhelum along fairly cultivated country to Khushab, a distance of 42 miles, would be little more than a surface line, and not require much bridging. From Khushab to Bhakhar, a town 12 miles south of Darya Khan, the point on the Indus opposite Dera Ismail Khan, the direct route is only 92 miles in length, but it would run right across the sandy desert between the two rivers, and be quite unproductive. The proper route for a line of railway lies further to the north, skirting the salt range hills and hitting the Indus somewhat higher up. This route only gives 14 miles of desert crossing (between Van-Buchran and Kundian); accommodates all the principal villages, (population about 2,000 each); is only about 14 miles longer than the direct route; and there is good water through the whole length. The names of the principal villages and the distances from Pind Dadun Khan are as follows:—Bhilawal (10 miles); Lileh (18); Sial (27); Rajar (37), Khushab (47); Hadali (56); Gunjial (73); Bandial (78); Van-Buchran (87); Kundian (101); Pipli (115); Kallar Kot (126); Darya Khan (153). From Darya Khan to Dera Ismail Khan is about 13 miles, with the Indus intervening.

The Punjab Government does not think that such a line could ever be a commercial success; and considers that if rapid communication with Dera Ismail was required from the military and political points of view, the route should be *via* Mooltan and not *via* the Punjab Northern Railway. Such a line would, however, necessitate a most costly bridge over the Chenab opposite Mooltan. The advocates of the proposed line across the Sind-Saugor desert do not look so much to the commercial advantages to be derived from the country to be passed

through, as to the impetus which will be given to the Trans-Indus districts. The line would open up the Bannu and Dera Ismail Khan districts, including the rich grain-producing Murwut country and the valley watered by the Kurram; would give a line of railway traversing the Punjab through its centre, and afford easy relief to those Trans-Indus military stations now so difficult of access; and would open up communication with the important trade route from Afghanistan *via* the Gumal pass. This pass is perhaps the most important of all those leading into Afghanistan, being easy and open all the year round; and the estimated annual value of the trade by this route is about Rs. 70 lakhs.

The extension to Darya Khan should not cost more than the present Salt Branch, so that the entire 153 miles, with a fair quantity of rolling stock, would not cost more than Rs. 45 lakhs to make.

RAILWAY TO QUETTA AND KANDAHAR.

In the cold weather of 1857-58 a survey for a line of railway from Sukkur

		<i>References.</i>		
P. W. D. Pros.	July	1877,	Nos 47-91.	towards Dadur, at the foot of the Bolan pass,
"	"	January	1879, "	163-72.
"	"	February	1879, "	264-6.
"	"	May	1879, "	223-5.
"	"	January	1880, "	21-70.
"	"	June	1880, "	17-20.
"	"	June	1880, "	28-44.
"	"	May	1881, "	8-11.
"	"	July	1881, "	196.
"	"	August	1881, "	157.
D. G. Ry.'s. Pros.	June	1880,	"	33-5.

was commenced by some Engineers in the employ of the Sind Punjab Railway Company. General John Jacob was probably the originator of the scheme, the objects in view being to develop the northern trade and to establish a military post in a healthy locality both as a sanatorium and as a camp for European troops in Upper Sind. A line for a railway was actually surveyed from Sukkur through Shikarpur to a point a few miles beyond the Sind frontier, a distance in all of about 50 miles, when work was stopped, as it was found that there was no chance of the project being taken up in earnest.

Nothing further in this direction seems to have been done until the end of 1876, when reconnoitring parties were organized to examine a line from Sukkur *via* Jacobabad to Dadur, and an alternative route from Larkhana *via* Jull, Gundava and Shorun, to Dadur. Another party investigated a route from Sukkur, avoiding Jacobabad, and keeping along the protective bunds on the west bank of the Indus to the hills at Kusmore, and from thence south of the hills to Sibi and the foot of the Bolan.

These survey parties also investigated the Bolan and Moolla passes to Quetta and Kheilat. The Moolla pass was found to be much easier for a line of railway than the Bolan, but if Quetta was the objective point, the detour by that pass would be excessive. All these survey parties were withdrawn at the end of March 1877, and nothing further was done in the matter until the end of 1879, although meanwhile a military expedition had been sent to Kandahar and Southern Afghanistan.

But after the news of the massacre at Cabul, it was decided to lay a surface line of railway, 5 feet 6 inch gauge from Ruk station on the Indus Valley Railway through Jacobabad to Sibi at the entrance of the Nari pass, and about 20 miles to the east of the entrance to the Bolan pass. The permanent way material was collected from the reserve stores of all the guaranteed railways in India; the orders for its collection issued on the 10th September, 1879, the first rail was laid at Ruk on 1st October, 1879, and the last rail into Sibi on the 15th January, 1880, thus the 133 miles of intervening line were laid in $3\frac{1}{2}$ months, or at an average rate of $1\frac{1}{2}$ miles per day. A greater speed was anticipated, but was not found practicable owing to the great difficulty experienced in maintaining proper arrangements for water supply for so large an establishment (3,500 men and 1,500 animals) in the midst of the desert many miles away from any natural water supply. A branch of 19 miles from Sibi to Pir Chowki at the entrance to the Bolan Pass was ordered to be constructed early in September 1880, and in the following month it was opened for military traffic.

At the same time that orders were given for the concentration of material at Ruk for a broad gauge line to the foot of the Bolan, orders went to England for sufficient permanent way material and rolling stock to lay a metre gauge line up the Bolan pass to Quetta, and possibly into the Peshin Valley beyond. The whole of the work was placed under the Governor of Bombay, and Sir Richard Temple immediately visited the country and minutely inspected the different routes from the plains of Sind to the plateaus of Southern Afghanistan. It was on the results of Sir R. Temple's reconnaissance that the Government of India decided to abandon the old trade route *via* the Bolan, and run the line of railway up the Nari river and *via* Harnai, Sharigh, and the Chapar rift towards Gulistan Karez in the Pishin valley. Mr. Molesworth carefully inspected both routes, and he considered the Harnai route was infinitely superior to that *via* the Bolan.

The Bolan Pass has never been properly surveyed for a line of railway; its difficulties are well known, but before any leisure time could be given to examine it carefully, military exigencies demanded a line of railway towards Kandahar,

and the Harnai route was chosen. A general description of the pass follows. From the mouth of the pass to Kundilani (9 miles), the road track follows the bed of the stream, and crosses it frequently; the floods rise fully 10 feet above the usual water level. Along this part a line of railway could be run on a raised bank above ordinary floods with easy gradients and moderate curves without excessive labor or cost.

From Kundilani to the Kirta plain is 8 miles; the lower 4 miles of which lie through a narrow winding gorge, subject to floods which rise some 25 feet and completely fill the gorge between its vertical walls. Through this a line of railway could only be taken by gradients of 1 in 20 and sharp curves of 70 feet radius. It was believed this gorge could be avoided by running up either the Postal or Kundilani ravines, and it is possible that an uniform gradient of 1 in 40 may be so obtained, but the cost would be apparently very great. This alternative was again examined in February 1881 and found unsuitable and very long.

From the Kirta plain to Mach is 30 miles. Through the Kirta plain and on to Bibinani the ascent would be comparatively easy, but some difficult crossings of old beds of the river are met with, and there is a stiff descent to Bibinani. From Bibinani past Abigum to the left bank of the Bolan near Mach the track ascends considerably and crosses two difficult nullahs. If the Kundilani gorge can be turned the line of railway would avoid the descent to new Bibinani, and keeping to the east of the Kirta valley would gradually ascend by a gradient of about 1 in 40 to the left bank of the Bolan river at Mach. From this point the present road descends to the river bed, a depth of 200 feet, a damaged causeway slants across the river, and a slight ascent to the high ground on the right bank leads to the camping ground at Mach.

From Mach to the summit is 22 miles. From Mach the road rapidly descends, again crosses the river, and with gradients of 1 in 6 and 1 in 10 gets on to the Hirok plateau. After the third mile from Mach the road crosses the beds of two deep nullahs, the descents being steep and tortuous; and for the rest of the way to the summit of the pass the road is of the same description crossing the bed of the stream constantly. The intermediate lengths between the river crossings are fairly straight, and being 5 feet above the river bed are free from unimportant floods. The ascending grade is about 1 in 20. Near Dozan a particularly rocky gorge is met with; it is about 2 miles long, is extremely narrow and has vertical cliffs from 200 to 300 feet on either side. This part is subject to floods which may rise to 25 feet above the water in the ordinary channel. From Darwaza, the summit of the pass, there is a sudden descent of about 250 feet to the Dusht plain, and from there to Quetta the route is easy and open. From Durwaza to Quetta, a distance of 24 miles, there is a fall of 300 feet.

At Mach a broad gauge line, if practicable so far, would have to terminate. Beyond, the line would be enormously expensive, with gradients of 1 in 20 and curves of 70 feet in radius; and the floods are so impetuous that no tempor-

ary line could exist. From the summit to Quetta an easy line can be found, but in order to avoid the precipitous descent, its length would be some 4 or 5 miles longer than the present road. The total length of a railway from the foot of the pass to Quetta, even admitting obligatory slopes of 1 in 20 and 70 feet curves, would not be much less than 100 miles, and parts of it would be constantly liable to floods. Of this, 65 miles may be said to be comparatively easy and free from extreme floods; and about 26 miles would have to be laid with grades of 1 in 20, with several curves of 70 feet radius, and subject to complete inundation from great floods.

In December 1879 General Phayre reported that he had examined a new line altogether which promised to be safe and easy; this route was reconnoitred by Colonel Lindsay in February 1881, and found to be quite impracticable. The direction of this route runs from the mouth of the Bolan to a point at the head of the Kundilani defile which is thus avoided, and the river crossed in a good place; from there by an easy plain on the right bank of the Bolan river direct to old Bibinani, Rorani, Kajuri and the Gehisturi nullah to a point on the southern slopes of the Kuli mountain 500 or 600 feet above Mach to the south-west, and by so doing heading the main drainage of the pass; from there winding round the Kuli mountain the line would turn the upper Bolan defile and enter the Dusht near Darwaza, the summit of the pass.

In the following description of the Harnai route the distances are all estimated from Sibi station. If the line is continued on the metre gauge, Sibi will probably be the station where the change of gauge will be effected.

Harnai Route;

The mouth of the Nari river is $7\frac{1}{2}$ miles north of Sibi, and from there the line follows the left bank to the 13th mile, the works being heavy and requiring some tunnelling owing to the steep banks of the river. At the 13th mile the line crosses to the right bank and enters the Kelat-i-Kila maidan, over which it runs for 2 miles; it then crosses a spur by a short tunnel and somewhat heavy approaches, involving some deep rock cutting and a 50 feet embankment. After passing this spur the work is heavy for the next 6 or 7 miles, the line having to cross and recross the river several times until Babeh Kutch is reached at the 20th mile; then after passing through a tunnel it curves out into a plain for about 3 miles to Gandakin Duff at the 23rd mile. Here the railway must enter a narrow defile about 4 miles in length, and through which the works will be heavy, involving two short tunnels, some rock cutting, and two river crossings.

At the end of this defile, about the 26th mile, is Kochali, where the valley widens out, and the work is comparatively easy up to Zindagi Ab (29th mile), when two streams of some magnitude have to be crossed; otherwise the works are easy until the head of the valley is reached, when a deep cutting will be required to cross the pass into the next valley. From here to Spintangi, (39th mile,) the work is moderately easy except at the 38th mile, where the river and valley are crossed by a considerable bridge and embankment.

At Spintangi the route is blocked by a wall of white rock necessitating a short tunnel; but from there to Harnai (53rd mile) the work is moderately easy. It then ascends the valley of an affluent to the 59th mile, crosses over into another tributary valley, and crosses that at Nassak (61st mile); up to this point no gradient steeper than 1 in 70 is required. For about $4\frac{1}{2}$ miles beyond Nassak the work is moderately heavy only, but here the Nari river changes its direction, and being bounded by high banks and considerable hills, it will probably be necessary to leave the river in order to rise into the Sharigh valley, entailing a long and heavy cutting and a gradient of about 1 in 45.

At the 70th mile the Sharigh valley is entered, and a tolerably easy route is found to the 85th mile, soon after which the ascent to the Chapar rift commences. This rift is an opening cut through a mountain range, about 2,000 feet in height, by the river rushing from one valley into another, which though less than 2 miles distant is about 400 feet below it. A practicable line is obtainable up the east side

of the rift by a gradient of 1 in 45 for about 5 miles, with curves of 600 feet radius, and only involving five short tunnels, the longest of which will probably not exceed 350 feet. This part will, however, be very costly.

After emerging into the upper valley (90th mile) the work is light for 6 or 7 miles, but there are two difficult passes between Chapar (94th mile) and the Kutch valley (102nd mile), each probably about a mile in length in which the work will be heavy. After reaching the Kutch valley the river rises somewhat sharply to the Braiman Kotal, which is 6,200 feet above the sea level; and beyond this saddle the country is broken and disintegrated in the extreme. Through this gradients of 1 in 50 or 55 will be required. The line will enter the Gwal valley at Ulgai (115th mile), and follow it nearly to Kassim Killa (133rd mile), when it will turn down the Lora valley passing through Haiduzai and Saidhamid to Gulistan Karez (158th mile). Throughout this length the line will be extremely easy, the principal work being the crossing of the Lora twice and other bridges.

This trace carries the railway to the north of Quetta, an unavoidable circumstance, as a possible deviation from the Braiman pass through Quetta would involve a long detour and some very heavy work. An easy branch to Quetta can be made from Kassim Killa, a distance of about 20 miles.

The gradients and curves on this line are, therefore, much easier than up the Bolan pass; and were the gradients on that line lightened much, the length of a railway up either pass would not differ much. The Harnai route has also the advantage in a better water supply, more fuel, cultivation and food supplies.

Any extension to Kandahar must either cross the Amran range or entail a long detour of 60 miles of difficult work to go round it. The ordinary route crosses the range by the Khojak pass, but this is impracticable for a railway, as its gradients are too steep, unless the range can be tunnelled. A considerable amount of investigation is, however, further needed before a line across this range can be selected; it is of very broken and rugged character, and any railway over it must necessarily be expensive. Probably the Gwaja and Durra passes are the most practicable, and two lines have been partially surveyed, one running from Killa Abdulla, and the other from Gulistan Karez, passing thence in a northerly direction through Spintangi. These entail a ruling gradient of about 1 in 50, and a total length of about 50 miles of ghaut work. Another route would go from Gulistan Karez through Spintangi down the Durra pass, by which the amount of ghaut work would be reduced to about 30 miles in length, but the ruling gradient will probably be 1 in 40, if not steeper.

After leaving the Amran range near Gwaja (186th mile), the Kandahar plain will allow of the easy construction of a railway to Kandahar (278th mile). It need be only a surface line with easy gradients and curves; and the five large rivers—Kardanai, Kushobai, Melmundi, Argandab, and Tarnak—might be crossed by causeways, as there is seldom any water in them and then only for a short time.

An approximate estimate for a 5 feet 6 inch gauge line from Sibi to Kandahar was made during the Afghan war, and the rates worked out to Rs. 1,05,630 per mile of ghaut work, and Rs. 83,580 per mile through fairly easy country; so assuming that about 100 miles will present considerable difficulties, the estimate for a line from Sibi to Kandahar, 278 miles, works out to Rs. 254 lakhs. But this is probably much under the mark, as a more recent estimate of the line from Nari mouth (where the present railway stops) to Quetta works out thus:—

Nari mouth to Kassim Killa, 126 miles,	...	...	...	£.	1,621,000
Quetta Branch, 20 miles, ...	...	...	...		140,000
			Total,	...	1,761,000

and the extension to Kandahar will probably cost a further £1,500,000.

At one time it was intended to make the line from Sibi into the Pishin valley, and a good deal of work at the lower end was done. At the end of July

1880 the works were, however, precipitately abandoned, and although work was again started during the following cold weather, work on this line was finally stopped at the beginning of 1881.

PROJECT TO CONNECT SIND SYSTEM OF RAILWAYS WITH THE BOMBAY SYSTEM.

(See notes of Railway projects in the Bombay Presidency).

RAJPUTANA AND CENTRAL INDIA.

On the 1st January, 1882, the lengths of railway open, under construction, or in course of preparation were :—

<i>Open to traffic.</i>				Miles.
East Indian Railway, Jubbulpore branch, broad gauge,	...	...	...	90
Sindia Railway,	"	"	...	53
Rajputana-Malwa Railway,	metre	"	...	879
			Total,	1,022

<i>Under construction.</i>				Miles
Bhopal Railway, broad gauge,	...	...	...	50
Jodhpore Railway, metre	"	...	...	17

Projects under preparation.

Gwalior to Jhansi and Saugor.

The following is a short narrative of the several projects which have been proposed from time to time :—

UJJAIN-BHOPAL.

In 1878 a rapid reconnaissance of the country between Ujjain and Bhopal was made with a view of comparing what a metre gauge line of railway would cost with one along the fair weather road laid out between Indore, Sehore and Bhopal.

<i>References</i>	
P. W. D. Pros	November 1877, Nos 78
" "	February 1878, " 695-706.
" "	August 1879, " 155-60.
" "	August 1879, " 161-9.

The line from Indore would be about 3 miles longer; the engineering features would be about the same, but the bridging a little less on the Indore route as it lies nearer the watershed. But the Indore-Dewas line passes through a thinly populated and comparatively poor country; while the route *via* Ujjain would pass through a rich grain and opium country, and connect some important towns.

If the line from Ujjain is ever made, it will probably pass through Shajapur, Shujawalpur, Sehore, to Bhopal, a distance of about 110 miles. It will of necessity be a somewhat expensive line, as it crosses at right angles the drainage from the northern slopes of the Vindhya, and there will be the same difficulty in obtaining good building material as was experienced in building that portion of the Sindia-Neemuch Railway lying between Indore and Rutlam. The soil is mostly "black-cotton," the trap rock is either disintegrating into "moorum" or else is very expensive to cut; there is no brick earth, and where limestone is found there is an absence of fuel to burn it. The building material, therefore, will have to be brought long distances by tramway as on the Holkar and Sindia-Neemuch lines. A mileage estimate of not less than Rs. 80,000 should be allowed, if a fair proportion of stock is given; this would make the estimate for the whole line (110 miles) stand at Rs. 88 lakhs.

The above estimate omits an extension of 2 miles into the city of Ujjain of the present branch from the Rajputana-Malwa Railway. For purposes of economy this branch was stopped on the left branch of the Sipra nearly opposite the city, but it is probable that the river will soon be bridged, and railway accommodation

given to Ujjain, the capital of Maharajah Sindia's Malwa possessions, as was originally intended. This branch might also be advantageously extended to Shajapur, on the old Agra-Bombay road, a distance of about 40 miles. On this portion the bridging would be much lighter than further eastward; and the trade of the rich districts of Rajgarh and Narsingarh would be tapped.

In November 1877, the Begum of Bhopal offered the Government of India 35 lakhs of rupees as her contribution for a line of railway between Ujjain and Bhopal; the money was to be free of interest until the line was opened; after which the Begum was to get 4 per cent. plus half profits in excess of 4 per cent. This offer was accepted by Government; but the original intention was abandoned, and the money has since been diverted to the construction of a broad gauge line between the Great Indian Peninsula Railway at Itarsi and Bhopal.

GODHRA TO CAWNPORE.

Mr. Mathew, the late Agent and Chief Engineer of the Bombay, Baroda and Central India Railway Company, was very desirous of extending his Company's railway system into Central India, and if possible into

the Gangetic valley. He therefore proposed that surveys should be undertaken to examine a line from Godhra *via* Rutlam and Gwalior to Cawnpore. The line would pass almost exclusively through Native States, and would not benefit any large centres of traffic. The project was therefore not looked on very favorably, and is not likely to be considered while other and more promising schemes for railway extension demand the attention of Government. A survey of the portion between Godhra and Rutlam may, however, shortly be undertaken.

The two Guaranteed Railways focussing in Bombay have always had a keen interest in the traffic down the Gangetic valley, and several lines have been proposed by which fairly direct railway communication between Cawnpore and Bombay could be obtained. It will be interesting to detail them here: the distances have been corrected according to the latest information.

No. 1 <i>via</i> Great Indian Peninsula Railway.	No. 2 <i>via</i> Great Indian Peninsula Railway.	No. 3 <i>via</i> Great Indian Peninsula Railway.
Miles. Bombay to Khandwa, .. 353 Khandwa to Ujjain, 122 Ujjain to Gwalior, 271 } 405 to be Gwalior to Cawnpore, .. 134 } construct- ed.	Miles. Bombay to Itarsi, 464 Itarsi to Bhopal, 62 Bhopal to Jhansi, 184 } 380 to be Gwalior to Cawnpore, .. 134 } construct- ed.	Miles. Bombay to Itarsi, 464 Itarsi to Bhopal, 62 Bhopal to Jhansi, 164 } 323 to be Jhansi to Kalpi, 93 } construct- Kalpi to Cawnpore, .. 46 } ed.
Total, .. 880	Total, .. 906	Total, .. 849
No. 4 <i>via</i> Great Indian Peninsula Railway.	No. 5 <i>via</i> Bombay, Baroda and Central India Railway.	Distances from Bombay to Cawnpore by the present lines opened to traffic.
Miles. Bombay to Itarsi, 464 Itarsi to Bhopal, 62 Bhopal to Tehri, 137 } 298 to be Tehri to Mau-Ranipur, .. 37 } construct- Mau-Ranipur to Cawnpore, .. 124 } ed.	Miles. Bombay to Pali, 302 Pali to Godhra, 17 Godhra to Rutlam, 112 } 532 to be Rutlam to Gwalior, .. 286 } construct- Gwalior to Cawnpore, .. 134 } ed.	Miles. <i>via</i> Ahmedabad, Ajmere and Agra, .. } 1,004 <i>via</i> Jubbulpore and Allahabad, .. } 964
Total, .. 824	Total, .. 851	

JHANSI-BHOPAL.

In the working season of 1880-81 three routes between Jhansi and Bhopal were roughly reconnoitred with a view to testing the estimate and capabilities of the intervening country in view of a through line of railway from the Great Indian Peninsula Railway towards Cawnpore and Gwalior.

References.		
P. W. D. Pros.	March	1881, Nos. 28-34.
" "	June	1881, " 79-86.
" "	September	1881, " 15-31.

These lines ran as follows :—

- (a). From Jhansi *via* Oorcha, Mau-Ranipur, Tehri, Madanpur, Basoda, Bhilsa to Bhopal, with branch to Saugor.
- (b). From Jhansi, *via* Oorcha, crossing the Jamni river, Madanpur, Basoda Bhilsa to Bhopal.
- (c). From Jhansi, *via* Lalitpur, Basoda, Bhilsa to Bhopal.

Basoda and Bhilsa have been considered as obligatory points, and probably would also be found so if it were decided to carry the line along the west bank of the Betwa towards its upper reaches instead of crossing it somewhere near Jhansi.

The lengths of the three lines work out thus—

Lines.	Jhansi-Basoda.	Basoda-Bhilsa.	Bhilsa-Bhopal.	Total
Line (a),	146	25	34	205
Line (b),	143	25	34	202
Line (c),	125	25	34	184

and it seems probable that a line along the west bank of the Betwa would also be about 200 miles in length.

Line (a).—The characteristic of this line is the desire to serve as near as possible the important marts of Mau-Ranipur and Tehri, and to keep the direction of the line as much as possible within British territory. The heaviest bridge-work between Jhansi and Basoda will be the crossings of the Betwa and the Bhina rivers; and the heaviest earthwork, some rough ground for 22 miles out of Jhansi and some through the Madanpur pass at the 90th mile. The Betwa is a large river requiring about 2,200 lineal feet of waterway, with a fall of bed of 6 feet per mile, and high floods rising 60 feet in height and very rapid. Banks are high and well defined, and bed of hard granite. The site for the crossing (8 miles from Jhansi), is just below its confluence with the Jamni river, itself a large river. The estimate for a bridge of 15 spans of 150 feet amounts to Rs. 10½ lakhs. For the Bhina river (122nd mile), 3 spans of 100 feet are allowed (estimated cost Rs. 87,000), and for the Kotan (139th mile), 4 spans of 40 feet are needed. Between Basoda and Bhilsa there are no bridges of importance, and between Bhilsa and Bhopal the Betwa is again crossed, and requires a bridge of 6 spans of 100 feet, costing probably a little over Rs. 2 lakhs.

The country is quite open, and no curves sharper than 2,800 feet radius are required; the gradients are all easy except perhaps in the broken ground near Jhansi and near Madanpur, where short lengths of 1 in 100 will be required. For stone and ballast there will apparently be no difficulty; but as the country passed through is mostly jungle, it is thinly populated and consequently labour is scarce.

Line (b).—This line follows line (a) across the Betwa at Oorcha and then bends to the right, and instead of keeping to the east of the Jamni river crosses it about 12 miles above its junction with the Betwa river, after which it proceeds through British territory and joins line (a) again north of Madanpur. This line is merely an alternative to line (a), and is 3 miles shorter, but the work would be much heavier, and so no advantage is gained. The Betwa crossing would be the same, the Bhina bridge is also common to both lines, but the Jamni river has to be crossed twice, of which the lower crossing would require 600 lineal feet of waterway, and also two other large nullahs. From Jhansi to about 5 miles south of the Jamni river, *i. e.*, for a distance of about 45 miles, the earthwork would also be very heavy. As the work on this line was found to be so much heavier than on either of the others no approximate estimate was made of it.

Line (c).—The object of this line was to get the most direct route, with the least amount of work; and as British territory and that of the Native States of Central India march together along this route, of the 184 miles only about 100 are in British territory. It passes through a much more cultivated tract of country than either of the other two lines, and besides accommodates Lalitpur (57th mile), a large town and cantonment. The heaviest bridgework will be at the crossing of the Betwa (24th mile) near Tal Baith, and also at the crossings of the Narain (78th mile) and Bhina (101st mile) rivers; and the heaviest earthwork will be from Jhansi to about 10 miles south of the Betwa, and also at the crossing of the Narain river. The hills south of Lalitpur, crossed between the 71st and 75th miles, offer no appreciable obstacle, as there is a broad valley running through them into the open country beyond.

The Betwa is crossed about 8 miles above its junction with the Jamni; the banks are not so steep as the crossing near Oorcha, and probably the floods are not so severe. The bed is hard granite rock. It requires a bridge of 17 spans of 100 feet, which is estimated to cost Rs. 5 lakhs. The Narain and Bhina rivers require respectively 400 and 300 lineal feet of waterway; and allowing for spans of 100 feet they will cost Rs. 1,32,000 and Rs. 87,000. Over the Gorari (11th mile) 6 spans of 40 feet will be required; and over the Kotan (115th mile) 4 spans of 40 feet.

The curves and gradients will all be easy, except perhaps near Jhansi and at the Narain river, where gradients of 1 in 100 may be found necessary. Material for construction is abundant, and sandstone is found in the range south of Lalitpur. Labor also would be more abundant, as the country is more open and cultivated. South of the Narain river, the division between British and Native States territories, and all through Basoda and Bhilsa, the country is richly cultivated. "Black soil" abounds along this section of the line.

The rough estimates worked out as follows for a 5 feet 6 inch gauge:—

Line.	Jhansi-Basoda.		Basoda-Bhilsa.		Bhilsa-Bhopal.		Total Jhansi-Bhopal without stock.		Average cost per mile without stock.
	Miles.	Rs.	Miles.	Rs.	Miles.	Rs.	Miles.	Rs.	Rs.
Line (a), ...	146	92,94,750	25	13,86,500	34	20,88,000	205	1,27,69,250	62,290
Line (c), ...	125	66,95,272	25	13,86,500	34	20,88,000	184	1,01,69,272	55,270

These estimates show that a line through between Bhopal and Jhansi will not be an expensive one, but of course when due provision is made for rolling stock, workshops, &c., the mileage rate will be considerably more. It is possible also that the estimates for construction may have to be raised on revision; for although iron is cheaper than when these estimates were framed, still the difficulty of getting good building stone at the southern end, and the scarcity of labor, have perhaps been under-estimated.

A branch to Saugor also formed part of these two schemes. From the Tehri line (line *a*) the branch took off at Khorye, at the 116th mile from Jhansi, and would be about 29 miles in length; and if the Lalitpur line (line *c*) were chosen, the location of the branch would probably be the same between Saugor and Khorye, and continued on to meet the main line at Etawa, at the 95th mile from Jhansi. In this case the branch would be 43 miles in length. The branch would cross a good deal of drainage, the principal streams crossed being the Dussan (30th mile from Etawa, and 16th mile from Khorye) and the upper reaches of the Narain, close by Khorye.

The direction of this branch is, however, favorable to the lie of the country, and if the Lalitpur line is made, a branch to Saugor will probably follow this route and be extended on to Kutni, the direct route for coal when the Rewah coal-fields

are in operation, and possibly also to Jubbulpore; but if the shortest route from Saugor to Bombay is a desideratum, the branch to Saugor would probably leave the main line at the 135th mile, about 15 miles north of Bhilsa, and generally follow the present road between Bhopal and Saugor, *via* Bajrod and Rahatgarh. This branch would be 55 miles in length, and would have to cross considerable drainage, the principal streams crossed being the Kotan, the Babnai, the Bhina, and the Dussan rivers. Its first cost would be therefore high, but the route to Bhopal would be 14 miles shorter than by the Tehri line, and 28 miles shorter than by the Lalitpur line.

The cost of all these branches was roughly estimated at Rs. 66,000 per mile without stock; but the Etawa-Khorye-Saugor branch could be constructed much more cheaply mile for mile than the more southern and longer branch.

KUTNI TO THE REWAH COAL-FIELD.

If the Rewah coal turns out such good locomotive fuel as is anticipated, a branch line of railway from the Kutni station, East Indian Railway, will be a necessity. The coal-field is situated to the south-east of Kutni, and lies entirely in Rewah territory. As far as is known it lies between the villages of Umaria and Sohagpur, the best seams at present known having been found in the valley of the Johilla stream, a tributary to the Sone.

The line will be about 40 miles long, and will traverse open and slightly undulating tableland.

Without stock the line should not cost more than Rs. 60,000 per mile for a broad gauge line, or about Rs. 24 lakhs for the whole branch. Its survey will probably be at once undertaken. The first 25 miles from Kutni station will lie in British territory (Central Provinces), the remainder in Rewah territory.

If this line is made it seems probable it will be continued to Bilaspur in the Central Provinces, and then form a connection with the proposed Railway to connect Bengal with Nagpur. The distance from Kutni to Bilaspur will be about 200 miles.

A LINE FROM KUTNI OR SUTNA TOWARDS GWALIOR.

Hereafter to extend the use of coal from the Rewah coal-fields it will be necessary to make a line from the Kutni station or its neighbourhood towards Jhansi and Gwalior.

References.
P. W. D. General No. 7040 of 1882.
D. G. Ry.'s Pros. C. August 1882, Nos. 7-11.

There appear to be two ways of affecting this—one by a line from Sutna through Puuna, Nowgong, and Mau-Ranipur to Jhansi; the other by a line from Kutni through Damoh and Saugor to Lalitpur, where it would form a junction with the proposed line from Bhopal to Jhansi and Cawnpore. The distance from Kutni to Jhansi by Sutna would be about 244 miles, of which 116 miles from Sutna to Nowgong would be new line; the distance *via* Saugor would be about 255 miles, of which the length of new line from Kutni to Lalitpur would be 185 miles. The Sutna line would necessitate a most costly bridge over the Ken river near Puuna; whereas the Saugor route would only cross the upper reaches of that river, would not encounter any great engineering difficulties, and would pass through a much more fertile country.

The line between Jhansi and Nowgong, 67 miles, has been located and estimated for as a metre gauge line; and the sanction of the Secretary of State been asked to commence this as a famine protection work. This length forms just a third of the proposed famine line between Jhansi and Bargah on the East Indian Railway. Beyond, no reconnaissance of the Sutna-Nowgong section, about 116 miles, has been made as yet, but as regards the other route the following routes were reconnoitred during the working season of 1881-82:—

						Miles.
Jhansi-Saugor	{	Jhansi-Lalitpur, ...	...	...	...	58
		Lalitpur-Saugor, ...	...	...	...	71
Mau-Ranipur-Tehri-Lalitpur,		...	...	...	...	71
Saugor-Damoh,		...	...	...	...	47
Damoh-Jokhye,		...	...	...	...	70
Damoh-Kutni,		...	...	...	...	65
Damoh-Jubbulpore,		...	...	...	...	63

and when these plans and estimates are ready, there will be sufficient data to arrive at a fair approximate estimate of the route *viâ* Saugor and Lalitpur.

CENTRAL PROVINCES, HYDERABAD AND THE BERARS.

On the 1st January, 1882, the lengths of railway open, under construction, or in course of preparation were—

						Miles.
<i>Open to traffic.</i>						
Great Indian Peninsula Railway, broad gauge,	...	...	...	...	...	671
East Indian Railway,	"	"	...	...	...	70
Berars branches,	"	"	...	...	...	14
Wardha Coal Railway,	"	"	...	...	...	46
Nizam's Railway,	"	"	...	...	...	121
Madras Railway,	"	"	...	...	...	17
Nagpur-Chhattisgarh,	metre	"	...	...	...	98
Rajputana-Malwa,	"	"	...	...	...	37
Total,						1,074
<i>Under construction.</i>						
						Miles.
Nagpur-Chhattisgarh Railway, metre gauge,	...	...	...	...	...	50
Bhopal Railway,	broad	"	...	...	...	12
<i>Under preparation.</i>						
						Miles.
Saugor-Jubbulpore,	...	...	...	...	...	110
Saugor-Narsinghpur,	...	...	...	...	...	86
Jubbulpore-Gondia,	...	...	...	...	...	135
Bilaspur-Barakur,	...	...	...	...	...	366

The following reconnaissances of lines through the Central Provinces were made in the cold season of 1881-82 :—

References.

P. W. D. Pros. November 1881, Nos. 132-3.
" " November 1882, " 62-82.

- (1). Saugor to Chhindwarra station (Great Indian Peninsula Railway), 86 miles.
- (2). Saugor-Damoh-Jubbulpore, 110 miles.
- (3). Jubbulpore-Pindrai-Balaghat-Gondia station (Nagpur and Chhattisgarh Railway), 135 miles.
- (4). Chhindwarra station-Dhooma-Pindrai-Balaghat-Gondia, 144 miles.
- (5). Jubbulpore-Seoni-Nagpur, 173 miles.
- (6). Nagpur-Mohgaon-Umarwarra-Narsinghpur station (Great Indian Peninsula Railway), 176 miles.

A description of each line follows. A reference to the Map at the end of the Chapter is necessary.

SAUGOR-CHHINDWARRA STATION (GREAT INDIAN PENINSULA RAILWAY).

From Chhindwarra (1,211 feet above mean sea level) to the Nerbudda river, a distance of 10 miles, the work is light, waterway very moderate, and with a ruling gradient of 1 in 100. A good point for crossing the Nerbudda is near Sankal, and below where the Herun river joins the main stream. The foundations are good on a bed of limestone rock, and the place is at the base of the only

ridge within reasonable distance that offers a practicable gradient for a railway to the summit of the Bhaurie range. A bridge of 9 spans of 150 feet, and piers 70 feet high will be necessary. The approach on the south side will require a bank of 70 feet in height.

The ghaut ascent may be said to commence at the north abutment of the bridge. Its length is $9\frac{1}{4}$ miles, from about mile 11 to mile 20, and the total rise 673 feet. This can be accomplished by a ruling gradient of 1 in 75 in the lower $3\frac{1}{4}$ miles, and 1 in 70 in the remaining $6\frac{1}{2}$ miles. The features of the country render necessary a somewhat tortuous alignment, and the work on this section will be expensive; about 5 miles may be considered as light ghaut work, and 5 miles of heavy ghaut work, including a tunnel of about 600 feet in length.

From the crest at the 20th mile, near the village of Punari, the line falls rapidly to the Dhoba river, mile $38\frac{1}{2}$. A considerable amount of cross drainage has to be passed, and a series of 1 in 70 gradients are used on this length. The Dhoba river will require a bridge of 4 spans of 150 feet; good foundations on limestone rock.

From mile 39 to mile 46 the line rises with easy grades to the crest of the range north of Singpur, the line being taken through a convenient saddle near the village of Kaonu. On this section the work is easy and bridging light.

From mile 46 to mile 66, where another range of hills is met, the line is mostly a surface line with easy gradients. The Sonair river at mile 59 will require a bridge of 4 spans of 150 feet, foundations apparently hard clay; height of piers about 35 feet.

From mile 66 to mile 74 the line ascends the valley of the Keyth river by gradients of 1 in 100, reaching the watershed at the village of Gatampur (74th mile). From mile 74 to mile 80 the line follows the undulations of the country with easy grades and light work. At the 78th mile the Bewas river is crossed, requiring 2 spans of 150 feet, height of piers 50 feet, with rock foundations.

From mile 80 to mile 86 the location is the same as for a line between Saugor and Damoh. Two miles out of Saugor is a ridge which must be crossed, necessitating an ascending gradient of 1 in 100, and a descending one into Saugor Cantonment of 1 in 110. Saugor is 1,700 feet above mean sea level.

The line follows a well established trade route, and the nature of the country passed through may be classed as follows:—

36 miles jungle with no population.

43 „ well cultivated and well populated.

9 „ sparsely cultivated and sparsely inhabited.

Black soil abounds between Chhindwarra and the Nerbudda. At the Nerbudda crossing good building stone—both sandstone and limestone—is available; and generally good building material is found all along the route.

The earthwork on this line may be classed as follows:—

52 miles ordinary light plain railway work,

17 „ heavy „ „

12 „ light ghaut work,

5 „ heavy „

Including the Nerbudda bridge, the total waterway required averages 45 lineal feet per mile. The ruling gradient is 1 in 70, and it appears doubtful if it can be much reduced.

Owing to the Nerbudda bridge and the heavy ghaut work, the cost of a metre gauge line would average about Rs. 81,000 per mile, giving a gross sum of about Rs. 70 lakhs for the 86 miles of railway.

SAUGOR-DAMOH-JUBBULPORE.

The site for a railway station at Jubbulpore can only be determined after

careful consideration, as the interests of the Cantonment, the native City and of the East Indian and Great Indian Peninsula Railways must all be considered; for a metre gauge line from Saugor and extending southwards towards Nagpur, the best station site would appear to be near the suburb named Gurha.

Starting from Gurha the line follows for the most part the watershed line between the Herun and Bagha rivers up to the 20th mile, when the Herun river has to be crossed. On this portion the work is easy and the grades light, but the approaches to the Herun bridge will necessitate heavy embankments. The Herun bridge will require 3 spans of 150 feet, piers 60 feet high founded on sandstone rock.

From mile 21 to mile 28 the line rounds the southern spur of the Kymore hills, following the valley between these hills and the Kalumar plateau. Along the first 3 miles of this section the work is easy, but the remaining 4 miles will be in cutting, averaging 10 feet in depth, and with an ascending grade of 1 in 100. The cutting will be through alluvial soil, shingle and sandstone in about equal quantities. Between mile 28 and mile 30 the work is very easy and grades light; and in the next 4 miles the ridge is crossed with an ascending grade of 1 in 100, and a somewhat slighter one for the descent on the northern slope. The cuttings average 15 feet in depth, through alluvial soil and strata of sandstone.

The line then descends with fairly easy grades to near the gullet through the Bhanjar range at the 40th mile. The country about Jabbera is somewhat difficult, and its rapid fall necessitates somewhat of a detour towards the east. It crosses the valley of the Bhadar nullah (waterway 2 spans of 40 feet and 4 of 10 feet) about $1\frac{1}{2}$ miles east of Jabbera. To the gullet the line rises with a gradient of 1 in 100, passing the crest in a cutting 35 feet deep, the material being deep strata of sandstone alternating with clays and moorum.

After this to the 44th mile the line is a surface one with easy gradients and light work; it then rises with a grade of 1 in 100 to the summit of the plateau through rather stiff cuttings in sandstone and moorum, and then descends with easy grades to the crossing of the Bearmi river at the 50th mile. This river will require 4 spans of 150 feet, with piers 50 feet high founded on sandstone rock.

From this river to Damoh at the 63rd mile, the country is open and flat, consequently the work will be light and the gradients easy, although 1 in 100 has to be used to gain the top of the plateau. The waterway is slight on this length, the only bridge of any magnitude being 2 spans of 40 feet.

From Damoh (63rd mile) the line turns west, and for the next 6 miles a good deal of cross drainage has to be passed, necessitating gradients of 1 in 100 to follow the undulating surface of the country. At mile $70\frac{1}{2}$ the Kohan nullah is crossed, requiring a bridge of 3 spans of 40 feet, with piers averaging 30 feet in height. For the next 11 miles the line follows with easy gradients a watershed, and the works are very light. At the 82nd mile the line again turns north, so as to cross the Sonair river above the village of Beyli, where a good rock crossing exists. Its approaches will require some heavy work, but this cannot be avoided, owing to the formation of the ground. This river will require a bridge of 5 spans of 150 feet, with piers 40 feet in height and founded on limestone. From mile 86 to mile 89 the line follows a watershed, the work being moderately heavy to make the grades easy; for the next 4 miles the line rises with a gradient of 1 in 100 along the edge of the plateau on the left bank of the Gadhari nullah, and after rounding the shoulder of the hill to the west of the village called Abchand, gains the crest north of the village Gauchi. The minor waterway is light; but there is a good deal of earthwork on this section.

From the 98th mile to the crossing of the Bewas at the 102nd mile the line falls with easy grades and light work. This river requires 2 spans of 150 feet with a pier 50 feet high. From this bridge the line ascends easily along a watershed to the 105th mile, where a spur on the hills to the east of Saugor is met with; the ascending gradient there becomes 1 in 100 to the summit at the 108th mile, whence a descending gradient of 1 in 110 carries the line into Saugor Cantonments (110th mile).

The detour *viâ* Damoh is necessary to avoid having to climb up and down the Kaloomar plateau. A line direct to Saugor would involve a total rise and fall to Garrakotha of 1,010 feet against 285 feet on the Damoh route. The Damoh line also passes through more fertile country, while the plateau is for the most part barren or covered with forest of small teak. Out of the length of the 110 miles the line passes through about 27 miles of jungle, 71 of well cultivated country, and 12 miles of sparsely cultivated land.

The earthwork may be classed as follows :—

67 miles ordinary plain railway work,
 34 „ heavy „ „ „
 9 „ light ghaut work,

with the steepest gradient of 1 in 100.

The bridging required averages 27 lineal feet per mile. Labor, both skilled and unskilled, is not abundant. After crossing the Herun river from Jubbulpore, building materials are plentiful all along the line, and good sandstone in large blocks can be found at site of most bridges, or else within easy distance. Limestone and moorum are also plentiful; and water is generally found wherever required.

It is estimated that a metre gauge line along this route should not cost more than Rs. 65,000 per mile, or at a total cost of Rs. 71½ lakhs.

JUBBULPORE-PINDRAI-BALAGHAT-GONDIA.

Starting from the station in the suburb Gurha, the line for the first 7 miles out of Jubbulpore presents no difficulties of any kind, and encounters but little drainage. At the 7th mile the Ghaur river requires 250 feet of waterway, foundations on rock, and rail level about 45 feet above the river bed. From the 16th to the 19th mile the ground is much cut up owing to the narrow, deep and tortuous ravines met with on the right bank of the Nerbudda. The grades and curves are, however, easy, although the earthwork and minor bridging will be considerable.

The site for the Nerbudda bridge is at Ghogree Khass near Bunder Kola, at the 19th mile, and is very favorable, the only drawback being the great height of the banks on either side, which make it necessary to carry the rail level about 120 feet above low water level. The foundations throughout will be on hard black limestone, the cold weather level of the water being only a few inches deep. The great height of the piers can only be lessened by making severe descending gradients in cutting to the bridge, or by increasing the spans of the requisite girders. About 1,250 feet of waterway is necessary, this can be given by 5 spans of 250 feet, and placing the railway on the top of the girders.

From the 20th to the 30th mile inclusive the line is carried from the Nerbudda valley to the summit of the Satpura range of hills, with a steady continuous rise of 500 feet. The first two miles cross in embankment an open but rapidly ascending plain to a knoll near Gagarda, whence a long projecting spur of hills presents peculiar facilities through 4 miles for a ghaut line in side cutting. At the 26th mile the line crosses below Katkuhi in high embankment from the Gagarda spur to the main mass of the Satpura range, and thence onward below the crest of the plateau which is almost flat, and which the gradients of 1 in 100 probably tops at the 30th mile. The whole line from the 22nd to the 30th mile is covered with dense forest, but the hill-side features are generally soft with occasional difficult bits of limestone and basalt cliff as at Saliwana (24th mile) and Mehurtulla (28th mile). These points may probably be avoided on closer investigation; but on the whole the soil is easily workable, and there seems but little doubt that a gradient of 1 in 100 is easily obtainable throughout. The cross drainage to be passed is inconsiderable, but to get easy curves the earthwork along the 8 miles of ghaut ascent will naturally be heavy, although no serious difficulty presents itself anywhere.

From the 30th mile to the 42nd the line, still ascending, follows almost throughout a watershed to the highest summit level (42nd mile) to be crossed. This point is 1,860 feet above mean sea level, the height of Jubbulpore being 1,351 feet. The ground at the 32nd mile is rather lumpy, requiring considerable cutting and filling, and so also is it at the 34-35th mile, but on the whole the work must be called easy over this length.

From mile 42 to mile 53 forms the descent of 408 feet into the valley of the Wainganga at Pindrai. The plateau at Nidhani (46th mile) is an obligatory point, but the slopes of the hills from the 42nd to the 46th mile are very gentle, admitting of easy curves and gradients. No blasting would seem to be required except for a short length at the top of the ghaut. From Nidhani to the Alone river (51st mile) the line may be described as the easiest kind of ghaut work, as it runs along a perfectly bare, soft hill-side which admits of the easiest curves, and requires no blasting except here and there where a few large boulders are met with. The bridge sites for the Alone river (51st mile) and the Thour river (53rd mile) are both of solid basalt rock throughout, and present no difficulties whatever for foundations. These rivers run in deep channels, and as the rail level will be about 40 feet above the river beds, it is proposed to bridge the Alone with one span of 125 feet, and the Thour with one of 250 feet, and two land arches of 20 feet each.

The large village of Pindrai is entered immediately after the Thour river is crossed, and a straight run over the bridge and into the village station site can only be obtained by a considerable side cutting into the rocky spur overlooking the village. From Pindrai (53rd mile) to Paili (66th mile) there are no difficulties as regards earthwork or curves, but southwards from Pindrai the difficulties regarding cross drainage may be said to distinctly increase. Both the Sarnan and the Chakor streams are crossed in this length. They are small streams, but have no well defined beds and spread over the country. Good rock crossings can be obtained, but it seems as if a certain amount of training works above the bridges will be found necessary to direct the streams. Between Poudi (55th mile) and Nainpur (62nd mile) a good deal of small drainage into the Chakor nullah has to be crossed at considerable height, besides an awkward but apparently unavoidable turn at Nainpur on to the high watershed. From Nainpur to Paili (66th mile) the line traverses a gravelly watershed plateau between the Chakor and Thour rivers.

From Paili (66th mile) to the Poldra river (71st mile) the line falls 200 feet in a steady gradient along the hill sides covered by the great Bhansic Bhar forest. This ghaut work is, however, easy, the soil being free from rock, and the ground admitting of easy curves and of passing the line from spur to spur without heavy embankment except at the Poldra river, where a heavy embanked approach is necessary. All this cross drainage flows into the Bhima river.

Between the 71st and the 80th mile at the foot of the Mahakapata spur the line rises and falls on very easy gradients over undulating ground. The streams Poldra, Maukwar and Saojharra have to be crossed with 80, 120 and 75 lineal feet respectively. The Poldra will require a high level bridge, some 60 feet above the river bed; but both it and the Maukwar have rocky beds throughout, whilst the Saojharra has a sandy bed. It is probable, however, that rock lies at no distance underneath.

The Hattu-Padan pass is crossed between miles 80 and 84; and although apparently formidable, it presents no very serious obstacles. The gradients are easy, and although for about 2 miles (82nd to 84th) there will be a good deal of blasting of hard detached granite boulders, and the construction of many retaining walls, drains, &c., there are no serious difficulties.

Between the 84th and 92nd miles the gradients and earthwork are very easy. A large embankment seems needed at the approach to the Malikari river (one span of 130 feet), but it may be lessened on further examination. The Magdarra pass at the 90th mile will require considerable blasting for a short distance, but is otherwise easy. The 92nd to 94th miles pass through dense forest, and a good deal of cutting being required at the approach to the Nahara bridge, this section will be

somewhat expensive. The Nahara river can be crossed at a natural rocky barrier, called the Ghora Oran, where its section is very deep and irregular, but it may be found advisable to cross it a little higher up where the section is less irregular. It requires a waterway of 350 lineal feet. The Tondbheri stream crossed at the 102nd mile requires 150 lineal feet of waterway, and has apparently a sandy bottom, but probably rock is near.

Between the 113th mile and Gondia on the present Chhattisgarh railway (135th mile), the earthwork is a mere surface embankment, except at the crossings of the Ghusri and Bagh rivers. The Ghusri requires 160 lineal feet of waterway, while the Bagh requires 750 feet. The Bagh (or Wainganga) river is a formidable obstacle, will probably require three large spans of 250 feet each; the foundations will be on rock, and the rail level some 40 feet above the river bed. Gondia is 1,189 feet above mean sea level, and is 81 miles by rail from Nagpur.

All along the route excellent water is everywhere obtainable. Unskilled labor is abundant, and excellent building stone is found at several places along the line. Of the 135 miles, 119 are well cultivated; 11 are rich forest; and only 5 may be said to be uncultivated. The work on this total length may be classed as follows:—

14	miles of common heavy work,
94	„ ordinary open country,
14	„ easy ghaut work,
13	„ heavy ghaut work.

It is not probable that any gradient need be steeper than 1 in 100, and the curves obtainable not less than 800 to 1,000 feet radius. Including the Nerbudda and Wainganga bridges, the waterway averages 39 lineal feet per mile.

Taking an average of Rs. 70,000 per mile for a metre gauge line, the total cost of this line would be Rs. 94½ lakhs.

To get an easier crossing of the Nerbudda, and possibly a better crossing of the Satpura range, two alternative lines were examined.

A line branching off at Bunderkola (17th mile from Jubbulpore), and running up the valley of the Nerbudda through Chulia and Kakra could cross the Nerbudda at Chapal ghaut, where a bridge of 3 spans of 250 feet would suffice, foundations rock, and with rail level at about 75 feet above the river bed. After crossing the river the ascent of the Satpura range can only be done by gradients of 1 in 70 throughout a total rise of 602 feet, crossing the ridge at Patan, 1,902 feet above mean sea level. The descent to Pindrai (53rd mile from Jubbulpore and 67th by this route) amounts to 450 feet, is steady and continuous, but with easy gradients. This line is 14 miles longer than *viâ* Nidhani, and has to cross a large amount of extra cross drainage. The only points in its favor are that a less expensive bridge is required over the Nerbudda, and the line is carried somewhat nearer to Mandla; but neither of these are of sufficient weight to adopt this alternative.

Another alternation of the above alternative line, leaving it at Chulia, crossing the river at once, topping the Satpura range between Umerdeh and Jamanpani, and meeting the line again at Bamni, was examined. This line is 7 miles longer than the direct line *viâ* Nidhani, but it crosses the Satpura range at the lowest point, 1,842 feet above mean sea level, and an ascending gradient of 1 in 100 or even 1 in 120 may be obtained. The Nerbudda crossing would require an equally expensive bridge as that on the direct line, and the site is not so favorable. Easy gradients can only be obtained at very heavy expense, and which does not seem commensurate with the advantages to be gained.

CHHINDWARRA STATION (GREAT INDIAN PENINSULA RAILWAY)—DHOOMA-NIDHANI-PINDRAI-GONDIA.

This is a cross line run for the purpose of seeing whether a line could be taken from Saugor through Chhindwarra or its neighbourhood towards Mandla

and Gondia. The Nidhani plateau on the trace running from Jubbulpore to Gondia being as it were an obligatory point the line was examined from that point in the direction of Chhindwarra.

Descending from Nidhani to Kamarria (2nd mile) by a short length of easy ghaut, the line rises to the watershed plateau between the Nerbudda and the Alone rivers, which it reaches by a heavy piece of ghaut work at the Morcha pass ($4\frac{1}{2}$ mile); thence onward to the 14th mile is along a watershed needing little but surface embankment and little bridging. At the 14th mile the Johan river is crossed, and then the line rises partly along a hill-side and partly over undulating plateaus divided by deep ravines, until Boria Kalan (20th mile) is reached. On the whole the work on this section will not be expensive, as the soil is easy, although a considerable number of short heavy banks and cuttings will be required. At Boria Kalan the line reaches the crest of the plateau and continues along it with light work to the 25th mile; it then descends to the summit of the Nagandeori ghaut at the 28th mile, passing to the west of the large village of Dhooma at the 27th mile.

The Nagandeori ghaut, miles 28 to 34, follows a ravine which starts almost due west of Dhooma, and along which the cart road from Dhooma to Chhindwarra runs. Some heavy embankments will be required, but a gradient of 1 in 100 can be obtained without heavy cost; the work on this section may be classed as light ghaut work. From the 33rd mile the line follows the valley of the Sonair river, and after the ghaut is passed easy grades and light work prevails, although there is considerable cross drainage, until the Sonair river has to be crossed at the 41st mile. This river will probably require a bridge of 2 spans of 150 feet with height of pier about 30 feet.

From the 41st mile near the village of Dargavah, the line turns west, rises with easy grades to a crest line at the 44th mile, and then falls till it reaches the large village of Srinagar at the 49th mile. The work is moderately light, and the gradients, with the exception of a 3-mile length of 1 in 109, not severe. From Srinagar the line runs towards the north-west, crosses a ridge at $50\frac{1}{2}$ miles, passes to the east of the village Burgaspur (mile 52), and from there along open country to Chota Chhindwarra station on the Great Indian Peninsula Railway, at the 56th mile from Nidhani. A line joining Chhindwarra Station with Gondia would, therefore, be 145 miles in length, and the distance from Saugor to Gondia would be 230 miles against 245 miles *via* Damoh and Jubbulpore.

At Boria Kalan the Satpura range is crossed at an altitude of 1,910 feet above mean sea level. This is 50 feet higher than the crossing of the line between Jubbulpore and Gondia, but owing to the lie of the ridges the ascent and descent can be accomplished with greater facility than the less elevated ghaut crossing. The earthwork between Chhindwarra and Nidhani may be classed thus:—

36	miles of easy plain work,
11	„ „ common heavy work,
4	„ „ light ghaut work,
5	„ „ heavy ghaut work.

Assuming a mileage rate of Rs. 75,000 per mile, the cost of a line from Chhindwarra to Gondia—230 miles—would be Rs. 172 $\frac{1}{2}$ lakhs.

The line between Nidhani and Gondia has been already described. There are no great engineering difficulties between Chhindwarra and Nidhani; materials are fairly plentiful; the line passes for a considerable distance through a rich country, and it follows an old and well established trade route. Its prospects therefore seem very favorable.

JUBBULPÓRE-BARAILA-SEONI-NAGPUR.

This line would probably have the same location as the Jubbulpore-Pindrai-Gondia line as far as Baraila, 34 miles from Jubbulpore, above described.

From the 34th mile to the 42nd the earthwork is on the whole easy, except at the crossings of the Parait (38th mile) and Gadani (40th mile) nullahs, where heavy embankments are required for the bridge approaches. These are small ravines, and only require 50 and 30 lineal feet of waterway, but the line will have to cross them at considerable height. From mile 42 to the summit of the Ahargondi ghaut at mile 53½, the line ascends with easy gradients, passing near to the villages of Gorukhpur and Bhujia; the earthwork although heavy is not difficult, and the cross drainage to be passed slight. The summit is 1,960 feet above mean sea level. From this to the crossing of the Wainganga at 60½ miles, (mean altitude 1,505 feet,) the descending gradient is 1 in 80, but by cutting through the summit to the extent of about 40 feet, and by making the descent about a mile longer, which is practicable by a detour to the west of the 58th mile, a gradient of 1 in 100 could probably be obtained. Even without this detour it seems practicable to reduce the grade to 1 in 100, except for about 1¼ miles, where 1 in 90 must be used.

The work on this section will be very heavy. At miles 55, 56 and 57 there are very heavy cuttings, and a severe embankment at the 58th mile. Of the 7 miles of ghaut work, 4 miles must be described as heavy ghaut work, and 3 miles of light ghaut work. The minor bridging is also very heavy, about 400 lineal feet being required in this section.

A suitable crossing of the Wainganga river is obtained where a reef of sandstone rock crosses the river and about a mile below where it is joined by the Bijna nullah; it will require 4 spans of 150 feet about 45 feet above the bed of the river.

After crossing the Wainganga the line again ascends, following a watershed line by the village of Lowmia (62nd mile), Chargaon (64th mile), and reaching the large and important trade centre Bhingarh at the 65th mile. No difficulty of any sort presents itself, until at the 66th mile the line again strikes a higher reach of the Wainganga. From the 66th to the 70th miles this rocky ravine is traversed, and although the gradients are easy, the works are somewhat heavy. Crossing the Dehri nullah at the 70th mile the line rises mostly along watershed lines to a crest at the 79th mile near Bandol on the Great Northern Road. With short exceptions at the 70th, 72nd, and 76th miles, the works are light, the gradients easy, and little cross drainage to be passed. After passing the crest at the 79th mile the line crosses the Great Northern Road, and then falls rapidly to opposite the village Chobi, where a large deep nullah has to be crossed. The line again ascends from the 83rd to the 86th mile, when it crosses another ridge in a cutting 40 feet deep; after that it turns east, and makes with easy gradients for the Civil station of Seoni at the 93rd mile. Owing to the undulating nature of the ground, there will be a good deal of heavy work in cutting and embankment between the 79th and 93rd miles.

After passing Seoni the line makes a slight detour to the west to avoid a ridge, again crosses the Wainganga river, now much diminished, at the 96th mile, and following its valley reaches the highest summit (1,995 feet above mean sea level) at the 102nd mile. From there to Mohgaon (107th mile) it passes along a watershed. These 14 miles (93rd to 107th) may be described as 8 miles of fairly light work and 6 miles of moderately heavy work.

Of the 73 miles of line between Baraila (34 miles from Jubbulpore) and Mohgaon (107 miles) the earthwork may be classed thus:—

41	miles of ordinary light railway work,
25	„ ordinary but heavy railway work,
3	„ light ghaut work,
4	„ of heavy ghaut work,

and of bridging the average required is nearly 30 lineal feet per mile.

From Mohgaon (107th mile) to mile 110 the gradient is easy and the earthwork light, and this brings the line to the summit of a rapid descent. From mile 110 to mile 121 there is one continuous descent of 578 feet, with the lowest practi-

cable gradient of 1 in 90, but with minimum curves of 1,000 feet radius. Along this length of 11 miles are no works of special difficulty, but the works will be of necessity very costly, and the cross drainage to be passed considerable.

From mile 121 to mile 127 the general descent still continues, but the ground is very undulating; gradients of 1 in 150 are obtainable without specially heavy work. In this length the following rivers are crossed:—

Punjdar,	foundations rock,	requiring	180	lineal feet of waterway,
Omergani,	„	moorum,	„	120 „ „ „
Telia,	„	„	„	120 „ „ „

Between the 127th mile and the Salwa station, Chhattisgarh Railway, at the 158th mile, no special engineering difficulties are met with. The ground admits of easy gradients. The soil is chiefly “black cotton,” except at the wooded ridges, where moorum is met with.

Salwa station is 15 miles from Nagpur, so the entire distance by this line from Jubbulpore to Nagpur, would be 173 miles. This line has two distinct ghauts to pass over, the upper reaches of the Wainganga lying between; it will require a gradient of 1 in 90 over the more southern ghaut, and the ghaut work is very costly. Assuming Rs. 85,000 as a fair average per mile, the cost of the 158 miles between Jubbulpore and Salwa station will amount to Rs. 134½ lakhs.

NAGPUR-UMARWARA-KHARAKBEL-NARSINGHPUR.

A line between the Salwa station, Chhattisgarh Railway and Narsinghpur on the Great Indian Peninsula Railway, was also examined. As far as Mohgaon, 66 miles from Nagpur, it would follow the same route as that towards Jubbulpore, but from there it was taken to the west to avoid any descent into the Wainganga valley. The Satpura range is, however, much higher to the west, and the lowest crossing obtainable was at an altitude of 2,880 feet above mean sea level.

From Salwa station to Mohgaon (66 miles from Nagpur) has been already described. Up to the 75th mile the work is easy and also the gradients; but from there to mile 81 the ground throughout is very rough and traversed by a series of ridges and ravines. With a series of deep cuttings and high embankments a grade of 1 in 100 can be obtained, but the soil is all “black cotton,” and the maintenance of high embankments would be very great. From Khyree (81st mile) to Ramgarh (90th mile) the earthwork will be comparatively light with easy gradients; and thence on to Saliwarra (98th mile) gradients of 1 in 150 are obtainable by a succession of stiff cuttings through basalt 30 feet deep, and corresponding embankments. From the 98th mile to Umarwara (101st mile) the work will also be extremely heavy, a gradient of 1 in 100 being, with difficulty, found. From there to Gadarwarra (110th mile) at the foot of the ghaut the ground is not so rough as in the previous section, and easy gradients are practicable, but the work is very heavy, needing heavy cutting through rocky soil.

Between miles 110 and 130 the country seems too difficult to carry an ordinary railway except at inordinate expense. Gradients of 1 in 65 and 1 in 70 are obtainable, but only at great expense, the whole of the 20 miles with the exception of the 4 miles over the Sorli plateau on the summit of the pass (117 to 121 miles) requiring the heaviest description of ghaut work. The gorge at mile 115 would require an embankment about 1,200 feet long, and over 70 feet deep at its deepest part. Miles 122 and 123 are especially difficult, as the line would have to run along detached conical hills, which would need to be connected by enormous embankments, and through which heavy cross drainage would have to be passed. Again considerable difficulty would be experienced between miles 123 and 124, where the line would have to run for some distance along a precipitous cliff about 250 feet above the bed of the adjacent nullah.

The earthwork from mile 130 to mile 142 would be moderately heavy, the line running through a rough stony country cut up by ravines requiring considerable minor waterway. Easy gradients are, however, obtainable.

Between mile 142 and mile 160 there is a fall of 710 feet into the Nerbudda valley, and the works are necessarily heavy; but as the line runs generally over sidelong ground, and the heavy cuttings are principally through soft earth hillocks, the work may be classed as light ghaut work. The first 7 miles, however, fall very rapidly, and no better gradient than 1 in 80 can apparently be got at any reasonable expense. The cross drainage is slight.

From mile 160 to mile 166 the line would be a surface one through the Nerbudda valley to the Karakbel station on the Great Indian Peninsula Railway, the nature of the country rendering a line direct to Narsinghpur impracticable. Along these 166 miles from Nagpur the works may be classed thus:—

15	miles of completed railway,
78	„ of ordinary plain railway work,
27	„ of heavy plain railway work,
18	„ of light ghaut work,
28	„ of very heavy ghaut work.

The line is not one that will perhaps be ever further considered, as it is not a trade route, and is not likely to be selected before the route *via* Jubbulpore and Gondia; moreover, the extreme height of the summit level at Sarli (2,880 feet) and the very heavy approach works are very much against the route.

Karakbel is 10 miles east of Narsinghpur, so the actual distance by this route between Narsinghpur and Nagpur is 176 miles.

It is not considered that a metre gauge line could be made over these 166 miles under Rs. 95,000 per mile, or for a total of Rs. 158 lakhs; and whether such a line is ever made will probably depend on the extent and value of the coal-field at Bara Chhindwarra.

WARORA-CHANDA.

As soon as definite arrangements are made to work the iron industry in the Chanda district, the Wardha Valley Railway will of necessity have to be extended southwards to Chanda, a distance of about 30 miles. No difficulties are likely to be experienced, so a broad gauge line should be made and completely stocked for Rs. 90,000 per mile, or at a total cost of about Rs. 27 lakhs.

This line will eventually connect with the extensions northwards proposed to be made to the Nizam's railway, and thus give a line of railway communication through the centre of the Deccan.

EXTENSIONS TO NIZAM'S RAILWAY.

Extensions eastwards and northwards into the coal and mineral districts have

References.
Foreign Department, Political, February 1882, Nos. 248-81.

been under consideration for several years, and in 1875 and 1876 surveys were undertaken by the Nizam's Government to determine the proper routes, and the feasibility of the projects.

The main line selected started from Nampuli station, the terminal station on the Nizam's line at Hyderabad, runs eastward through Bhonaghir (34 miles) to Warangul [otherwise called Hanamcoonda], a distance of 94 miles from Hyderabad. From here the main line would take a northerly direction; cross the Godavery at the 150th mile from Hyderabad; accommodate Chinnor, a town some 15 miles up the Godavery from Sironcha, where the Pranhita (Wainganga) joins the Godavery; and then run up the valley of the Wardha river to a point opposite Chanda (255 miles). Here it would make a junction with the present Wardha Coal Railway, which will probably be continued 30 miles further south to Chanda at no very distant date.

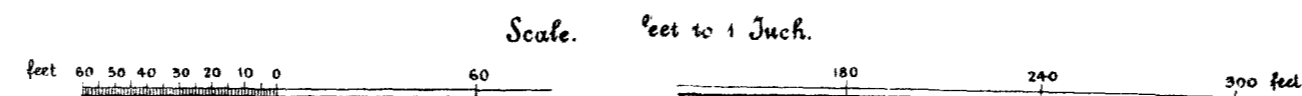
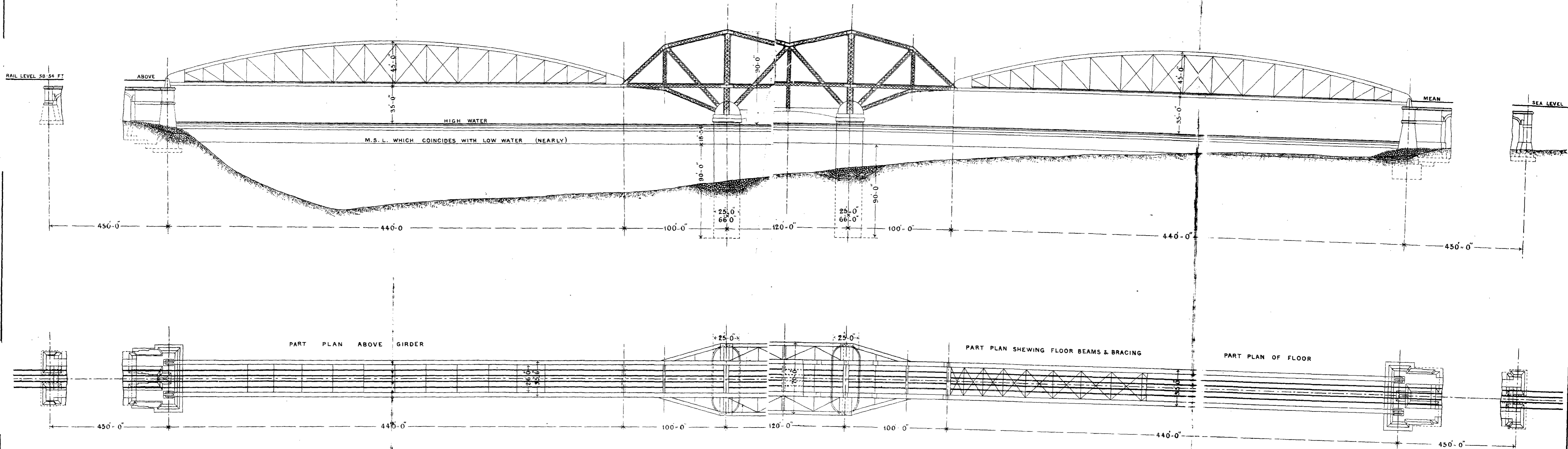
The line from Hyderabad to Warangul has been actually located, and estimates on the metre gauge prepared. There are no engineering difficulties to surmount, the gradients and curves are easy, and excellent building stone (gran-

ite), lime, and ballast are obtainable all along the line. The estimate for a light railway (metre gauge) amounted to Rs. 26,00,000 for these 94 miles, or at an average of Rs. 28,000 per mile, but this is probably too low if a fair provision of rolling stock is to be made and the rivers all crossed by permanent bridges.

The continuation northwards will not be an expensive line, except at the crossings of the Godavery and its large tributary, the Mannair, as the country is open and the engineering difficulties are not frequent.

A branch line from Mutwarra, near Warangul, through the Singareni coal-field to the right bank of the Godavery opposite Badrachellam has also been surveyed and estimated for. This line proceeds in a south-easterly direction, reaches Singareni at the 70th mile, and its whole length to the Godavery would be about 109 miles. The estimate was formed for a "mineral" line on the metre gauge, and with temporary crossings over the Moostir and Kumersain rivers, as permanent bridges over these would be somewhat costly. It amounted to Rs. 27½ lakhs, or about Rs. 25,000 per mile.

E. I. R. HOOGHLY BRIDGE.

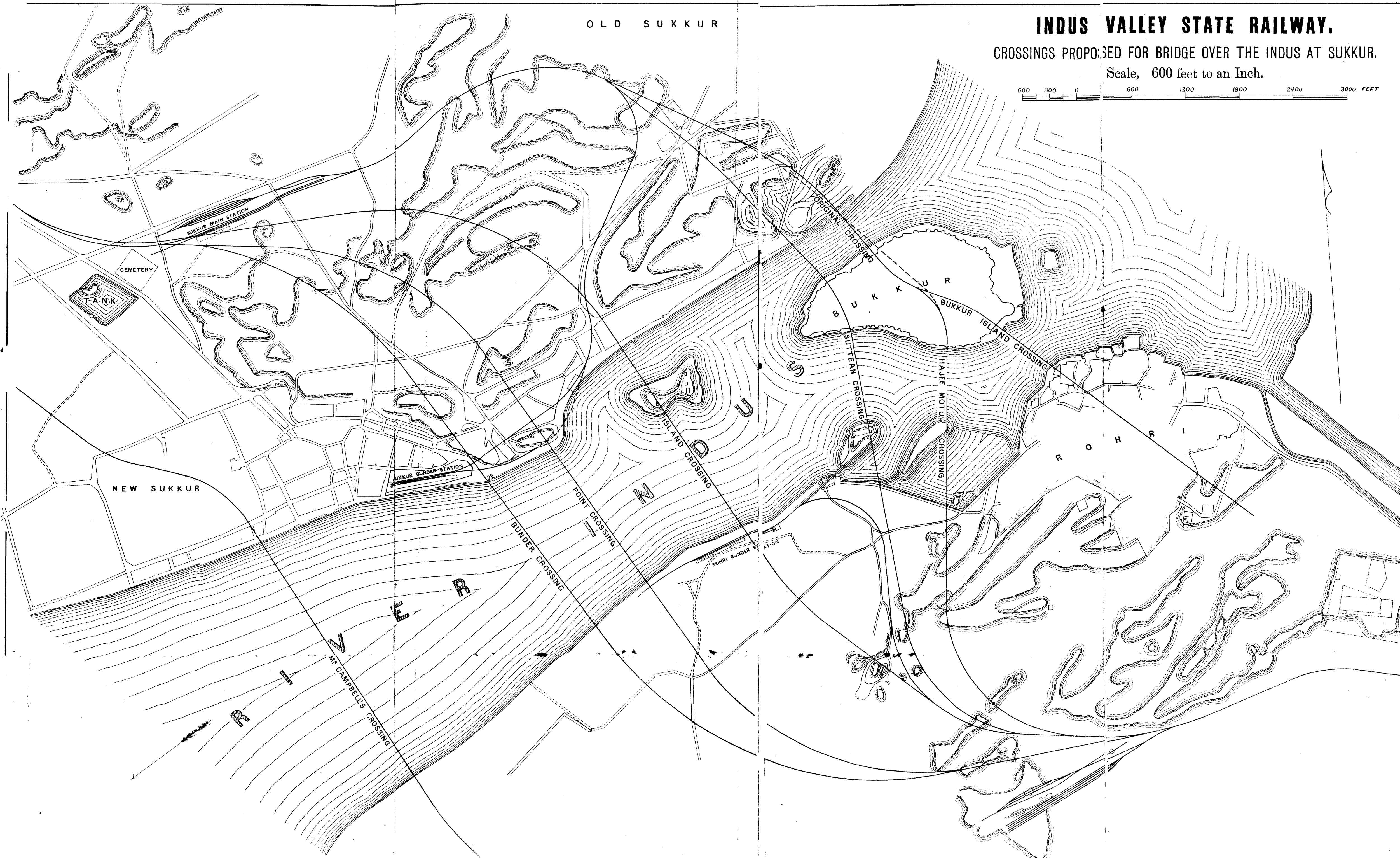
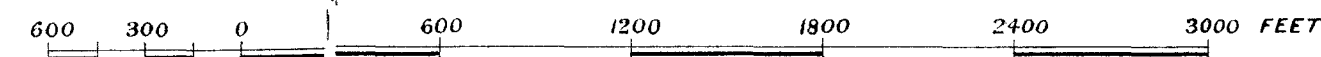


OLD SUKKUR

INDUS VALLEY STATE RAILWAY.

CROSSINGS PROPOSED FOR BRIDGE OVER THE INDUS AT SUKKUR.

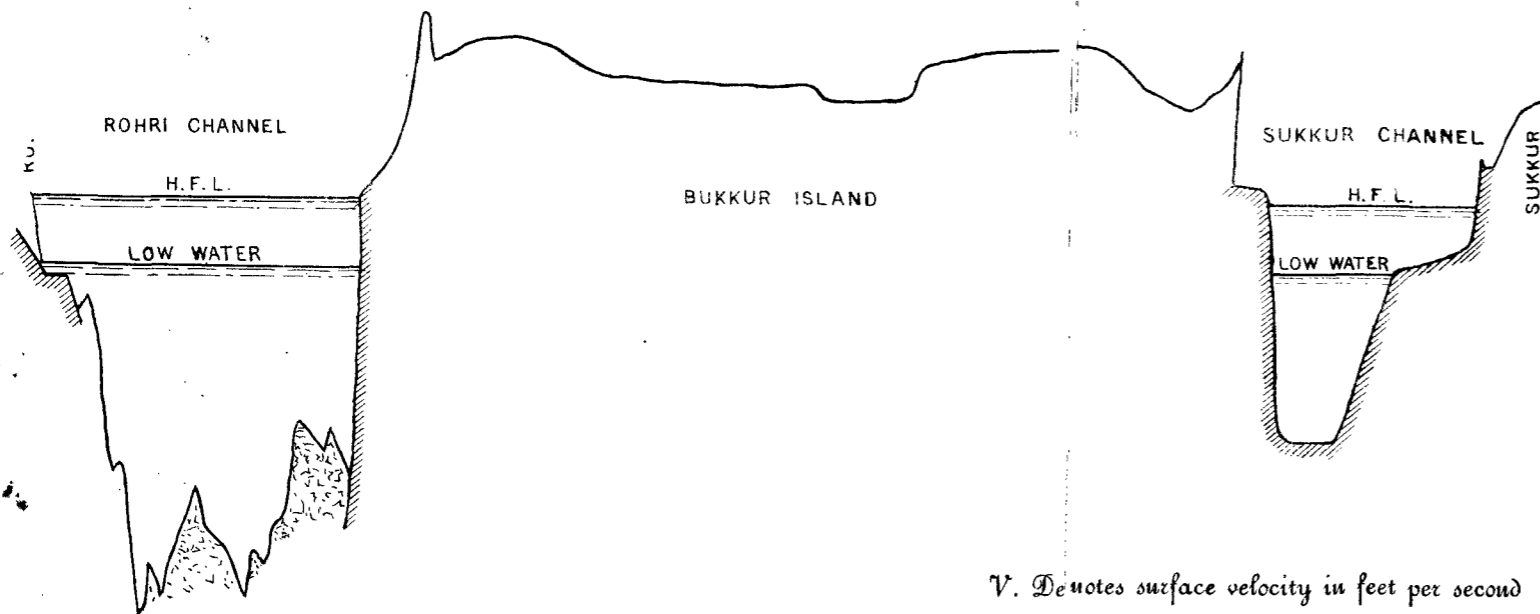
Scale, 600 feet to an Inch.



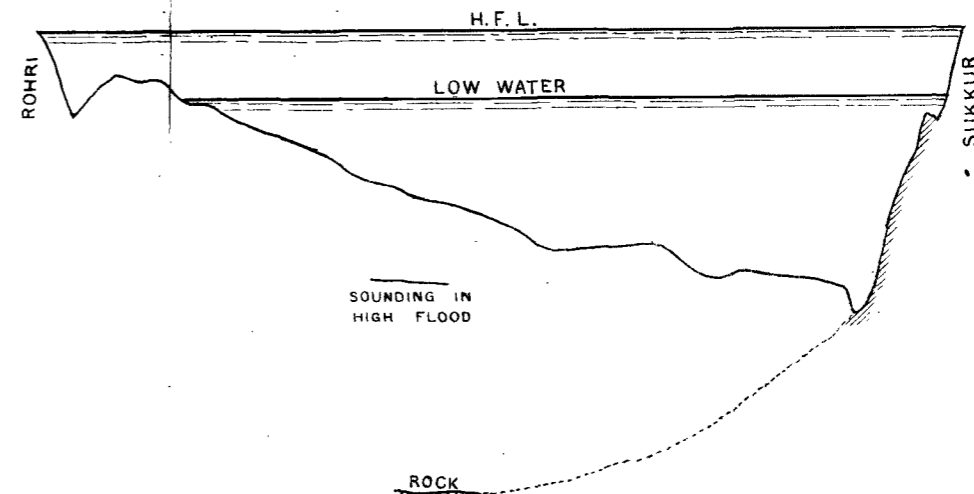
INDUS VALLEY STATE RAILWAY.

SECTIONS OF DIFFERENT SITES PROPOSED FOR BRIDGE OVER THE INDUS AT SUKKUR.

SITE N° 1
ORIGINAL CROSSING

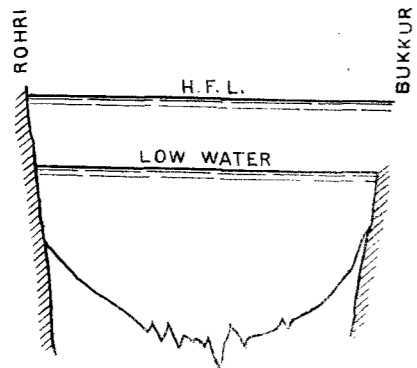


SITE N° 5
POINT CROSSING

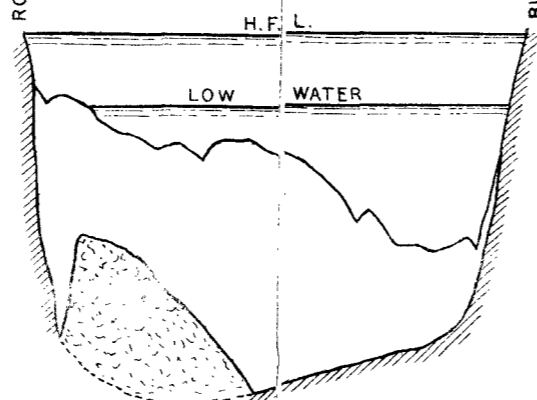


V. Denotes surface velocity in feet per second

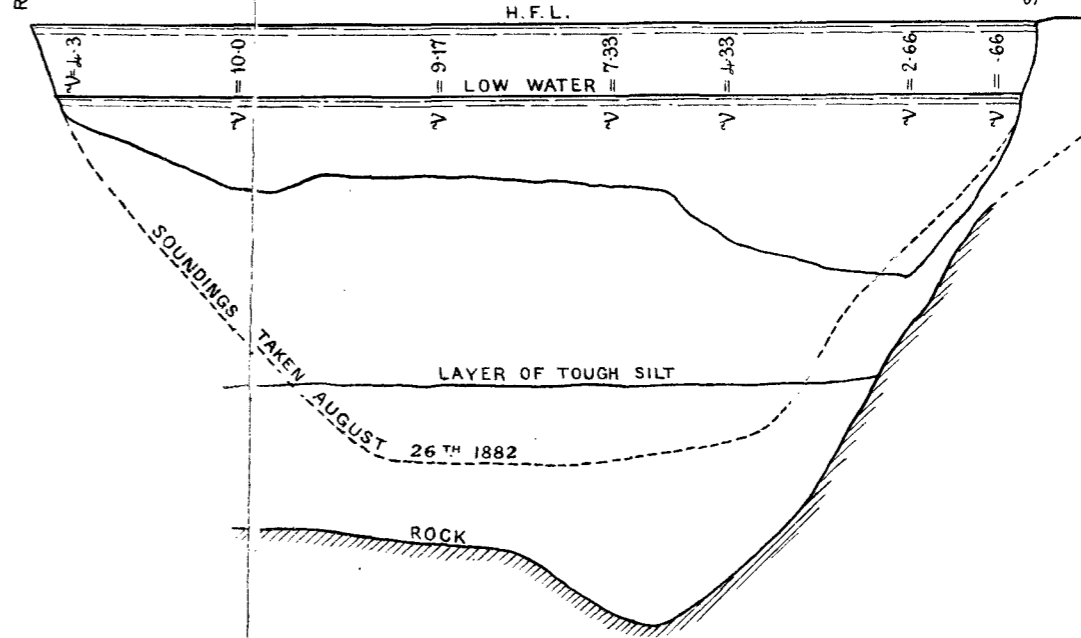
SITE N° 2
HAJEE MOTU



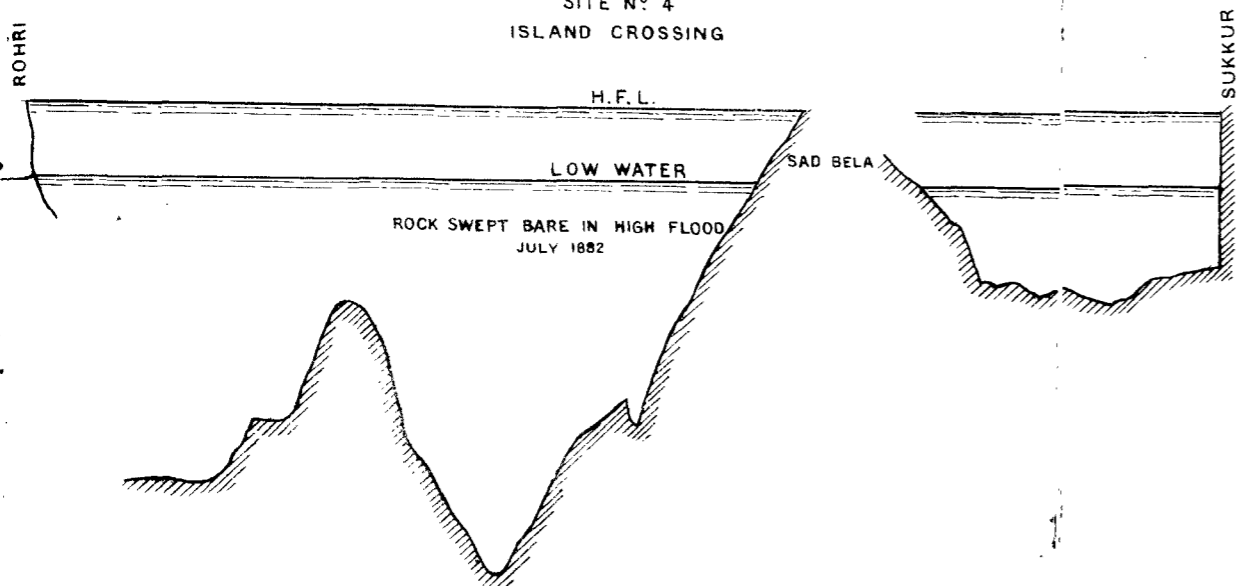
SITE N° 3
SUTTEAN
SOUNDINGS OCTOBER 1873.
SOUNDINGS TAKEN IN HIGH FLOOD JULY 1882
SHEWER ROCK SWEEP BARE AT 85 FT DEEP.



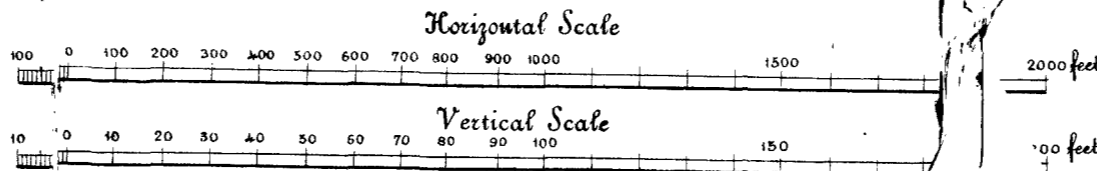
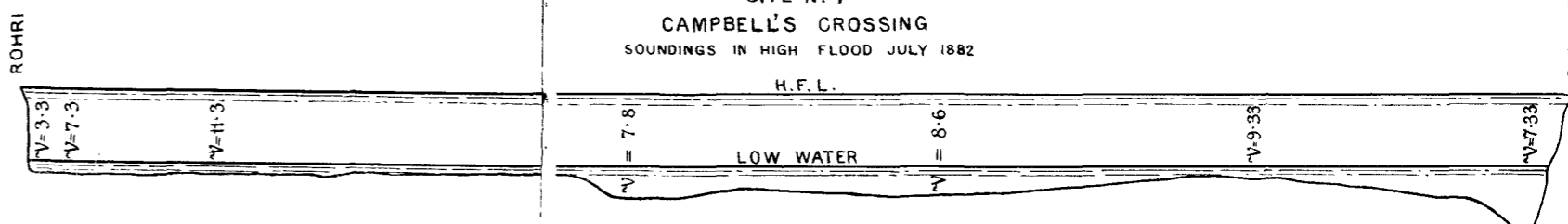
SITE N° 6
BUNDER CROSSING
SOUNDINGS IN HIGH FLOOD JULY 1882



SITE N° 4
ISLAND CROSSING



SITE N° 7
CAMPBELL'S CROSSING
SOUNDINGS IN HIGH FLOOD JULY 1882



CHAPTER VI.

SUPPLY AND USE OF COAL ON INDIAN RAILWAYS.

CONTENTS.—General information showing where different kinds of fuel are used on Indian Railways—Actual cost of fuel on different sections of railways—Extreme difference in cost—Wood being given up as locomotive fuel—Distribution of coal throughout India—Trans-Indus coal—Salt Range coal—Coal near Attock—Coal near Sharagh—Coal in the Rewah State—Coal in the Madras Presidency—Coal in the Nizam's dominions—Coal in Assam—Coal in the Khasia and Garo hills—Large freight charges on coal burnt in Upper India—Economy to be effected by reduction of freight rates—Pre-eminence of Bengal coal—Mohpani coal—Warora coal—Economy of burning Warora coal—Value of English coal—Values of country coals—Cost of handling and storing coal—Relative values of different kinds of fuel—Wood as a fuel—Coal and wood equivalents—Economy of using English coal—Probable use of Rewah coal—Probable use of Singareni coal.

The following information as regards the kinds of fuel used on the different sections of the railways in India has been obtained from the several Railway Administrations. The date of compilation may be taken as the 1st July, 1882; and indeed all the figures and estimates used in this Chapter may be referred to that date.

General. Bengal steam coal used throughout the system. Kurhurbaree coal, raised by the railway itself, costs Rs. 2-1-1⁴ at Giridi station. Coal is also obtained from the Beerbhoom Coal Company, in exchange for Kurhurbaree coal at 1,000 tons Kurhurbaree equal 1,143 tons Bellrooi coal; thus Beerbhoom coal costs the railway Rs. 1-13-5² per ton at Sitarampur station. Beerbhoom coal is used between Howrah and Muddapur and on the loop line; Kurhurbaree on the rest of the system.

Steam coal obtained from Barakur and Mogulpur in the Raniganj coal-field. Both kinds received at Shamnagar station, about 125 miles from the Collieries, and costs Eastern Bengal Railway. —Barakur Rs. 8-15-6 per ton, and Mogulpur Rs. 7-11-6 per ton.

Kurhurbaree steam coal from the Bengal Coal Company's mines is used throughout the line. Contract price, Rs. 3-4-0 at mines; and the coal costs at Benares station, 316 miles from the mines, Rs. 12 per ton. Oudh and Rohilkhand Railway.

Kurhurbaree steam coal from the Bengal Coal Company's mines is used between Delhi and Lahore, and costs at Ghaziabad, Sind, Punjab and Delhi Railway. 782 miles from the mines, Rs. 21-8-2 per ton. Wood is burnt between Lahore and Mooltan; it costs at Okara station Rs. 25 per 100 maunds. English coal is used between Karachi and Kotri, costing Rs. 17 at Karachi. Value of English and country coal about the same.

English coal is used from Bombay to Nandgaon and from Bombay to Raichur, and costs on the line in Bombay Rs. 17-6-11 per ton. Mohpani coal is used between Khandwa and Sohagpur, and costs Rs. 9 per ton at Mohpani, 12 miles by branch line from Gadarwarra station. Warora coal is used from Nagpur to Bhusawal and from Bhusawal to Khandwa; costs Rs. 5 at Warora and Rs. 6-7-6 at the Wardha station. Kurhurbaree steam coal is used between Jubbulpore and Sohagpur, it costs Rs. 3-12-0 at Giridi and Rs. 18-7-0 at Jubbulpore, 624 miles from the mines. The section between Bhusawal and Nandgaon is served by both English and Warora coal according to the amount of stock in hand. Warora and Mohpani coal are considered about equal, in steaming properties, and both much inferior to English and Bengal coal.

Bombay, Baroda and Central India Railway. English coal used throughout the line; contract price in England for delivery at Bombay £1 4s. 6d., cost at Bombay Rs.

14-12-6.

English coal (patent fuel) used on sections—Madras to Jalarpet, Arkonam to Tirupati and Guntakul to Bellary. Cost of patent fuel in England £0 8s. 6d. per ton (free on board); cost, landed in Madras, Rs. 18 per ton. Wood is used on all other sections of the line, and is collected at short intervals all along the line. Prices per ton vary from Rs. 3-6-0 to Rs. 8, the average being about Rs. 5. Relative values of patent fuel and wood are as 1 to 3.

English coal and wood fuel used throughout the line, the mail trains being worked with coal, while the others are usually worked with wood fuel. But on sections—Trichinopoly to Erode, and Trichinopoly to Tuticorin, wood fuel is much more used than on the sections between Madras and Trichinopoly, and Negapatam to Trichinopoly. Coal which costs £0 12s. 0d. per ton in England is received at the ports of Madras, Cuddalore, Negapatam, and Tuticorin, and averages Rs. 16-2-0 per ton when received on the railway. Wood is received all along the line, and costs, on the average Rs. 4-8-0. Three tons of wood are considered to be about equivalent to one ton of English coal.

Northern Bengal Railway. Raniganj steam coal used throughout the line. Cost at the collieries Rs. 4-4-0, and Rs. 11-12-0 at Damukdia, and Rs. 12-5-0 at Sara stations.

Kurhurbaree coal used throughout. Cost at Giridi Rs. 3-12-0 per ton, and Rs. 10-13-3 at Bankipore, 178 miles from the mines.

Kurhurbaree coal used. Cost at Giridi Rs. 3-12-0 and at Barrh Ghaut, 142 miles from the mines, Rs. 9-8-0. The cost of ferriage across the Ganges and wastage is estimated at Rs. 2-3-0, so cost on the railway is Rs. 11-11-0.

Cawnpore-Farukhabad Railway. Kurhurbaree coal (picked rubble) used. Cost price at Giridi Rs. 3-8-0 per ton, Rs. 16 at Cawnpore, 524 miles from the mines.

Muttra-Hathras Railway. Kurhurbaree coal (picked rubble) used. Cost price at Giridi Rs. 3-8-0 per ton, and Rs. 20-2-0 at Hathras road station, 698 miles from the mines.

English coal is used between Sabarmati and Nana and from Khandwa to Rutlam. Purchased in Bombay market at an average of Rs. 14-11-0; cost at Sabarmati, 313 miles from Bombay, Rs. 21-8-2, and at Khandwa, 353 miles from Bombay, Rs. 23-8-0. Bengal coal, both from Kurhurbaree and Raniganj, is used on the other sections of the railway. Average cost price at the mines delivered into wagons is Rs. 3-7-4, while the cost at Agra, 681 miles from the mines, is Rs. 20-0-10; and at Delhi, 795 miles from the mines Rs. 22-7-4. Wood was formerly used on the Khandwa section, but owing to its rapidly increasing price, has had to be discontinued. The relative values of English and Kurhurbaree coal are considered to be about the same.

Kurhurbaree coal is used throughout the line except on the Salt branch, where wood is principally used. Cost price at Giridi Rs. 3-8-0 per ton, at Lahore, 1,116 miles from the mines, Rs. 30-11-9. Wood costs from Rs. 8 to Rs. 11 per 100 cubic feet. Wood is also used in working ferry trains across the Chenab river. Experiments with the coal (? lignite), found in the Salt Range are still being carried on, but have hitherto been unsatisfactory, owing to the impurities mixed with the coal. One lb. Bengal coal equals about 2½ lbs. of the wood here available.

English coal is used on the Sibi branch between Jacobabad and Rindli. Cost price at Karachi Rs. 17-4-0 per ton, and at Kotri station, 105 miles from Karachi, Rs. 19-12-6. Wood is used throughout the main line between Mooltan and Kotri, and on the Kandahar branch as far as Jacobabad. Taking 125 cubic feet of wood to a ton, the average price of wood between Mooltan and Rohri is Rs. 6-14-0 per ton, and between Sukkur and Kotri Rs. 4-10-0.

English coal is used throughout, bought in Bombay market, but only taken delivery of at Bhavnagar. Cost price at Bhavnagar from Rs. 18 to Rs. 24; average may be taken at Rs. 18-8-0. Cost of carriage by country boat from Bombay to Bhavnagar is from Rs. 3 to Rs. 4 per ton.

Wood fuel is now used throughout this line, and is received at the Dharur and Gangawarum stations, and also at the 53rd mile from Wadi junction. Cost of wood per ton is Rs. 6 if supplied by Nizam's Forest Department, and Rs. 3-6-0 from private contractors. Inferior wood, under 4 inches in diameter, is supplied at prices varying from Rs. 1-8-0 to Rs. 2-6-0 per ton.

English coal is now used solely between Rangoon and Prome, but for the past two years coal and wood were used in about equal proportions. Cost of coal at Rangoon is Rs. 18-6-6. Wood on tenders costs approximately Rs. 7-4-0 per ton; and taking 1 lb. of coal as equivalent to 2-75 lbs. of this wood, the relative values for equivalent quantities are—coal Rs. 19 and wood Rs. 19-15-0.

From this information, and utilizing the rates charged by the different lines for the carriage of Revenue stores, the following table has been calculated. The cost of handling and storing coal and putting it into tenders is shown as estimated by the different lines. The longer lines of railway have been divided into well marked sections, so the relative cost of coal and wood on the different sections can be seen at a glance. The Map at the end of the Chapter shows graphically the sections on which the different coals and wood are used.

Railway and Section, (omitting minor branches).	Miles.	Cost per ton of fuel at source of supply.			Source of supply of fuel.	Cost per ton of fuel at point where first received on line.			Freight charge per ton to centre of section.			Handling &c, per ton.			Total cost per ton at centre of section.		
		Rs.	A.	P.		Rs.	A.	P.	Rs.	A.	P.	Rs.	A.	P.	Rs.	A.	P.
<i>East Indian Railway.</i>																	
Howrah to Muddapur, ...	183	1	13	5	Assensol	1	13	5	0	15	4	0	1	3	2	14	0
Loop line, ...	188	1	13	5	Sitarampur.	1	13	5	1	9	2	0	1	3	3	7	10
Muddapur-Allahabad, ...	382	2	1	2	Kurhurbaree.	2	1	2	2	3	8	0	1	3	4	6	1
Allahabad-Delhi, ...	390	2	1	2	"	2	1	2	6	4	0	0	1	3	8	6	5
Allahabad-Jubbulpore, ...	228	2	1	2	"	2	1	2	5	6	6	0	1	3	7	8	11
<i>Eastern Bengal Railway,</i> ...	152	...	...	...	Barakur.	8	2	0	1	9	4	0	3	6	9	14	10
<i>Oudh and Rohilkhand Railway.</i>																	
(Including all branches), ...	547	3	4	0	Kurhurbaree	12	0	0	6	6	9	0	4	10	18	11	7
<i>Sind, Punjab and Delhi Railway.</i>																	
Delhi-Lahore, ...	349	3	0	0	"	2	8	2	4	1	8	0	4	0	25	13	10
Lahore-Mooltan, ...	208	6	12	0	Wood.	6	12	0	1	6	0	0	6	0	8	8	6
Karachi-Kotri, ..	105	17	0	0	Englsh.	17	0	0	1	3	0	0	4	0	18	7	8

Railway and Section, (omitting minor branches).	Cost per ton of fuel at source of supply.			Source of supply of fuel.	Cost per ton of fuel at point where first received on line.			Freight charge per ton to centre of section.			Handling &c. per ton.			Total cost per ton at centre of Section.			
	Miles.	Rs.	A.		P.	Rs.	A.	P.	Rs.	A.	P.	Rs.	A.	P.	Rs.	A.	P.
<i>Great Indian Peninsula Railway.</i>																	
Bombay-Poona, ...	119	17	6	11	English	17	6	11	1	4	0	0	3	6	18	14	5
Poona-Sholapur, ...	164	17	6	11	"	17	6	11	4	3	0	0	3	6	21	13	5
Sholapur-Raichur, ...	160	17	6	11	"	17	6	11	7	9	0	0	3	6	25	3	5
Bombay-Nandgaon, ...	178	17	6	11	"	17	6	11	1	13	8	0	3	6	19	8	1
Dhond-Manmad, ...	145	17	6	11	"	17	6	11	4	14	4	0	3	6	22	8	9
Nandgaon-Khandwa, ...	98	5	0	0	Warora.	6	7	6	6	1	7	0	3	0	12	12	1
Bhusawal-Nagpur, ...	244	5	0	0	"	6	7	6	3	2	10	0	3	0	9	13	4
Khandwa-Sohagpur, ...	141	9	0	0	Mohpani.	9	0	0	1	13	7	0	3	0	11	0	7
Sohagpur-Jubbulpore, ...	121	3	12	0	Kurhurbaree.	18	7	0	1	9	5	0	3	0	20	3	5
<i>Bombay, Baroda & Central India Railway.</i>																	
Bombay-Ahmedabad, ...	309	14	12	6	English.	14	12	6	2	13	3	0	6	0	17	15	9
Ahmedabad-Wadhwan, ...	80	14	12	6	"	14	12	6	6	5	10	0	6	0	21	8	4
Gaekwar's Railway, ...	60	14	12	6	"	14	12	6	4	11	6	0	6	0	19	14	0
Patri Salt Branch, ...	22	14	12	6	"	14	12	6	6	9	3	0	6	0	21	11	9
<i>Madras Railway.</i>																	
Madras-Jalarpet, ...	132	18	0	0	Patent fuel	18	0	0	1	3	3	0	1	5	16	4	8
Arkonam-Tirupati, ...	42	18	0	0	"	18	0	0	1	2	5	0	1	5	19	3	10
Guntakul-Bellary, ...	32	18	0	0	"	18	0	0	5	4	4	0	1	5	23	5	9
Jalarpet-Beyypur, ...	274	5	0	0	Wood.	5	0	0	0	14	7	0	1	10	6	0	5
Jalarpet-Bangalore, ...	85	5	0	0	"	5	0	0	0	8	9	0	1	10	5	10	5
Tirupati-Raichur, ...	266	7	8	0	"	7	8	0	1	1	6	0	1	10	8	11	4
<i>South Indian.</i>																	
Madras-Tanjore, ...	290	15	2	0	English.	15	2	0	1	10	8	0	3	0	16	15	8
Negapatam-Erode, ...	166	15	2	0	"	15	2	0	1	11	8	0	3	0	17	0	8
Trichinopoly-Tuticorin, ...	195	15	2	0	"	15	2	0	2	0	8	0	3	0	17	5	8
<i>Northern Bengal Railway, ...</i>																	
Patna-Gya Railway, ...	233	4	4	0	Barakur.	11	12	0	3	15	7	0	3	0	15	14	7
<i>Patna-Gya Railway, ...</i>																	
Patna-Gya Railway, ...	57	3	12	0	Kurhurbaree.	10	13	3	0	13	6	0	8	0	12	2	9
<i>Tirhoot Railway.</i>																	
* Ferry charges included in handling, ...	75	3	12	0	"	9	8	0	1	1	9	*2	3	0	12	12	9
<i>Cannpore-Farukhabad Railway, ...</i>																	
Cannpore-Farukhabad Railway, ...	87	3	8	0	"	16	0	0	1	1	6	0	4	0	17	5	6
<i>Muttra-Hathras Railway, ...</i>																	
Muttra-Hathras Railway, ...	29	3	8	0	"	20	2	0	0	6	6	0	4	0	20	12	6
<i>Rajputana-Malwa Railway.</i>																	
Sabarmati-Nana, ...	149	14	11	0	English.	21	8	2	1	9	6	0	3	0	23	4	8
Khandwa-Rutlam, ...	160	14	11	0	"	23	8	0	1	11	2	0	3	0	25	6	2
Agra-Ajmere, ...	233	3	7	4	Kurhurbaree.	20	0	10	2	7	9	0	3	0	22	11	7
Delhi-Bandikui, ...	136	3	7	4	"	22	7	4	1	7	1	0	3	0	23	1	5
Ajmere-Nana, ...	152	3	7	4	"	20	0	10	6	9	1	0	3	0	26	12	11
Ajmere-Rutlam, ...	233	3	7	4	"	20	0	10	7	7	0	0	3	0	27	10	10
Jodhpore Railway, ...	17	3	7	4	"	20	0	10	7	1	11	0	3	0	27	5	9
<i>Punjab Northern Railway.</i>																	
Lahore-Rawalpindi, ...	174	3	8	0	"	30	11	9	2	0	11	0	3	0	32	15	8
Pindi-Peshawar, ...	105	3	8	0	"	30	11	9	5	5	11	0	3	0	36	4	8
Turnool-Khushalgarh, ...	67	3	8	0	"	30	11	9	5	2	6	0	3	0	36	1	3
Lala Musa-Bhera, ...	59	10	0	0	Wood.	10	0	0	0	13	7	0	7	0	11	4	7

Railway and Section. (omitting minor branches).	Cost per ton of fuel at source of supply.			Source of supply of fuel.	Cost per ton of fuel at point where first received on line.			Freight charge per ton to centre of section.			Handling &c, per ton.			Total cost per ton at centre of Section.			
	Miles.	Rs.	A. P.		Rs.	A.	P.	Rs.	A.	P.	Rs.	A.	P.	Rs.	A.	P.	
<i>Indus Valley Railway.</i>																	
Mooltan-Rohri,	280	6	14	0	Wood.	6	14	0	2	4	3	0	8	0	9	10	3
Sukkur-Kotri,	227	4	10	0	"	4	10	0	1	11	2	0	8	0	6	13	2
Ruk-Jacobabad,	37	4	10	0	"	4	10	0	0	8	2	0	8	0	5	0	2
Jacobabad-Bandli,	112	17	4	0	English coal	19	12	6	7	2	7	0	11	0	27	10	1
<i>Bhavnagar-Gondal Railway.</i>																	
Bhavnagar-Wadhwan,	106	21	0	0	"	21	0	0	1	2	0	0	5	0	22	7	0
Dhola-Dhoraji,	88	21	0	0	"	21	0	0	1	9	6	0	5	0	22	14	6
Nizam's Railway,	121	4	8	0	Wood.	4	8	0	0	7	6	0	3	0	5	2	6
Burma Railway,	163	18	8	0	English coal	18	8	0	2	9	0	0	8	0	21	9	0

A study of these figures leads to the consideration how far the present extreme differences in cost of coal—varying from Rs. 2-14-0 on the lower section of the East Indian Railway to Rs. 27-10-10 on the Ajmere-Rutlam section of the Rajputana-Malwa Railway, and to Rs. 36-4-8 on the Pindi-Peshawar section of the Punjab Northern Railway—can be, or are likely to be, lessened. It may also be taken for granted that wood cannot be economically burnt on any sections very much longer. First, between Delhi and Lahore, and then on the Punjab Northern Railway, wood fuel has had to be abandoned owing to its increasing scarcity. Lately it has been considered cheaper to burn English coal on the heavily graded section between Khandwa and Indore rather than burn wood fuel; and now the South Indian Railway are burning much more coal than formerly, both in consequence of the increase of speed and also on account of the largely increasing compensation claims arising from the burning of goods in transit due to sparks from the wood fuel.

As regards railways in the Punjab, coal exists in the Suliman range, west of the Indus, and is also found near Attock and in the Pind-Dadan-Khan Salt Range. The Suliman coal is apparently of fair quality, containing about 58 per cent. of fixed carbon, 38 of volatile substance, and 4 of ash; but as yet it has been found in seams too thin to be worked economically; and is, moreover, too far from existing lines of railway to be used on locomotives. The coal found in the Salt Range is very scattered, poor in quality, probably not of great extent, and is more of the nature of lignite than true coal. It contains much iron pyrites, and is consequently objectionable for use in locomotives. It was used for some time on the Sind, Punjab and Delhi Railway, but was given up after a lengthened trial on the ground that it was liable to spontaneous combustion; that it disintegrated and deteriorated very rapidly from exposure; and that the sulphur acted injuriously on the tubes and fire-boxes of the locomotives. It is now again under trial on the Salt Branch of the Punjab Northern Railway, where wood is still burnt; but the results are not satisfactory, and it seems unlikely even when carefully picked to be of much use in the present style of locomotive.

Coal or lignite of a better quality has recently been found a little to the south of Attock; its use for locomotive purposes has not yet been sufficiently tried, but it is probable that it only exists in small pockets and consequently very limit-

ed in extent. When the Trans-Indus hills are better known it may be that workable seams of coal will be found, but that time must be awaited.

On the Sind frontier, traces of coal have been found in the Bolan pass, but it is worthless as fuel. On the Harnai route from Sibi to the uplands of Southern Afghanistan three seams of coal have been noticed at Sharagh, about 70 miles from Sibi. These seams are only from 3 to 5 miles distant from the trace of the proposed railway towards Quetta and Kandahar, and therefore will be of great value when the railway is constructed. Hitherto it has not been possible to make any extensive explorations for coal in this district, nor has its steaming properties yet been determined, but it seems improbable that coal can exist in that part of the country in any large quantity.

Although it was long known that extensive coal-fields existed in the Rewah State, it is only lately that borings have been made on any scale. At present the coal has only been examined at its out-crop, where it may be presumed to be of an inferior character to that lying underneath, but the experiments made with it have been very satisfactory, and give it a relative value of 71 per cent. of the Kurhurbaree coal; and judging from the results as yet obtained, it seems probable that the efficiency of the coal got from the deep seams will amount to 80 per cent. of the Kurhurbaree coal. The seams as yet found are many and some of considerable thickness; the dip is slight, and enormous quantities of excellent locomotive coal seem to exist at varying depths from the surface, but none greater than from 250 to 300 feet.

This field lies from 35 to 60 miles south-east of the Kutni station of the East Indian Railway, and a survey for a branch railway to the site is to be put in hand at once.

The Madras Government has made persistent efforts to open out the coal-fields at Badrachellam on the Godavery, but as yet with indifferent success. A much better quality of coal is found on the opposite bank of the river in the Nizam's dominions, where indeed the principal part of this coal-field lies, and a little to the west of this is the Singareni coal-field. This field has an area of about 8 square miles, and there are four known seams of coal, one of which is 30 feet thick. This coal is decidedly of good quality, containing 66 per cent. of fixed carbon, 23 of volatile matter, and 11 of ash. No coal has as yet been found south of this coal-field (the Badrachellam field being probably a part or extension of the same), so it seems probable that, when the Nizam's Railway is extended eastward, as it apparently should be within a short time, the Singareni coal-field will supply coal to the railways in the Madras Presidency, to the railway system in the Southern Mahratta country, and to south-eastern branch of the Great Indian Peninsula Railway.

The Jaipur and Makum coal-fields, situated in Upper Assam, will also be extensively worked, as they can produce excellent coal, but their out-put must of necessity, from their geographical position, be restricted to use in the Assam Valley. The Makum coal-field has one seam 100 feet thick, of which 75 feet is good coal. It is of good quality, containing 60 per cent. of fixed carbon, 36 of volatile matter and 4 of ash. A light railway (metre gauge) is now under construction from Dibrugarh to Sadiya, with a branch to the Makum coal-field; this will bring the coal to the banks of the Brahmaputra, whence it will be distributed by water.

Coal is also found in considerable quantity near Cheerapunji and Shillong in the Khasia hills in the province of Assam, but until railway construction has been much more developed this coal will probably be inaccessible for locomotive purposes. Further to the west, along the same range, the Garo and Jaintia Hills coal is also

found, the more promising of which is found at Daingiri, containing 48 per cent. of fixed carbon, 44 of volatile matter, and 8 of ash. It seems probable that some of these fields will be worked as soon as the Dacca-Mymensingh Railway is open to traffic; but any extension of this line northward of Mymensingh will be heavily weighted by the construction of a bridge over the old bed of the Brahmaputra, and which is estimated to cost at the least Rs. 10 lakhs.

On the whole the province of Assam is extremely rich in coal, the rough estimates of the probable procurable quantity being not less than 40 millions of tons.

For the present therefore, the railways in the North-West Provinces, Punjab, and Sind, must draw their coal supplies from England, or from the coal-fields in Bengal; and owing to the immense distances, the freight charges on the coal must necessarily amount to large sums. As the cost of coal at the pit's mouth either in England or in the Bengal coal-field is not capable of much reduction, being now about Rs. 3-8-0 per ton at Kurhurbaree, the cost of coal to railways in the North-West Provinces and the Punjab can only be reduced by reduction of the freight charges. The East Indian Railway is at present the great distributor of the

Economy to be effected by reduction of freight rate for coal.

Bengal coal, and its freight rate for coal is $\frac{1}{8}$ th of a pie per maund per mile; that is to say, the cost of coal per ton is increased by one rupee for every 42·32 miles that the coal has to be moved. There can be no doubt that the East Indian Railway is making a handsome profit out of the carriage of coal; and as it is believed that that railway can now carry, at a profit, stuff in large quantities at the rate of $\frac{1}{10}$ th of a pie per maund per mile, it is possible that the rate for coal may before long be sensibly reduced. A reduction to $\frac{1}{7}$ th pie increases the distance that one ton can be carried for one rupee to 49·38 miles; a reduction to $\frac{1}{5}$ th pie the distance is 56·43 miles; and to $\frac{1}{4}$ th pie the distance is 63·48 miles. These reduced freight rates would lower the cost of a ton of Kurhurbaree coal in Lahore [1,116 miles from Giridi] from Rs. 30-11-9 to Rs. 26-1-7, to Rs. 23-4-5, and to Rs. 21-1-3, respectively. These figures represent marked differences in the ultimate price of coal at Lahore, but they are not obtainable until the carrying railways—the East Indian and the Sind, Punjab and Delhi—feel themselves in a position to make the reduction on their own motion.

The price of English coal at Karachi may lower to about Rs. 15, its present average price in Bombay, which is about Rs. 2 lower than at present; but that is not likely to happen until Karachi becomes a more extensive mart for exporting produce, when ships will come to the port laden with coal in ballast and certain of a return cargo.

Of the undeveloped coal-fields the two which seem likely to play very important parts in the supply of locomotive fuel are the Umaria (Rewah) and the Singareni (Nizam's) coal-fields. But apart from speculation, it is interesting to

Pre-eminence of Bengal coal.

study the Map at the end of the Chapter showing on what sections of the existing railways the different kinds of coal are used. The Bengal coal—the best of which comes from the Kurhurbaree coal-field, and when burnt fresh is little inferior to English coal after importation—stands pre-eminent. The railways terminating in Madras and Bombay still use English coal largely, as they are far distant from local supplies: the only other coal-fields worked on a moderately large scale are those at Warora and Mohpani in the Central Provinces. Both of these coals are used on the Great Indian Peninsula Railway, and are considered equivalent in steaming properties, but it seems probable that the Mohpani coal is a little the better when

Mohpani coal.

used on a large scale. Unfortunately, however, the outturn from this field has hitherto been so small and its initial price so high (Rs. 9 per ton at the mines), that the Great Indian Peninsula Railway can only use it on one section of its length,—that between Khandwa and Sohagpur. From the Table it will be seen that the average cost of this coal to the railway is Rs. 11-0-7, while the price of Bengal coal, which is burnt on the Jubbulpore-Sohagpur section, is Rs. 20-3-5. If the supply from

Mohpani were sufficient it could also be burnt economically on the Jubbulpore section also, for, even taking its efficiency at only 70 per cent. of Kurhurbaree coal, it could be burnt for about Rs. 15 against the Rs. 20-3-5 now being paid. It is hoped that the out-put from these mines will be somewhat increased shortly, but they cannot be relied upon except for very limited supplies. In consequence of this Mohpani cannot be counted upon as a source of supply for more than local wants.

Warora coal is now being extensively used on the Great Indian Peninsula and Nagpur-Chhattisgarh Railways; and now that the out-put from the mines is more steady and has been much increased of late, it is probable that it will be more extensively used for locomotive purposes. On the Great Indian Peninsula Railway it meets English coal at Nandgaon, the respective values per ton at that station being (*vide* Table) English Rs. 19-8-1, and Warora Rs. 12-12-1. Taking the efficiency of Warora coal at 70 per cent. of English, the equivalent of Warora coal will cost Rs. 18-3-7 against that of Rs. 19-8-1 for English—thus showing that, *cæteris paribus*, Warora coal could be economically burnt on the Great Indian Peninsula Railway farther west than Nandgaon. As Manmad, the junction station for the Dhond-Manmad chord line is only 16 miles further west than Nandgaon, it would appear that Warora coal should be burnt on that chord line rather than English, and such may be the case, but the difference would be very slight, and probably not sufficient to justify the expense of altering the locomotives to adapt them to burning Warora coal. From recent experience the Locomotive Superintendent of the Great Indian Peninsula Railway is now inclined to give Warora coal a value of efficiency much below 70 per cent. of English coal. This may arise from the present out-put at Warora being somewhat inferior to the first supplies, or it may be due to the rapid deterioration which the coal undergoes from exposure; but the quality will doubtless improve as the collieries are more developed.

Moreover, owing to the expense due to hauling English coal up the Western Ghats, it would seem that Warora coal should be economically burnt as far as the top of the Ghats, and doubtless this will be the case in progress of time. But the flow of traffic on the Great Indian Peninsula Railway exercises material influence on the present consumption of Warora coal. At present the great flow of traffic is towards Bombay, enormous quantities of wheat going from the Central Provinces to Bombay for export. On the East Indian Railway the wagons which would go empty up-country to bring down produce for export traverses almost the entire length of its main line with full loads of coal; but on the Great Indian Peninsula Railway the Warora coal has to traverse the railway in the same direction as the mass of its principal traffic, and consequently it is cheaper to bring up English coal from Bombay in the returning wagons which would otherwise run empty to a greater distance than otherwise would happen. Hence the present anomaly.

On the Khandwa-Rutlam section of the Rajputana-Malwa Railway English coal is, and has been, used since wood fuel was given up in March 1882. This coal costs the railway at Khandwa Rs. 23-8-0 per ton; and although it is dearer than its equivalent of Warora coal, it has hitherto been considered economically preferable on account of the stiff gradients on the line between Khandwa and Mhow. Warora coal is not liked because it gives out sparks profusely and requires a special arrangement of the fire-bars. Hence to burn this coal the locomotives require to be specially adapted for it; and this further means the retention of the same engines on the same sections of the railway. Warora coal costs Rs. 5 per ton at the pit's mouth, and can be placed into Rajputana-Malwa wagons at Khandwa at a total cost of Rs. 15-4-0 per ton. Taking its equivalent at 70 per cent. of English coal, its relative value is Rs. 21-12-7 against English at Rs. 23-8-0—a sensible difference, but not sufficient to make it more economical to burn Warora coal owing to the heavy gradients on this section.

It will also be interesting to make a theoretical comparison of the different

coals and consider whether the present distribution for use on the different sections is correct.

Value of English coal.

The prices for English coal are as follows:—

	Rs.	A.	P.
Great Indian Peninsula Railway, delivered at Bombay, ...	17	6	11
Bombay, Baroda and Central India Railway, delivered at Bombay,...	14	12	6
Rajputana-Malwa Railway, delivered at Bombay, ...	14	11	0
Sind, Punjab and Delhi Railway, delivered at Karachi, ...	17	0	0
Indus Valley Railway, delivered at Karachi, ...	17	4	0
Madras Railway, delivered at Madras, (patent fuel,) ...	18	0	0
South Indian, delivered at Madras, ...	16	2	0

These rates vary with the contract rates in England with the different varieties imported, and with the rate of freight current at the time. Coal contracted for in England and shipped to India at stated times is often dearer when landed in India than if the same coal is bought in the Indian market. If ships are sure of a return cargo they bring coal out as ballast, and as a rule have no difficulty in effecting an immediate sale. The Rajputana-Malwa and Indus Valley Railways buy all their English coal in the Bombay and Karachi markets at the current rates, whereas the Guaranteed lines usually make their contracts in England and ship the coal at regular intervals throughout the year.

After a series of experiments with English and Indian coal and patent fuel, the Madras Railway Company resolved to burn either wood or patent fuel, and of course their locomotives are adapted accordingly. The patent fuel costs in England 8s. 6d. per ton, free on board ship, and averages Rs. 18 when received at Madras; whereas on the South Indian Railway, the last contracts for coal in England averaged 12s. per ton, and cost when landed in Madras only Rs. 16-2-0 per ton.

For the purposes of comparison the following average prices of English coal may be taken:—

	Rs.	A.	P.
At Bombay, ...	15	0	0 per ton.
„ Madras, ...	17	0	0 „
„ Karachi, ...	17	0	0 „

Values of country coal.

The following prices are assumed:—

	Rs.	A.	P.
Bengal coal, ...	3	8	0 per ton.
Warora „ ...	5	0	0 „
Mohpani „ ...	9	0	0 „
Rewah „ ...	5	0	0 „
Singareni „ ...	5	0	0 „

The values assumed as the cost of handling, &c., vary greatly on the different lines, and are due to the different rates of labor, and also to the fact that on some lines interest on the initial cost of store sheds for coal, coal platforms, &c., has also been added. For the sake of comparison 4 annas per ton of coal and 6 annas per ton of wood (= 125 cubic feet) may be taken as the average cost of handling coal and wood in the several stages from first receipt on the line to being placed on the locomotive.

The East Indian Railway, which burns both Barakur and Kurhurbaree coals—from the Bengal coal-fields—considers that 1,143 tons of Barakur are equal to 1,000 tons of Kurhurbaree coal. The Great Indian Peninsula Railway uses English, Warora, Mohpani, and Bengal (Kurhurbaree) coals, and the relative values as deduced on that line, assuming English coal to be represented by the figure 3,347 are—Warora and Mohpani equal at the figure 1,952, and Kurhurbaree 2,854.

There are, however, a great many points to be taken into consideration when discussing the values of experiments of this nature. The full value of the steaming properties of the different kinds of coal can only be arrived at after con-

siderable experience in burning each kind. The class of locomotive used, the intelligence and experience of the engineman, and the nature of the road and water—all have marked effect on the result of the experiment.

Patent fuel only seems to be slightly inferior to the English coal usually imported to Madras.

Wood is still largely used on the Madras Railways, and on the Indus Valley Railway. At one time it was extensively used on the Sind, Punjab and Delhi Railway, but now coal is used on all sections of that line except between Lahore and Mooltan. It was also used on the Rajputana-Malwa Railway, between Khandwa and the foot of the Vindhya range, but coal is now the cheaper fuel. For a similar reason coal has lately supplanted wood on the Burma railways.

About $2\frac{1}{2}$ tons of wood equal one ton of Bengal coal, and about 3 tons equal one of English coal, when the coal is fresh, but when the English coal is frequently turned over, it does not seem to be better than Kurhurbaree coal; moreover, these figures must vary considerably with the kind of wood obtainable.

For the sake of comparison the following figures may be taken as giving a fair approximation of the relative values of the different kinds of coal available for use on Indian Railways:—

English,	..	..	..	..	..	..	} 1,000
.. patent fuel,	..	..	..	..	..	..
Bengal, Kurhurbaree,	..	..	..	..	..	..	} 870
.. Barakur,	..	..	..	..	..	..
Rewah-Umaria,	..	..	..	..	..	..	800
Mohpani,	..	..	..	..	..	..	720
Warora,	..	..	..	..	..	..	700
Singareni,	..	..	..	..	..	..	700
Wood,	..	..	..	..	..	..	330

The recent experiments with the coal from the Rewah coal-field, show that it is about equal to the Barakur coal. But as the experiments were made with only superficial coal, it is believed that coal little inferior to the best Kurhurbaree, will be obtained from this field, and at no greater depth than from 200 to 300 feet. The Singareni coal-field in the Nizam's dominions is also known to produce coal with excellent steaming properties; and its coal will probably be used throughout the Madras Presidency and on the south-eastern branch of the Great Indian Peninsula Railway as soon as the Nizam's Railway is extended eastwards to the coal-field. In the above scale the value of the Singareni coal is assumed at 700.

Using the above averages, and putting the use of wood on the Indus Valley Railway out of the question, English coal could be economically used throughout the whole of that line, as it would only cost Rs. 31-10-0 at its northern junction at Mozufferabad, against Rs. 35-12-5 for Bengal coal. In fact the junction of the two kinds of coal would take place 88 miles north of Mozufferabad, *i.e.*, 2 miles north of Chichawatni station; and as by far the greater bulk of the traffic between Lahore and Karachi is towards the seaboard, it will be economical to burn English coal between Karachi and Lahore if the present freight rates for coal on the East Indian Railway are continued. The point of equality occurring, however, 127 miles south of Lahore, it will be cheaper to continue to burn Bengal coal on the Lahore and Peshawar line.

On the Rajputana-Malwa Railway English coal now meets Bengal coal at Nana station, 462 miles from Bombay. The average prices of coal on each side of Nana are shown in the Table as English Rs. 23-4-8 and Bengal Rs. 26-12-11, and are thus nearly balanced, but when it is considered that the bulk of the traffic is downwards towards Bombay, and that the returning wagons, now running empty could bring back English coal, it would seem that economically the price of English coal should slightly preponderate, and this would be effected by burning

English coal on the next locomotive district, *i.e.*, as far as Sujat Road, 78 miles farther from Bombay, if not as far as Ajmere itself. Taking the actual distances to Ajmere into the calculation of revenue freight charges, Bengal coal would cost in Ajmere itself Rs. 25-3-4 against Rs. 27-14-6 for English; so it is quite a matter for consideration whether the equalization of the up and down traffic would not justify at the present tariff rates the burning of English coal as high up as Ajmere.

The burning of English coal on the section between Khandwa and Rutlam has already been alluded to, but it has still to be considered whether Warora coal cannot be economically burnt further north than Mhow, at the top of the Vindhya Ghauts. Bengal coal at the Rutlam station costs the Rajputana-Malwa Railway Rs. 30-2-10 per ton, whilst its equivalent of Warora coal can be put down at the same station for Rs. 26-10-2. At the Neemuch station the equivalent values are—Bengal coal Rs. 28-6-4 against Warora coal Rs. 29-2-10, so therefore it is a matter of consideration in regard to the permanent set of the bulk of the traffic on the line whether the use of Warora coal should stop at Rutlam or be continued 83 miles further north to Neemuch. At present rates the equivalent of Warora coal would cost in Ajmere Rs. 33-11-9 against Rs. 25-3-4 for Bengal coal and Rs. 27-14-6 for English coal, so unless both the prime cost of Warora coal and the freight rate over the Great Indian Peninsula Railway are reduced, Warora coal cannot possibly compete in the Ajmere market. Mohpani coal would probably be used on this length as far as Ajmere, but unfortunately its outturn is not sufficient to supply even the local wants of the Great Indian Peninsula Railway.

Assuming that, owing to increased prices for labor and current prices of food, the cost of coal at the Rewah coal-field will not be less than Rs. 5 per ton, and that another rupee will be added for freight over the branch railway, Rewah coal should be delivered into wagons at Kutni station, East Indian Railway, at Rs. 6 per ton. The distances from Kutni and Giridi to Allahabad are 171 and 405 miles respectively, and accepting the present freight rate of $\frac{1}{8}$ th pie per maund per mile, the Allahabad coal consumer would get a ton of Rewah coal for Rs. 10-0-2 against Rs. 12-15-11 for a ton of Kurhurbaree coal; but as the value of Rewah coal is only 80 per cent. of the Kurhurbaree coal, the equivalent value of Rewah coal at Allahabad is Rs. 12-8-3 against Rs. 12-15-11 for the other. As, however, the up-country traffic in coal is of vital importance to the East Indian Railway, the freight rate for the better coal would obviously be reduced so as to give the better coal the command of the Allahabad and up-country markets—it may, therefore, be assumed that the Rewah coal will not go beyond Allahabad along the main line of the East Indian Railway. But it will command a large area of its own; it will be exclusively burnt on any system of lines through Central India and Bundelkhand, on the line from Jubbulpore to join the railway running eastwards from Nagpur, and on the upper length of the Great Indian Peninsula Railway if the out-put from the Mohpani coal-field cannot be increased. This Rewah coal can be delivered at Jubbulpore, 57 miles from Kutni for Rs. 7-5-5 per ton; and would consequently cost the Great Indian Peninsula Railway at Gadarwarra—opposite the Mohpani mines—Rs. 9-6-9. This is only very slightly in excess of the initial cost of Mohpani coal, and being of a superior quality would supersede it and be probably used as far west as Khandwa.

As regards its probable use on the Rajputana-Malwa Railway, it will certainly be used as far as Ajmere if the connection along the top of the Vindhya Range from Kutni *via* Saugor and Ujjain is made. Also with an initial cost of Rs. 5 at the pit's mouth it could be loaded into Rajputana-Malwa wagons at Khandwa at the price of Rs. 15-12-11 per ton. Allowing an equivalent value of 80 per cent. of English coal, this figure for the equivalent amount stands at Rs. 19-12-2 against English Rs. 23-8-0, and Warora Rs. 24-12-7. This shows a decided difference in favor of Rewah coal, and as the coal is of the same nature as Kurhurbaree coal, the locomotives will probably not require any alteration as in the case of Warora coal.

A line of railway to open out the Singareni coal-field in the Eastern part of the Nizam's dominions will start from Hyderabad, and be about 150 miles in length. Probable use of Singareni coal. The coal, therefore, may be considered as having to travel over about 270 miles of line before it reaches the Great Indian Peninsula Railway at Wadi junction. The freight charge will be Rs. 6-5-3 per ton, and if the initial cost is Rs. 5 per ton, good coal can be delivered at Wadi for Rs. 11-5-3 per ton. English coal now costs the Great Indian Peninsula Railway at Wadi Rs. 25-3-5; and assuming that Singareni coal is only equivalent to Warora coal (which is a low estimate) the equivalent of country coal at Wadi will cost Rs. 16-2-11.

At Sholapur station English coal costs the Great Indian Peninsula Railway Rs. 23-8-9 per ton, while its equivalent of Singareni would cost Rs. 19-7-5; while at the Poona station English coal costs Rs. 20-2-5 against Rs. 24-5-1 for its equivalent of country coal. The set of the traffic would, therefore, decide whether burning English coal stopped at Poona or was continued to Sholapur.

At Raichur Singareni coal would cost the Madras Railway Rs. 12-6-9 per ton against Rs. 8-11-4 now paid per ton of wood. It would cost that Railway Rs. 15-14-2 at Cuddapa and Rs. 17-5-0 at Tirupati, where it would meet with the patent fuel, which costs Rs. 19-10-0 at that station. It would, therefore, be cheaper to burn this coal rather than wood all along the section between Raichur and Tirupati.

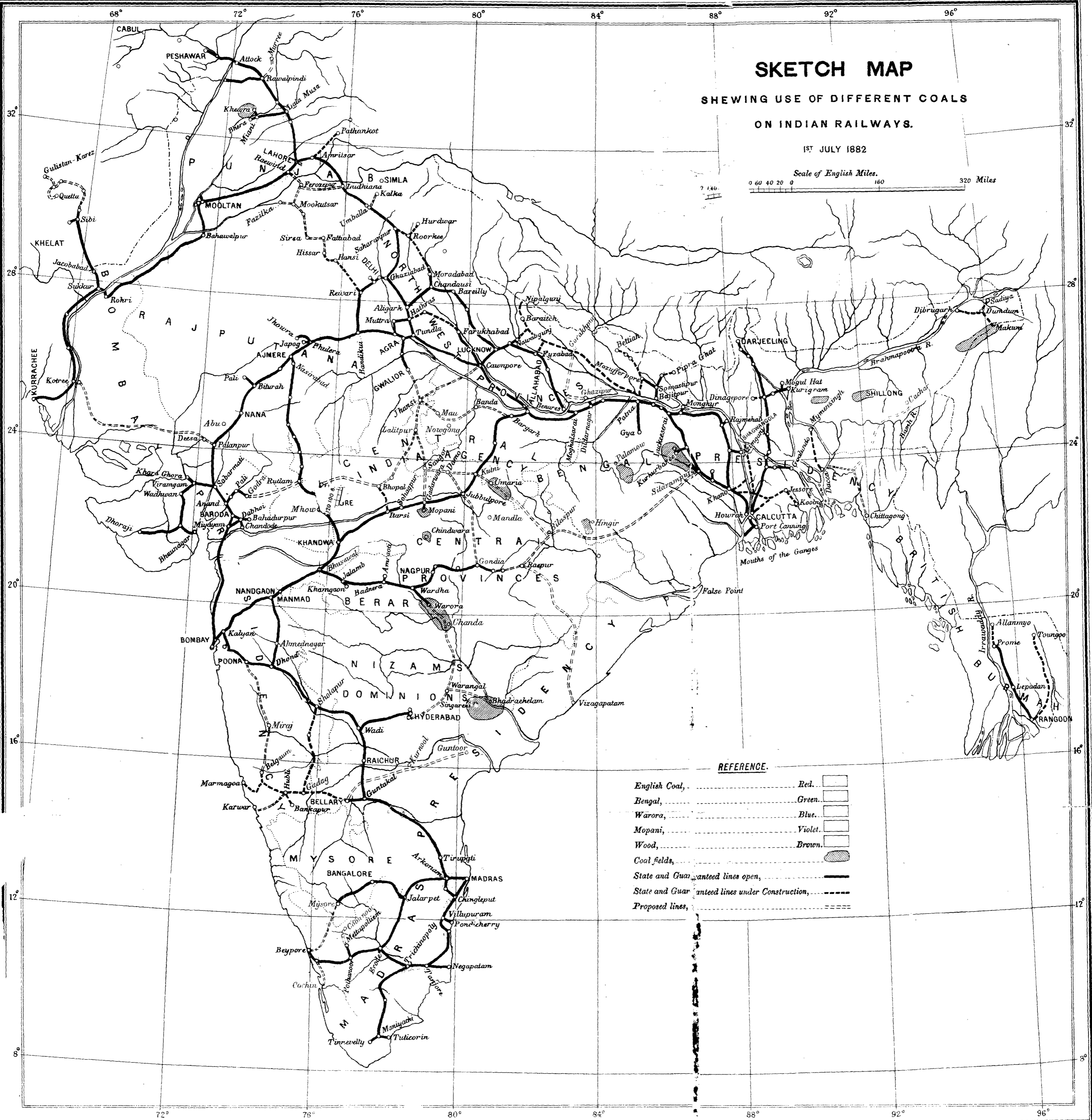
On the Southern Mahratta Railway system it is probable that English coal will be used from Marmagao as far perhaps as Hubli, and it may also be used on the Western Deccan Railway; but coal from the Singareni field should be largely used on this system, as its probable cost at Sholapur and Bellary will not be more per ton than Rs. 14-7-9 and Rs. 17-2-9 respectively. Considering the heavy traffic in grain from the Punjab over the Sind, Punjab and Delhi and Indus Valley Railways to Karachi, and the resulting empty mileage of wagons in the opposite direction, as well as the steadily increasing cost of wood fuel, it would probably pay those railways to carry coal from Karachi at a lower rate than has hitherto been tried in order to encourage the substitution of coal for wood fuel on the section of those lines on which wood is now used; and if the East Indian Railway Company could see its way to a reduction in the present freight charges, the Bengal coal would command a wider range of economical consumption.

SKETCH MAP

SHEWING USE OF DIFFERENT COALS
ON INDIAN RAILWAYS.

1ST JULY 1882

Scale of English Miles.
0 60 120 180 240 300 360 Miles



REFERENCE.

English Coal,	Red.	
Bengal,	Green.	
Warora,	Blue.	
Mopani,	Violet.	
Wood,	Brown.	
Coal fields,		
State and Guaranteed lines open,		
State and Guaranteed lines under Construction,		
Proposed lines,		

CHAPTER VII.

RAILWAY STORES.

CONTENTS.—Stores arrangements now controlled by the Director General—the accumulation of stores—surplus stores—difficulty of utilizing old permanent way material—statement of stores balances on the principal railways—surplus stores of the East Indian Railway Company taken over by Government at termination of their original contract—reserve depôts at the ports, Calcutta, Bombay and Karachi—gradual abolition of reserve depôts at ports—statements showing principal stores operations during year—ships employed and number lost—additions to rolling stock during year—statement of rolling stock on all lines—utilization of indigenous products and local manufacture.

As the construction of State Railways has now assumed a more steady character, and as the lines are being gradually extended, instead of as at the commencement being put in hand and opened for traffic before they were either sufficiently complete or sufficiently stocked, the time has arrived in which a reduction of the agency by which English stores and rolling stock were distributed to the several railways is practicable. At first the very large transactions in stores and the arrangements which had to be made with the different railway companies for the construction of rolling stock, required the whole attention of an experienced officer; but now, that all the large State lines have workshops of their own, and their stores requirements are settling down into proportions which can be moderately well foreseen, the Government of India considered that the stores arrangements could be operated by the Director General of Railways without the intervention of a special officer. Opportunity was therefore taken of the transfer of Mr. R. T. Mallet, then the Director of Stores, to the post of Engineer-in-Chief of the Rewari-Ferozepore State Railway, of placing the stores work directly under the Director General of Railways as an integral part of his office. This took place in November 1881, and the arrangement has hitherto worked satisfactorily.

Considerable attention has been given throughout the year to the question of accumulation of stores. Even in England, where the manufactories being so close at hand it might be assumed that a reserve of stores would not be wanted to be kept on any line, stores are found to accumulate; so in India, far from the sources of manufacture, where a reserve to meet the demands of current maintenance work is absolutely necessary, the tendency to accumulate large depôts of stores is very apparent. Hitherto no strong check has been exercised in this direction, consequently stores have been amassed year by year in anticipation of possible wants, and many of these before they can be utilized are superseded by stores of a newer design or of a better character. The result is the stores become surplus, and as there is no sale, as a rule, for such things in India, the capital locked up in them is practically lost. A small reserve of stores is absolutely necessary in India for each line, but by a little foresight and arrangement, that reserve may be so added to periodically as not to increase it to any marked extent beyond what is necessary to provide for the normal wants of the railway.

Lists of stores which are not required or cannot be utilized on the owning line are now regularly prepared by every railway administration; these lists are periodically circulated, and endeavours made to supply the wants of one line from the serviceable, but surplus, articles on another. But unfortunately there is a limit to such transfer, as the workshops of the different lines are so far apart that inland freight is often prohibitory, and amounts to more than would be paid for getting a newer and better article out from England. Still, however, some good has been effected in this manner, though the surplus stores balances have not as yet been wiped off or even reduced within desirable limits.

These stores lists are doubtless much swollen by the large quantities of old permanent way material which should have a distinct marketable value, but for

which the demand in India has hitherto been small. The adoption of steel rails on all lines is now rendering surplus all the iron rails originally laid down. Some of these old rails are being shipped back to England for different purposes according as the freight market will permit, while others are now being largely utilized in India for construction purposes, such as building goods sheds, platform roofs, road bridges, telegraph posts, &c., &c. In this way the old material is worked up again at a profit to the railway, but the demand is unfortunately as yet not sufficient to prevent the surplus stores of such material from increasing.

The following interesting table gives a statement of stores on the different lines, and show that radical changes have yet to be made before the stores balances on some of the lines can be considered as in an entirely satisfactory condition.

Statement of Stores on the principal Railways on 31st December, 1881.

RAILWAY.	Open mileage.	Approximate value of surplus stores.	Value of serviceable stores not surplus.	Total stores.	Surplus stores per mile open.	Total stores per mile open.	Half-yearly cost of stores establishment.	Stores establishment per mile open.	Percentage of half-yearly establishment to "Total Stores."
	Miles.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	
East Indian, ..	1,506 $\frac{3}{4}$	Returns not received.	..	1,19,48,613	..	7,930	1,12,136	74.745	0.9409
<i>Guaranteed Lines.</i>									
Eastern Rengal, ..	158 $\frac{3}{4}$	19,662	8,96,886	9,16,548	123	5,773	1,377	8.674	0.1502
*Oudh and Rohilkhand, ..	546 $\frac{3}{4}$	1,50,577	23,91,746	25,42,323	275	4,650	5,322	9.733	0.2093
Sind, Punjab and Delhi, ..	663 $\frac{1}{2}$	51,482	41,99,606	42,51,088	77	6,407	31,824	47.963	0.7486
Madras, ..	858	95,967	28,58,227	29,54,194	112	3,443	10,488	12.223	0.3550
South Indian, ..	653 $\frac{1}{4}$	2,34,193	21,48,841	23,83,034	358	3,648	10,680	16.108	0.4481
Great Indian Peninsula, †	1,466 $\frac{1}{2}$	4,71,941	60,12,861	64,84,802	322	4,422	41,571	28.347	0.6410
Bombay, Baroda and Central India, ..	‡502	2,26,991	30,64,960	32,91,951	452	6,558	35,300	70.318	1.0723
<i>State Lines.</i>									
*Punjab Northern, ..	354 $\frac{3}{4}$	3,30,702	39,25,152	42,55,854	932	11,996	25,285	71.275	0.5941
Indus Valley and Kandahar, ..	653	Returns not received.	..	29,21,211	..	4,474	9,407	14.405	0.3220
Rajputana-Malwa, ..	1,115 $\frac{3}{4}$	2,71,027	34,09,631	36,80,658	243	3,299	30,135	27.009	0.8187
Calcutta and South-Eastern, ..	28	7,567	68,482	76,049	270	2,716	264	9.428	0.3471
Nalhati, ..	27 $\frac{1}{4}$	7,197	15,337	22,534	264	826	441	16.183	1.9570
*Northern Bengal, ..	245 $\frac{1}{2}$	60,796	5,32,877	5,93,673	248	2,418	1,332	5.425	0.2243
*Tirhoot, ..	85	4,069	7,34,064	7,38,133	48	8,684	2,906	34.188	0.3936
Patna and Gya, ..	57	2,220	1,74,375	1,76,595	39	3,098	2,439	42.789	1.3811
Mutra and Hathras, .	29	2,800	31,710	34,510	96	1,190	144	4.965	0.4172
Cawnpore and Farukhabad, ..	86	7,786	64,953	72,739	91	845	1,137	13.220	1.5631
Wardha Coal, .	46 $\frac{1}{2}$	35,635	1,29,453	1,65,088	792	3,550	568	12.622	0.3440
*Nagpur-Chhattisgarh, ..	98	Returns not received.	..	2,69,442	..	2,749	2,901	29.602	1.0766

* Construction works in progress on these lines.

† Includes Dhond-Manmad and Berars.

‡ Includes Patri and Gaekwar's.

N.B.—The value of stores on State Railways is taken from the Financial Statistics which accompanied Public Works Department letter No. 484 R.A. of 1882.

The value of stores on Guaranteed Railways is taken from the Revenue Accounts for the 2nd half-year of 1881.

"Stores in transit" are included.

The value of surplus stores are taken from the last 'Surplus Stores' Lists published by each line.

RAILWAY.	Open mileage.	Approximate value of surplus stores.	Value of serviceable stores not surplus.	Total stores.	Surplus stores per mile open.	Total stores per mile open.	Half-yearly cost of stores establishment.	Stores establishment per mile open.	Percentage of half-yearly establishment to "Total Stores."
<i>State Lines.</i>	Miles.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
*Rangoon and Irrawaddy Valley,	161	30,070	3,15,179	3,45,249	187	2,144	7,562	46,968	2,1903
Bhavnagar-Gondal, ..	192½	Nil.	..	3,34,035	Nil.	1,735	4,732	24,581	1,4166
<i>Native State Lines.</i>									
His Highness the Nizam's,	121	32,605	78,848	1,11,453	269	921	2,632	21,752	2,3615
*Mysore,	58	Returns not received.	..	97,259	..	1,676	5,031	86,742	5,1727

* Construction works in progress on these lines.

The surplus serviceable stores of the East Indian Railway, aggregating in value Rs. 12,17,274-14-11, were taken over by the Government of India at the same time that the lease of the old undertaking expired; and the Director General of Railways was in September of this year requested to take steps to utilize them as far as practicable.

The above amount was thus arrived at:—

	Rs.	A.	P.
The total value of stores adjudged to be surplus by the Consulting Engineer to the Government of India for Guaranteed Railways, Calcutta, was ..	16,63,208	7	0
Deducting articles rejected by the Consulting Engineer, viz.—			
Locomotive stores,	42,123	15	4
Carriage and wagon stores,	9,781	10	6
Carriage grease,	15,051	12	5
Total rejected ..	66,957	6	3
Articles of small value and scrap ordered to be sold	3,78,976	1	10
	4,45,933	8	1
The balance taken over by the Director General of Railways was	12,17,274	14	11
Less two clerical errors which had escaped detection—			
One in abstracting the total value of stores at Delhi of ..	+ 802	2	3
And one not traceable of	+ 5	0	0
Total, ..	+ 807	2	3
The net value of the stores taken over was thus ..	12,16,467	12	8

The whole of these stores were minutely inspected and divided into the following categories:—

	Rs.	A.	P.
A. Articles of small bulk in good order and likely to be soon used.— These were ordered to Howrah and are being issued as demands arise.			
Total book value class A, about ..	34,010	15	3
B. Chiefly iron roofing trusses and iron building materials.—These are likely to be all utilized within a few years.			
Total book value class B, about ..	1,55,592	7	6
C. Consisting of good and useful plant and tools.—These were sorted, cleaned, and repaired and issued as demands arose.			
Total book value class C, about ..	83,900	14	0
D. Miscellaneous stores, mostly of useful kinds.—To be sold if they cannot be utilized on State lines.			
Total book value class D, about ..	3,81,695	6	8
		2	s

	Rs.	A.	P.
E. Consists chiefly of odd parts of fittings for switches, signals, lamps, &c., of East Indian Railway patterns.—These were collected and made up as far as possible into complete sets, and efforts were made to utilize them. They could not however be used on State lines which had already been equipped with similar articles of the standard State patterns.			
Total book value class E, about ..	44,469	3	9
F. Consists of carriage traversers, carriage turntables, and wheels and axles for earth wagons.—These are not likely to be soon utilized.			
Total book value class F, about ..	2,55,662	2	11
G. A few articles of telegraph stores of no importance.			
Total book value class G, about ..	180	12	5
H. Good or repairable surveying and drawing instruments.—These have been made over to the Mathematical Instrument Department, Calcutta, for general issue.			
Total book value class H, about ..	39,838	0	6
K. Miscellaneous sundries which there is no probability of being able to utilize in any reasonable time.—These are being sold by auction on account of Government.			
Total book value class K, about ..	2,21,117	13	8
Total Rs., ..	12,16,467	12	8

At one time it was thought that by forming a few central depôts, in which a stock of all articles of current demand should be kept, the requirements of the different State lines could be met, and thus at the same time obviate or counteract any tendency towards undue accumulations. Depôts of stores were consequently formed at the ports Calcutta, Bombay and Karachi, but their working has not been found to fulfil in a thoroughly satisfactory manner the ends desired. It was therefore decided that each line of railway should keep its own small reserve, and be responsible for the submission of periodical indents for the supply of current demands. The balances of stores at the several port depôts are therefore being gradually diminished, and the following table shows the amount of decrease effected during the year under review :—

	Port Store depôt.	Balance on 1st April, 1881.	Balance on 31st March, 1882.	Decrease.
		£.	£.	£.
Stores for Productive Railways, ..	Calcutta	61,356	41,455	19,901
	Bombay	59,919	23,422	36,497
	Karachi	34,378	12,943	21,435
Stores for Frontier (Military) Railways, ..	Bombay	64,600	14,175	50,425
	Karachi	422,764	100,477	322,287
Totals, ..		643,017	192,472	450,545

The large decrease is in the amount of stores in depôt at Karachi. These stores consist principally of permanent way material got out for frontier railways during the exigencies of the late Afghan wars, and which are now being utilized in supplying the wants of new projects as they are sanctioned. These stores have suffered slightly from exposure and sea-water, and their value also bears the enhanced freight charges due to the effects of a war and to having been sent to a port like Karachi, where no return cargo could be found as a rule; but in order that new lines should not be unduly assessed by the transfer of this material, the issuing price now charged is the original price in England, less 25 per cent. for depreciation, and plus the freight charge from England ruling at the time the transfer is effected.

The decrease in the amount of stores held at Calcutta is not so great as desired, as the East Indian Railway is pressing hardly for the resumption by them of the land now used as the State Railway Stores depôt; but the delay is unavoidable, and the time cannot be shortened.

The principal operations in State Railway stores during the official year 1881-82 can be seen from the following figures :—

Expenditure incurred in England on

(a). Productive Public Works stores, amounted at par to	£.	427,783
(b). Frontier lines stores,	£.	366,280
(c). General charges of Secretary of State common to (a) and (b),	£.	11,983
Total, ..	£806,046	

The amount under heading (a) includes £103,952 for locomotive and rolling stock under supply to the Indus Valley Railway through the Agency of the Sind, Punjab and Delhi Railway Company.

The invoiced value of stores landed during the official year was—

Productive Public Works stores, ..	£.	72,013	£.	
{ Calcutta, ..	72,013			
{ Bombay, ..	158,807			
{ Karachi, ..	124,970	355,790		
Frontier stores,	£.	168,040	£.	457,107
{ Bombay, ..	168,040			
{ Karachi, ..	289,067	457,107		
Total,	£812,897			

The number of ships employed in bringing out State Railway stores and which arrived at Indian ports between 1st April, 1881, and 31st March, 1882, was as follows:—

To Calcutta,	No.	67
„ Bombay,	75	
„ Karachi,	45	
„ Madras,	30	
„ Rangoon,	21	

and the casualties were—

1 vessel bound to Calcutta, lost at sea.
1 „ „ Bombay, totally lost.
1 „ „ Madras, lost at sea.

Of these the one bound to Bombay containing the following stores:—1 double Fairlie engine £2,490, and 150 carriage roof lamps and spare glasses, £300, total £2,790—was the only one charged against the general results of the store operations; and so the cost of insurance of stores landed during the year works out to only 0.343 per cent.

The progress made during the calendar year 1881 in supplying the several State lines with locomotive and rolling stock can be seen at a glance from the following statements; the letters L, C, and G standing for locomotives, coaching stock, and goods stock, respectively:—

Metre Gauge.

Workshops in which erected.	During the half-year ending 30th June, 1881.			During the half-year ending 31st December, 1881.			Totals for the calendar year 1881.		
	L.	C.	G.	L.	C.	G.	L.	C.	G.
Jhelum, Punjab Northern Railway, ..	4	..	..	..	..	..	4	..	..
Howrah, East Indian Railway, ..	4	46	..	..	..	..	4	46	..
Ajmere, Rajputana-Malwa Railway, ..	35	19	68	2	26	171	37	45	239
Parell, Bombay, Baroda and Central India Railway, ..	..	9	..	..	..	..	..	9	..
Khandwa, Rajputana-Malwa Railway, ..	5	30	127	..	11	50	5	41	177
Lucknow, Oudh and Rohilkhand Railway, ..	..	81	70	..	13	..	..	94	70
Sabarmati, Rajputana-Malwa Railway, ..	1	..	80	..	..	..	1	..	80
Bangalore, Mysore Railway, ..	4	24	72	..	16	5	4	40	77
Gadecchi, Bhavnagar-Gondal Railway, ..	7	35	397	5	15	2	12	50	399
Somastipore, Tirhoot Railway, ..	..	..	24	..	..	26	..	..	50
Nagpur, Nagpur-Chhattisgarh Railway, ..	..	20	15	6	11	8	6	31	23
Purchased in India or built at Roorkee for the Muttra-Hathras Railway, ..	2	32	75	1	..	1	3	32	76
Total, ..	62	296	928	14	92	263	76	388	1,191

ADMINISTRATION REPORT.

5 feet 6 inch Gauge.

Workshops in which erected.	DURING THE HALF-YEAR ENDING THE						Totals for the calendar year 1881.		
	30th June, 1882.			31st December, 1881.			L.	C.	G.
	L.	C.	G.	L.	C.	G.	L.	C.	G.
Parell, Bombay, Baroda and Central India Railway, .. .. .	..	19	130	..	..	..	..	19	130
Ahmednagar, Dhond and Manmad Railway, ..	..	4	19	..	..	..	..	4	19
Karachi, Sind, Punjab and Delhi Railway, ..	39	..	505	11	..	184	50	..	689
Adamwahan, Indus Valley Railway, ..	..	13	6	..	33	..	..	46	6
Howrah, East Indian Railway, by purchase, ..	..	..	..	..	12	..	..	12	..
Calcutta, Calcutta and South-Eastern Railway, .. .. .	..	..	..	..	..	10	..	..	10
Total, ..	39	36	660	11	45	194	50	81	854

Metre gauge stock put on lines.

	Engines.	Coaching vehicles.	Goods vehicles.
Up to 31st December, 1880,	319	1,148	5,386
Up to 31st December, 1881,	395	1,535	6,544
Difference,	76	387	1,158

Metre gauge stock under erection on 31st December, 1881.

	Engines.	Coaching vehicles.	Goods vehicles.
In all workshops,	20	109	408
Total put on lines and in workshops, ..	415	1,644	6,952

5 feet 6 inch gauge stock put on lines.

	Engines.	Coaching vehicles.	Goods vehicles.
Up to 31st December, 1880,	188	704	3,624
Up to 31st December, 1881,	234	792	4,368
Difference,	46	88	744

5 feet 6 inch gauge stock under erection on 31st December, 1881.

	Engines.	Coaching vehicles.	Goods vehicles.
In all workshops,	37	165	78
Total put on lines and in workshops, ..	271	957	4,446

The foregoing figures do not include the following stock on other lines on the 31st December, 1881 :—

	Engines.	Coaching vehicles.	Goods vehicles.
On the Rangoon and Irrawaddy Valley Railway, metre gauge,	31	199	636
On the Nalhati Railway, 4 feet gauge,	4	10	24
Total,	35	209	660

The following tables show the total amount of locomotive and rolling stock in use on the railways in India on the 31st December, 1881 :—

Goods Stock.

GOODS VEHICLES.	East Indian.	Eastern Bengal.	Oudh and Rohilkhand.	Sind, Punjab and Delhi.	Madras.	South Indian.	Great Indian Peninsula.	Bombay, Baroda and Central India.	Calcutta and South-Eastern.	Nalhati.	Northern Bengal.	Tirhoot.	Patna and Gya.	Muttra-Rathas.	Cawnpore-Farakhabad.	Bhavnagar-Gondal.	Wardha Coal.	Nagpur and Chhattisgarh.	Haugoon and Irrawaddy Valley.	Rajputana.	Holkar and Sindia-Neemuch.	Punjab Northern.	Indus Valley and Kan-dahar.	Mysore.	Nizam's.
Covered Goods Wagons,	5,201	335	2,726	2,308	40	812	3,716	1,034	(d) 140	15	567	171	39	54	148	154	35	193	466	2,005	615	984	1,391	10	55
High-sided "	1,223	76	72	108	..	411	1,098	73	58	..	..	..	..	..	..	..	..	..	..	(a) 95	8	245	235	10	64
Open-sided "		2,200	(e) 34	..	97	74	58
Low-sided "	..	..	121	747	..	(b) 20	2,391	776	..	9	..	44	40	19	1,324	59	89	60	661	104	149	369	55	..	..
Coke or coal "	91	..	..	..	150	..	..	..	..	..	..	..	..	..	..	..	60	..	..	..	..	..	..	..	..
Ballast "	..	50	..	..	217	154	280	163	..	..	..	..	..	..	..	..	..	77	50	254	135	..	118	..	..
Iron cylindrical "	..	270	..	..	..	..	..	..	4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Sample "	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Iron rectangular "	..	200	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Open jute "	..	..	..	..	..	..	..	..	..	80	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Travelling tank,	..	..	..	..	..	..	..	..	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Covered goods (for ambulance purposes),	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Goods brake-vans,	178	13	..	27	..	32	37	31	(g) 5	..	..	..	..	..	..	..	6	..	..	..	..	108	..	18	
Cattle "	53	4	6	..	47	6	97	5	(f) 1	..	5	1	..	2	..	..	..	30	..	..	..	..	..	..	..
Sheep "		3
Powder (or ammunition vans),	31	1	4	..	3	3	17	6	..	2	1	..	..	..	..	..	..	1	6	23	7	8	4	..	..
Treasure brake-vans,	..	..	..	17	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Salt "	..	..	..	..	..	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Store delivery "	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..
Accident Tools,	13	..	..	..	..	..	..	..	..	3	1	1	..	..	..	..	..	..	..	6	2	..	1	..	1
Light material "	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	(e) 2	..	..	..	..	..	..
Fish "	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Coal hoppers,	1,151	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Timber Trucks,	127	15	157	20	106	29	141	55	2	20	6	2	10	16	..	..	8	18	31	16	8	9	2	..	..
Platform "	44	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	75	..	79	..	..
Bogie "	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Six-wheeled "	..	..	..	177	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Water "	..	..	..	..	4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	14	..	..
Cotton "	..	..	..	..	..	100	..	596	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Boiler "	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pilot "	..	..	..	..	..	25	11	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Fuel "	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	6	50	..	..
Iron water tank,	..	..	..	5	..	12	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Oil "	..	..	..	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Travelling cranes,	..	..	8	..	4	1	38	2	1	..	6	..	..	..	..	..	..	..	4	18	..	..	10	..	1
Rail carriers,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	31	300	..	..
TOTAL,	8,112	966	3,094	3,415	2,771	1,607	7,852	2,760	248	24	780	302	81	75	219	494	160	368	636	3,096	962	1,539	2,580	77	139

(a) Including 31 high sided (horse) wagons.
(b) Converted from 3' 6" gauge.

(c) Plank Wagons.
(d) 40 hired out to Patna-Gya line.

(e) 20 hired out to Patna-Gya line.
(f) Hired out to Patna-Gya line.
(g) 1 hired out to Patna-Gya line.

Every effort was made to introduce on railways materials of indigenous origin or of Indian manufacture. Lists were from time to time published showing what stores of this description could be procured, and Managers of State lines were instructed to use them as far as possible in preference to imported stores, so long as the Native products were of sufficiently good quality and not dearer than similar articles imported from Europe. The Agents of the Guaranteed Railway Companies were also asked to make use of indigenous products, and also of articles manufactured in India as far as they could with economy; and there can be no doubt that if such support is given to local manufacture, the local industries will receive an enormous impetus, and the outturn will be much improved in quality; the resources of the country cannot fail to show rapid development and fresh industries will be started, thus introducing fresh openings for utilizing the labor of the surplus population of India.

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APPENDIX A.

GOVERNMENT ADMINISTRATION AND HEADS OF DEPARTMENTS

during the year 1881.

Designation of Appointment.	Name of Officer.
Member of the Governor General's Council, Public Works Department.	The Hon'ble J. Gibbs, C.S.I., C.I.E.
<i>Government of India.</i>	
Secretary, Public Works Department,	Major General A. Fraser, C.B., R.E.
Deputy Secretary, Railway Branch,	{ Major General J. S. Trevor, C.S.I., R.E., (retired on 24th March, 1881). Colonel W. S. Trevor, V.C., R.E.
Under Secretary, Railway Branch,	Major F. Firebrace, R.E.
Consulting Engineer for State Railways,	Guilford L. Molesworth, C.I.E., M. Inst. C.E.
Director General of Railways,	{ Major General J. S. Trevor, C.S.I., R.E., (retired on 24th March, 1881). Colonel W. S. Trevor, V.C., R.E.
Director for Construction,	Colonel F. S. Stanton, R.E.
Accountant General for Railways,	Lieut.-Colonel A. J. Filgate, R.E.
Director of State Railway Stores,	R. T. Mallet, M. Inst. C.E. Appointment not filled up after Mr. Mallet's transfer to the Rewari-Ferozepore Railway on 12th November, 1881.
Assistants to Director General of Railways,	{ Major R. A. Sargeant, R.E. W. Harvey, M. Inst. C.E. Captain M. C. Brackenbury, R.E.
Consulting Engineer for Guaranteed Railways, Calcutta,	Colonel R. deBourbel, R.E.
Deputy ditto ditto ditto,	{ Captain W. H. Johnstone, R.E., (deceased on 21st June, 1881). Major K. A. Jopp, R.E., (Acting).
Consulting Engineer for Guaranteed Railways, Lahore,	Colonel J. G. Medley, R.E.
Deputy ditto ditto ditto,	Major H. Doveton, R.E.
Consulting Engineer for Guaranteed Railways, Lucknow,	Lieut.-Colonel R. C. B. Pemberton, R.E.
Deputy ditto ditto ditto,	Lieut. R. C. Maxwell, R.E., (Acting).
<i>Government of Madras.</i>	
Joint Secretary, Railway Branch, and Consulting Engineer for Railways,	{ Colonel J. Shaw-Stewart, R.E. Captain W. H. Coaker officiated during Col. Shaw-Stewart's absence on privilege leave.
Deputy Consulting Engineers,	{ Major C. J. Smith, R.E. Captain W. H. Coaker, R.E. Lieut. Hamilton acted for Major C. J. Smith, R.E., absent on furlough, till 13th August, 1881, and Lieut. L. Langley, R.E., from 14th August, 1881, till 25th October 1881.

Designation of Appointment.	Name of Officer.
<i>Government of Bombay.</i>	
Joint Secretary, Railway Branch, and Consulting Engineer for Railways,	} Colonel H. F. Hancock, R.E.
Under Secretary, Railway Branch, and Deputy Consulting Engineer for Railways,	{ Major G. W. Oldham, R.E. Major W. J. Engledue, R.E., acted from 20th April to 19th July, 1881. Major T. F. Dowden, R.E., acted from 1st December, 1881.
Deputy Consulting Engineers,	{ Major W. H. Clarke, R.E., (on leave). Lieut. C. L. Young, R.E., (on field service). Resigned appointment in Public Works Department on 8th November, 1881. Captain H. Pilkington, R.E., Acting Deputy Consulting Engineer, was confirmed on 8th November, 1881. Lieut. H. O. Selby, R.E., acted from 20th May, 1881, to 19th July, 1881. Lieut. Burn-Murdoch, R.E., acted from 1st December, 1881.
<i>Government of Bengal.</i>	
Chief Engineer and Secretary, Railway Branch, ...	H. C. Levinge, M. Inst. C.E.
Assistant Secretary ditto, ...	H. W. Warden.
<i>Government of N.-W. Provinces and Oudh.</i>	
Chief Engineer and Secretary, Public Works Department,	{ Colonel L. Russell, R.E., to 22nd April, 1881. Lieut.-Colonel J. G. Forbes, R.E.
<i>Government of the Punjab,</i>	
Secretary, Public Works Department,	Major General C. Pollard, R.E.
<i>Central Provinces.</i>	
Chief Engineer and Secretary, Public Works Department,	} Colonel J. O. Mayne, R.E.
<i>British Burma.</i>	
Chief Engineer and Secretary, Public Works Department,	{ W. C. Furnivall, M. Inst. C.E. to 26th May, 1881. Major C. C. S. Moncrieff, C.S.I., R.E.
<i>Assam.</i>	
Chief Engineer and Secretary, Public Works Department,	} Major J. M. McNeile, R.E.
<i>Hyderabad.</i>	
Chief Engineer and Secretary, Public Works Department,	{ Major J. G. Forbes, R.E., to 13th April, 1881. Lieut.-Colonel J. G. Lindsay, R.E., to 19th December, 1881. Lieut.-Colonel B. G. Smyth, R.E.
<i>Central India.</i>	
* Chief Engineer and Secretary, Public Works Department,	} Colonel C. S. Thomason, R.E.

Statement showing the lengths of all the Railways in India constructed, in progress, and under survey on the 31st December, 1881, together with the names of Heads of Departments during the year 1881.

Gauge	Railway	Total length open on 31st December, 1881	Under construction	Under survey or not yet commenced	HEADS OF DEPARTMENTS					Remarks
					Agent or Manager	Engineering Department	Traffic Department	Locomotive Department	Audit and Accounts	
5 6	East Indian, ..	1,506½	(a) 3½	..	Bradford Leslie. D.W. Campbell (b).	Bradford Leslie. C. H. Denham (c)	N. St. L. Carter.	D. W. Campbell. Mr. Stokes (acting) (d). W. Pearce Carriage and Wagon Supdt.	R. C. S. Mackenzie. St. Gore Browne (acting) (e)	(a) Hooghly Bridge. (b, c) Vice Bradford Leslie on duty in England from March to December. (d) Vice D. W. Campbell acting as Agent. (e) Vice R. C. S. Mackenzie on leave from July to December
	(Guaranteed).									
5 6	Great Indian Peninsula, ..	1,288	..	..	G. A. Barnett.	Wilson Bell Mr. Abbott (acting) (f)	H. Conder.	S. Jackson	E. V. Jordan	(f) Vice Wilson Bell on leave
5 6	Sind, Punjab and Delhi, ..	663½	..	..	R. Bocquet, C.I.E.	C. Stone. L. H. Mitchell (g).	D. Ross, C.I.E.	C. Sandiford	J. Lightfoot	(g) Vice Stone on leave
5 6	Madras, ..	858	(h) 2½	..	A. M. Saunders.	W. R. Robinson.	H. E. Church	F. H. Trevithick.	F. Church	(h) Bangalore Cantonment to City.
5 6	Bombay, Baroda and Central India, ..	421½	..	..	F. Mathew.	F. Mathew	J. R. Duxbury.	E. B. Carroll	J. O. Connell.	
5 6	Eastern Bengal, ..	158½	..	..	F. Prestage.	W. Nicholson.	T. Brander	T. Hindmarsh.	G. L. Calder.	
5 6	Ondh and Rohilkhand, ..	546½	(i) 5½	(j) 181	Col J. H. Jenkins.	H. B. Hederstedt.	S. Hartwell.	J. G. Cook, (k). H. H. Buckland.	G. O. Smith.	(i) Benares Bridge. (j) Moradabad to Ramnugger 47 Moradabad to Saharanpur 115. Roorkee to Hardwar 19 (k) Deceased on 14th April, 1881.
3 3½	South Indian, ..	665	..	..	W. S. Betts	D. Logan.	A. Stanton.	E. G. Sheward.	J. Smith.	
	Subsided or under modified guarantee.									
2 0	Darjeeling-Himalayan, ..	49	..	..	Gillanders Arbuthnot and Co					
5 6	Bengal Central, ..	..	129	136	W. C. Furnivall	W. C. Furnivall				
3 3½	Assam, ..	..	75	..	Shaw, Finlayson and Co.					
3 3½	West of India (Portuguese), ..	..	49½	..	E. E. Sawyer	E. E. Sawyer				
3 3½	Nilgiri, ..	..	..	12	Messrs. Stanes & Co					
	(State). Broad gauge.									
5 6 } 3 3½ }	Punjab Northern, ..	{ 301 (l) 55½	47 (l) 10	.. (l) 12	Major E. L. Marryatt.	Major E. L. Marryatt.	C. J. Keene to March 1881, then P. D. Barclay	A. B. Thomson to August 1881, then H. T. Ferguson.	Major A. G. Begbie.	(l) Salt Branch and extensions.
5 6	Indus Valley and Kandahar, ..	658	..	(m) 1½	Major T. B. B. Savi to April 1881, then Major L. C. Gordon (acting)	J. Ramsay to October 1881, then H. F. Storey	G. F. Mathew.	G. E. Thomas to April 1881, then E. W. M. Hughes	R. K. Williams. Lt. C. R. Hoskyns acted from August '81 to Nov 1881.	(m) Bridge over Indus at Sukkur.
5 6	Dhond-Manmad, ..	145½	..	..	..	..	..	..	..	Worked by G. I. Ry Co

Gauge	Railway	Total length open on 31st December, 1881	Under construction	Under survey or not yet commenced	HEADS OF DEPARTMENTS					Remarks
					Agent or Manager	Engineering Department	Traffic Department	Locomotive Department	Audit and Accounts	
ft. 12. 5 6.	Patna Gya, ..	57	..	(n) 90	V. Rigny.	V. Rigny.	A. W. U. Pope.	A. W. Rendell.	J. Douglas to April 1881 then H. Stuart.	(n) Gyato Lohardugga.
5 6	Calcutta and South-Eastern,	28	(o) 15	(p) 13½	R. G. Mookerjee.	Chief Engr. Bengal.	R. G. Mookerjee.	A. W. Rendell.	F. P. Quinlan.	(o) Sonarpur to Mugra Hât. (p) Mugra Hât to Hara Fort.
5 6	Wardha Coal, ..	46½	..	..	J. Y. Davidson.	J. Y. Davidson.	J. W. Hartley.	G. B. Reynolds.	F. L. Brown.	
5 6	Sindia, ..	74½	..	..	..	..	..	..	..	Worked by E. I. Ry. Co.
5 6	Dildarnagar-Ghazipur, ..	12	..	..	..	..	..	..	..	Worked by E. I. Ry. Co.
5 6	Amritsar-Pathankote, ..	..	65	..	..	T. E. Ivens.	..	..	R. G. Macdonald.	
5 6	Patri, ..	22½	..	..	..	..	..	..	..	Worked by B. B. and C. I. Ry. Co.
5 6	Nizam's, ..	121	..	..	Capt. G. F. O. Boughey.	Capt. G. F. O. Boughey.	W. Sandford	..	F. Morrison to May '81 then J. E. Braddon.	
5 6	Kamgaon, ..	8	..	..	..	..	..	..	..	Worked by G.I.P. Ry. Co.
5 6	Amraoti, ..	6	..	..	..	..	..	..	..	Worked by G.I.P. Ry. Co.
5 6	Bhopal, ..	..	62	..	..	H. T. Geoghegan.	..	..	Capt. C. H. F. Christie to March 1881 then Capt. H. R. LeM. Carey.	
<i>Metre gauge.</i>										
3 3½ 5 6	Rajputana-Malwa	{ 1,114½ (q) 1½	..	..	Major W. S. Bisset.	B. W. Blood.	J. O'Callaghan.	F. N. Gutersloh. W. R. S. Jones, Carriage and Wagon Supdt.	Lt.-Col. C. M. Moberly.	(q) Agra Fort Station to East Indian Railway Station.
3 3½	Nagpur-Chhattisgarh,	(r) 98	51	114½	J. Y. Davidson.	J. Y. Davidson.	J. W. Hartley.	C. E. Cardew.	F. L. Brown.	(r) Nagpur to Amgaon.
3 3½	Rangoon and Irrawaddy Valley	161	..	(s) 42	H. M. Matthews.	H. M. Matthews.	A. E. Adie.	C. H. Mackie acting till Aug. 1881, then G. E. Thomas.	B. M. Johnson to March '81 then J. S. Hubbard.	(s) Proma to Allanmyo.
3 3½	Rangoon and Sitang Valley, ..	..	163½	..	..	H. M. Matthews.	..	..	Do.	
5 6 3 3½ 2 6	Northern Bengal,	{ (t) 13 233 (u) 21	..	..	Major W. A. J. Wallace to June '81 then F. P. Quinlan to November 1881.	Major W. A. J. Wallace. J. A. Anderson during Major Wallace's absence on leave.	G. M. Drury.	A. W. Rendell.	F. P. Quinlan.	(t) Foradaha Branch worked by the E. B. Ry. Co. (u) Kaunia to Dhurua. (v) Farbatapur to Dinapur. (w) Kaunia to Mogul Hât.
3 3½ 5 6	Tirhoot, ..	{ 82½ (x) 2½	101	91½	V. Rigny.	V. Rigny.	A. W. U. Pope.	A. W. Rendell.	J. Douglas to April '81 then H. Stuart.	Mozufferpore to Bettiah 76½. Durbungah to Pura Ghat 24½. (x) Ghat Branch.
3 3½	Cawnpore-Farakhabad, ..	86	..	110	C. W. E. Henslowe.	C. W. E. Henslowe.	C. J. Keene.	W. C. Gibbens (deceased Aug 1881) then A. B. Thomson.	H. Marten.	
3 3½	Muttra-Hathras,	29	..	..	..	..	..	..	..
3 3½	Muttra-Achnera,	22½	..	(y) 1	..	..	..	..	..	Worked by the Rajputana-Malwa Railway. (y) Bridge over Jumna.

ADMINISTRATION.

V

Gauge	Railway	Total length open on 31st December, 1881	Under construction	Under survey or not yet commenced	HEADS OF DEPARTMENTS					Remarks
					Agent or Manager	Engineering Department	Traffic Department	Locomotive Department	Audit and Accounts	
ft. in. 4 0	Nalhati, ..	27½	..	..	R. G. Moorjee.	Chief Engr. Bengal.	R. G. Moorjee.	A. W. Rendell.	J. Douglas to April 1881 then H. Stuart.	
3 3½	Rewari-Ferozepore, ..	..	(a) 88½	(a) 204	..	R. T. Mallet.	..	..	Lt. Col. C. M. Moberly.	(a) Rewari to Hissar. (a) Hissar to Ferozepore and branches
3 3	Bareilly-Ranbagh, ..	..	..	60	..	J. R. Bell.	..	..	..
3 3½	Dacca-Mymensingh, ..	..	..	128	..	H. Bell.	..	..	F. P. Quinlan.	
3 3½	Southern-Mahratta, ..	..	382	..	..	Lieut.-Col. J. G. Lindsay.	..	..	Col G. J. Melliss.	
2 3½	Western-Deccan, ..	..	..	258½	..	E. H. Hallum.	..	..	..
2 6	Rawalpindi-Murree, ..	..	..	46	..	M. S. Dooley	..	..	R. G. Macdonald	
2 0	Jarhaut, ..	..	6½	..	..	..	..	..	..
3 3½	Bhavnagar-Gondal, ..	192½	..	..	H. Dangerfield.	H. Dangerfield.	C. E. Vining.	J. Rhind.	D. W. McPherson.	
3 3½ } 5 6 }	Mysore, ..	{ (b) 58 } 8 }	27½	..	..	Lt.-Col. A. Le Mesurier.	..	..	A. R. Becher.	(b) Bangalore to Mandya.
2 6	Gaekwar of Baroda's, ..	60½	..	..	..	..	..	..	..	Worked by B. E. and C. I. Ry. Co.
2 3½	Jodhpur, ..	..	(c) 17	(d) 42	..	..	..	..	..	(c) Karchi to Pali. (d) Pali to Jodhpur.

Numerical Return of all Races employed on Open Lines of Railway and on their River Steamer Services on the 30th September, 1881.

RAILWAYS	GENERAL ADMINISTRATION, INCLUDING AGENCY, AUDIT, ACCOUNT, PAYMASTERS, STORES, MEDICAL BARRACK, PRINTING, STATIONERY AND POLICE ESTABLISHMENTS				TRAFFIC AND TELEGRAPH DEPARTMENTS				ENGINEERS' DEPARTMENT				LOCOMOTIVE AND CARRIAGE AND WAGON DEPARTMENTS, INCLUDING STEAM-BOAT ESTABLISHMENT				TOTAL				Number of miles open	Number of stations	REMARKS		
	Europeans	East Indians	Natives	Total	Europeans	East Indians	Natives	Total	Europeans	East Indians	Natives	Total	Europeans	East Indians	Natives	Total	Europeans	East Indians	Natives	Total					
GOVERNMENT OF INDIA	East India (including the State lines worked by the Company)	74	41	3,571	3,686	315	234	10,081	10,630	82	27	15,795	15,904	468	247	11,308	12,023	939	549	40,755	42,243	1,591½	169		
	Eastern Bengal (including Damukdia Branch) ..	12	..	460	472	61	37	2,521	(a) 2,619	9	(b) 5	(c) 1,501	1,515	73	38	1,965	2,076	155	80	6,447	6,632	172½	36	(a) Including 1 European, 3 East Indians and 179 Natives of the landing and shipping establishment.	
	Oudh and Rohilkhand ..	25	22	719	766	46	18	1,250	1,314	19	7	4,246	4,272	53	51	3,621	3,725	143	98	9,836	10,077	546½	80	(b) Two men are contractors. (c) 163 men are extra.	
GOVERNMENT OF MADRAS	Sind, Punjab and Delhi (including Indus Steam Flotilla)	62	27	1,012	1,101	125	62	2,891	3,078	39	17	5,478	5,534	188	71	4,633	4,892	414	177	14,014	14,605	676	86		
	Madras	18	50	543	611	50	375	2,132	2,557	31	89	4,099	4,219	94	407	2,847	3,348	193	921	9,621	10,735	858	109		
	South Indian	10	23	285	318	21	67	1,628	1,716	10	30	2,819	2,859	43	236	2,131	2,410	84	356	6,863	7,303	662½	102		
GOVERNMENT OF BOMBAY	Great Indian Peninsula (including Dhond-Manmad and Berar State Railways)	36	29	1,134	1,199	307	206	4,770	5,283	58	20	16,177	16,255	391	197	9,221	9,809	792	452	31,302	32,546	1,439½	179		
	Bombay, Baroda and Central India (including Patna Branch)	15	23	741	784	14	26	2,486	2,526	16	4	2,540	2,560	65	163	1,723	1,951	110	221	7,490	7,821	444	77		
	Rajputana	29	(d) 28	721	778	35	58	1,442	1,535	40	9	7,589	7,638	(e) 133	(f) 159	3,359	3,651	237	254	13,111	13,602	726½	92	32	(d) Includes 1 Jew. (e) Includes 5 West Indians and Africans. (f) Includes 3 Parsees. (g) Includes Mortakka and Patal Pan Stations.
	Western Rajputana ..																								
	Holkar and Sindia-Nemuch	10	7	297	314	24	48	551	623	9	4	1,231	1,244	40	13	284	337	83	72	2,363	2,518	289	(g) 36		
	Dhond and Manmad ..	5	3	92	100	4	9	176	189	10	2	35	47	18	..	120	138	37	14	423	474	119½	14		
	Bhavnagar-Gondal ..	..	..	14	14	..	..	38	38	1	1	30	32	..	..	12	12	1	1	144	146	59½	9	
	Gaekwar's .. .. .	..	..	21	21	..	..	66	66	..	1	96	97	..	2	49	51	..	3	232	235	23	8	(h) This is the Locomotive Foreman who is also in charge of the Engineering Department.
	Calcutta and South-Eastern .. .. .	..	..	17	17	..	1	24	23	(h) 1	..	69	70	2	..	41	43	3	1	151	155	27½	7	(i) This is on both the Tirhoot and Patna-Gya State Railways.
	Nalhati	6	2	172	180	6	15	627	648	7	2	1,434	1,443	21	18	595	634	40	37	2,828	2,905	233	28	(j) One out of this is employed on both the Tirhoot and Patna-Gya State Railways.	
Northern Bengal (including Steam Ferry) ..	(j) 4	..	75	79	(k) 7	6	173	186	2	..	277	279	(l) 7	12	325	344	20	18	850	888	82	12	(k) One out of this is employed on both the Tirhoot and Patna-Gya State Railways.		
Tirhoot (including Steam Boat) .. .. .	..	..	60	60	4	5	82	91	2	..	270	272	3	5	129	137	9	10	541	560	57	8	(l) One out of this is employed on both the Tirhoot and Patna-Gya State Railways.	
Patna-Gya .. .. .	..	..	3	3	1	..	36	37	..	1	59	60	1	..	64	65	2	1	162	165	29	6		
Muttra-Hathras	5	5	54	64	2	3	134	139	4	..	234	238	4	5	115	124	15	13	537	565	86	22			
Cawnpore-Farukhabad ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Dindarnagar-Ghazpur ..	6	5	46	57	..	3	78	81	..	..	200	200	2	4	43	54	8	12	372	392	45	4		
Wardha Coal	1	3	31	35	3	13	92	108	2	4	343	349	22	19	479	520	28	39	945	1,012	56½	9			
Nagpur and Chhattasgarh ..	8	14	56	(m) 78	13	86	234	333	4	13	864	881	22	33	326	381	47	146	1,480	1,673	161	25	(m) Not including Police, which is under the control of the Inspector General of Police, British Burma.		
Rangoon and Irrawaddy Valley .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Khamgaon .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Amraoti	4	10	140	154	4	22	195	221	3	1	517	521	8	21	229	258	19	54	1,081	1,154	121	13			
Nizam's .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Mysore (n) .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	(n) Return not received.
Sindia .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Punjab Northern	13	8	168	189	45	62	1,324	1,431	22	6	509	537	94	31	1,335	1,460	174	107	3,336	3,617	367½	57			
Indus Valley and Kandahar	30	15	340	385	48	83	1,286	1,417	46	16	3,279	3,341	86	21	2,254	2,361	210	135	7,159	7,504	641	64			
Total Indian Railways ..	373	320	10,772	11,465	1,135	1,439	34,317	36,891	417	259	69,741	70,417	1,838	1,753	47,213	50,804	3,763	3,771	162,043	169,577	9,518½	1,252			

APPENDIX B.

Statement showing the number of servants employed in the Traffic and Telegraph Departments of all Railways open for traffic in India, and the casualties amongst them, whether by Death, Resignation and Discharge or Dismissal during the year ending 30th September, 1881, distinguishing those engaged in England and in India.

RAILWAYS	ENGAGED IN ENGLAND								ENGAGED IN INDIA								TOTAL								REMARKS														
	STATION MASTERS, GUARDS, ASSISTANT GUARDS AND ALL ENGAGED IN WORKING TRAINS				OTHERS				STATION MASTERS, GUARDS, ASSISTANT GUARDS AND ALL ENGAGED IN WORKING TRAINS				OTHERS				TOTAL																						
	Europeans				Europeans				Europeans				East Indians				Europeans				East Indians																		
	Average number employed	Number of casualties by			Average number employed	Number of casualties by			Average number employed	Number of casualties by			Average number employed	Number of casualties by			Average number employed	Number of casualties by			Average number employed	Number of casualties by																	
		Death	Resignation and discharge	Dismissal		Total	Death	Resignation and discharge		Dismissal	Total	Death		Resignation and discharge	Dismissal	Total		Death	Resignation and discharge	Dismissal		Total	Death	Resignation and discharge		Dismissal	Total												
East Indian (including the State lines worked by the Company)	2	237	3	23	4	30	142	..	6	5	11	68	1	14	1	16	92	4	31	11	46	307	4	37	5	46	234	4	37	16	57	
Eastern Bengal (including Damukdia Branch)	1-50	1	41	1	13	5	19	12 50	..	4	3	7	12	..	3	1	4	15 25	1	12	3	16	54 50	2	16	6	24	27-75	1	16	6	23	
Oudh and Rohilkhand	39 50	2	6	4	12	10 96	..	1	1	8	58	..	1	..	1	4 91	48-08	2	7	4	13	15-87	1	1	
Sind, Punjab and Delhi	4	3	101	1	15	31	47	29	1	5	10	16	25	1	7	7	15	27	1	4	5	10	133	2	23	38	62	56	2	9	15	26	
Madras	8	6 92	..	3	2	5	155 50	1	8	1	10	35	1	2	1	4	230 92	1	13	4	18	49 92	1	5	3	9	386-42	2	21	5	23	
South Indian	3	..	1	1	14	64-10	..	6	15	21	3	20	..	1	..	1	64-10	..	6	15	21	
Great Indian Peninsula (including Dhond-Manmad and Berar State Railways Bombay, Baroda and Central India (including Patna Branch)	6	6	214	3	28	..	31	139	2	14	6	22	68	1	8	5	14	81	..	15	..	15	294	4	36	5	45	220	2	29	6	37	
Rajputana	4	..	..	..	4	..	..	..	8	..	2	..	2	6	..	..	..	..	20	..	4	..	4	14	..	..	..	..	28	..	6	..	6		
Western Rajputana	36	1	4	2	7	49	..	9	12	21	36	1	4	2	7	49	..	9	12	21	
Holkar and Sindia-Neemuch	16	..	2	1	3	47	..	10	4	14	6	..	1	1	3	22	..	3	1	4	50	..	10	4	14	
Dhond and Manmad		
Bhavnagar-Gondal	2	..	2	..	2	9	..	5	4	9	3	..	1	1	1	5	..	3	..	3	10	..	5	4	9	
Gaekwar's		
Calcutta and South-Eastern		
Nalhati		
Northern Bengal		
Tirhoot		
Patna-Gya		
Muttra-Hathras		
Cawnpore-Farukhabad		
Dildarnagar-Ghazipur		
Wardha Coal		
Nagpur and Chhattisgarh	1 92	..	2	..	2	8-92	..	2	..	2	1	1 83	2 92	..	2	..	2	10 75	..	2	..	2	
Rangoon and Irrawaddy Valley	18	1	8	3	12	79	..	12	11	23	4	..	..	..	21	..	3	5	8	22	100	1	8	3	12	15	16	31			
Khamgaon		
Amraoti		
Nizam's	3	..	..	..	..	18	..	4	4	1	..	..	..	..	4	..	1	1	1	4	22	..	..	..	..	5	5				
Mysore (c)	(c) Return not received.	
Sindia		
Punjab Northern	50	4	18	12	34	65	6	32	29	67	..	..	..	..	3	..	..	..	..	50	68	6	32	29	67	84	23	9	35		
Indus Valley and Kandahar	46 60	3	12	8	23	92-59	3	21	9	33	12 83	..	..	..	8	..	2	2	2	59 43	100 59	3	23	9	35	23	9	35			
Total Indian Railways	13	..	1	1	24 50	1	..	1	845-64	19	136	72	227	953-77	13	143	119	275	254-41	4	37	15	56	518 91	7	86	29	122	1,137 55	24	174	87	285	1,472 68	20	229	148	397	

(a) Guards resigned.
(b) Station Master dismissed.

(c) Return not received.

Showing the number of Servants employed in the Locomotive and Carriage and Wagon Departments of Railways open for traffic in India, and the casualties amongst them, whether by Death, Resignation and Discharge or Dismissal, during the year ending 30th September, 1881, distinguishing those employed in England and in India.

RAILWAYS	ENGAGED IN ENGLAND								ENGAGED IN INDIA								TOTAL								REMARKS																							
	DRIVERS, FIREMEN, PILOT MEN, AND ALL WORKING ON MOVING ENGINES				OTHERS				DRIVERS, FIREMEN, PILOT MEN, AND ALL WORKING ON MOVING ENGINES				OTHERS				TOTAL																															
	Europeans				Europeans				Europeans				East Indians				Europeans				East Indians																											
	Average number employed		Number of casualties by		Average number employed		Number of casualties by		Average number employed		Number of casualties by		Average number employed		Number of casualties by		Average number employed		Number of casualties by		Average number employed		Number of casualties by																									
	Death	Resignation and discharge	Dismissal	Total	Death	Resignation and discharge	Dismissal	Total	Death	Resignation and discharge	Dismissal	Total	Death	Resignation and discharge	Dismissal	Total	Death	Resignation and discharge	Dismissal	Total	Death	Resignation and discharge	Dismissal	Total																								
East Indian (including the State lines worked by the Company) ...	32	1	1	2	76	...	5	2	7	207	4	21	3	28	81	..	2	1	3	145	2	16	3	21	154	4	17	21	460	7	43	8	58	235	4	19	1	24										
Eastern Bengal (including Damukdia Branch)	3	6	1	...	1	1	31	1	10	6	17	18	50	...	6	3	9	6	..	1	1	22	50	...	4	1	5	46	2	10	7	19	41	..	10	4	14								
Oudh and Rohilkhand	4	17	...	1	2	58	1	...	1	18	08	...	4	...	4	11	08	...	2	..	2	39	33	2	6	1	9	23	33	..	2	..	2	64	16	3	11	1	15	34	91	...	4	...	4			
Sind, Punjab & Delhi (including Indus Steam Flotilla)	3	...	...	...	15	...	8	8	8	121	7	36	16	59	32	1	11	6	18	60	...	30	2	32	42	...	12	..	12	199	7	74	18	99	74	1	23	6	30						
Madras	5	21	...	2	2	2	23	1	2	5	102	2	5	102	...	4	6	43	...	8	1	6	239	...	4	6	10	92	1	9	3	13	401	...	8	8	16								
South Indian	7	66	...	1	2	18	16	...	3	3	9	25	...	2	2	58	15	2	6	14	22	5	181	25	...	8	4	12	40	07	...	4	3	7	239	40	2	14	18	34					
Great Indian Peninsula (including the Dhond-Manmad and Berar State Railways)	83	...	10	3	13	46	1	5	...	6	156	1	13	1	15	70	...	14	1	15	111	4	23	122	...	53	1	54	396	6	51	4	61	192	...	67	2	69								
Bombay, Baroda and Central India (including Patri Branch)	15	3	1	1	5	11	1	1	2	28	1	4	4	9	28	...	7	...	7	14	...	3	2	5	166	1	48	12	61	68	5	9	7	21	194	1	55	12	68									
Rajputana	...	...	...	...	4	...	...	...	...	118	1	33	7	41	90	1	22	2	25	12	...	2	1	3	69	1	9	2	12	134	1	35	8	44	159	2	31	4	37	
Western Rajputana	...	...	...	...	2	...	...	...	...	39	...	4	3	7	12	...	1	2	3	11	...	1	1	12	...	3	1	4	52	...	5	3	8	24	...	4	3	7		
Holkar and Sindia-Neemuch	...	...	...	...	...	...	...	...	...	12	...	3	2	5	2	...	1	1	2	1	...	...	...	...	...	...	...	...	...	13	...	3	2	5	2	...	1	1	2
Dhond-Manmad	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Bhavnagar-Gondal	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Gaekwar's	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Calcutta and South-Eastern	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Nalhati	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Northern Bengal	1	...	...	...	2	...	...	...	...	18	...	1	3	4	12	...	3	1	4	7	...	3	...	3	15	...	3	2	5	28	...	4	3	7	27	...	6	3	9		
Tirhoot	...	...	...	...	1	...	...	...	...	5	...	...	1	1	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Steam Boat	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Patna-Gya	...	...	...	...	1	...	...	...	...	3	...	...	...	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Mutra-Hathras	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Cawnpore-Farukhabad	...	...	...	...	1	...	...	...	...	1	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Dildarnagar-Ghazipur	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Wardha Coal	...	...	...	...	...	...	...	...	...	1	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Nagpur and Chhattisgarh	...	...	...	...	...	...	...	...	...	10	...	...	...	1	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Rangoon and Irrawaddy Valley	7	...	1	1	4	...	...	...	...	6	...	...	1	1	8	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Khamgaon	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Amraoti	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Nizam's	...	...	...	...	...	...	...	...	...	5	...	...	...	1	1	9	1	...	4	5	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Mysore (c)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Sindia	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Punjab Northern	12	80	3	...	3	8	80	62	70	2	27	20	49	23	80	...	8	8	16	10	21	...	2	...	2	5	60	4	1	5	94	51	5	29	20	54	29	40	...	12	9	21				
Indus Valley and Kandahar	22	...	(a) 4	4	3	1	1	2	2	92	3	19	31	53	34								
Total Indian Railways	195	63	7	19	5	31	222	54	6	25	2	33	966	03	21	178	104	303	610	53	5	98	61	164	515	54	8	96	17	121	1,185	18	7	178	37	222	1,899	74	42	318	128	488	1,795	71	12	276	98	386

NUMERICAL RETURN OF EMPLOYEES.

APPENDIX C.

EDUCATION.

Extract from the Proceedings of the Government of India in the Home Department (Education),—No. 8, dated Simla, the 8th October, 1881.

RESOLUTION.

THE Government of India in its Resolution of the 22nd November, 1879, referred to the consideration of the various Local Governments the important subject of the education of European and Eurasian children in India, as treated in a Minute by His Excellency the (late) Viceroy, dated the 25th March, 1879, and in a Memorandum drawn up by the Venerable Archdeacon Baly on behalf of a Committee which had been appointed to report upon the question. On the 8th June, 1880, Lord Lytton's Government forwarded to the Secretary of State a series of reports on European education furnished at different times by Archdeacon Baly, and submitted for approval various proposals, generally based upon the Archdeacon's recommendations. To that communication no reply has yet been received from Her Majesty's Government, the Secretary of State having intimated his wish to await a further expression of the views of the Government of India after the reports of the Local Governments had been received.

2. These reports have now been for some time before the Government of India, and have been fully and carefully considered by the Governor General in Council. His Excellency in Council has also had the opportunity of perusing a further paper by Archdeacon Baly (explaining, and in some degree modifying, his original suggestions), as well as various memorials and representations from societies and individuals interested in the subject. The Government of India finds itself, therefore, in a position to review generally the whole question, and to state the conclusions to which it has come, and the measures in furtherance of European and Eurasian education which it is prepared to sanction or support.

3. From the enquiries made by Archdeacon Baly and the returns of the Local Governments, it would appear that in the interior of the Bengal* Presidency the total number of European and Eurasian children of school-going years among the classes who might be expected to use Indian schools is, as nearly as can be ascertained, 8,567. Of these, 4,530 children are on school-rolls, of whom 445 are on the average absent daily, while 4,037 receive no education of any kind. In Calcutta among the same classes about 4,000 children are on school-rolls, about 400 being daily absent, while about 1,000 are without instruction. There are thus in the whole Presidency upwards of 5,000 European and Eurasian children growing up in absolute ignorance.

4. There are, it further appears, 128 stations in the interior, with an aggregate of 608 children of European extraction of school-going years, in which no school can be established on account of the small number of children at each station. For places of this class boarding schools at a distance offer the only available means of education. There are 45 stations with an aggregate of 1,826 children, and a sufficient number in each station to support a school, in which nevertheless no schools exist. From these stations 808 children go to boarding schools elsewhere, but 1,083 receive no instruction. There are also 45 stations, possessing each a school, in which 2,044 children go to no school. In many, however, of these places the school is little better than a dame-school, and is quite unsuited for the education of boys above ten years of age.

5. The Governor General in Council agrees in the conclusion come to by former Governments, that the state of things revealed in the foregoing figures is from every point of view lamentable, and one which, if allowed to continue, will certainly become in the end (to use the words of Lord Canning) "a glaring reproach to the Government." It has been rightly said that one very special reason why Government cannot afford to ignore the growing up in India of an uneducated European population is, that in the case of the European his capacity for self-maintenance depends entirely upon the education he receives. He cannot support himself in this country by working as a day-labourer, or by adopting the avocation of the Native peasant. An uneducated European almost necessarily becomes an idle and profitless, and often a dangerous, member of the community. On the other hand, it must be remembered that he (or his English ancestor) was brought out to India originally to do work that could only be done by a European—a fact which in itself gives him some claim to consideration. The climate is uncongenial to him,—the cost of living is necessarily disproportionate to his means,—and he is deprived at the same time of those educational opportunities which are now available at home even to the poorest of the working class. In all these respects the European parent is placed at a disadvantage, and it thus becomes necessary for the Government to come to his assistance. For the same reasons the Government cannot, in rendering its aid, confine itself to subsidising and directing merely the primary education of Europeans, but must, contrary to the practice at home, assist also the schools designed for the middle, and even to some extent those for the higher education of this class of its subjects. (It is, however, to be remembered that the standard of education in Government-aided Primary Schools in England is at least as high as the standard in Middle Schools in this country).

6. It has been not unfrequently suggested in the papers now before Government that there is no

* In the following paragraphs of this Resolution the term "European" is used to signify all persons of European origin or descent, however remote, whether of whole or half blood, who hold to European habits and modes of life

good reason why European* parents should not make use of the schools already provided for the Native population; or why there should be any special and separate organisation for the education of poor European children. Why, it is asked, should they not attend the ordinary district and town schools of their neighbourhood, and be brought up side by side with the other children of the country? There is at first sight undoubtedly a good deal to be said in favour of such a system. It would furnish an apparently simple solution of the difficulty under consideration. It would involve no special outlay of money. It might perhaps tend to make Native and European understand each other better, and diminish race-prejudices and race-antagonism

Admitting the force of all this, the Governor General in Council is, nevertheless, of opinion that the adoption of a system of common education for European and Native youths is impossible. It is not merely that, if the Government were to attempt to compel European parents to send their children to Native schools, it would be met by an amount of prejudice, which, however unreasonable in many ways, it would be very difficult to overcome, but it would have to encounter objections on the part of many parents of a much higher kind—objections, namely, to placing their children in schools where they would receive no religious instruction, and where the whole atmosphere of the place would be non-Christian. It appears to the Governor General in Council that, as a simple matter of respect for conscience, such scruples ought to be treated with the utmost consideration, while practically, he has no doubt they would prove strong enough to render abortive any scheme which sought to disregard them. Again, there being in most stations no such thing as a Native girls' school, there would, on the plan suggested, be no provision for the education of European girls, while the distance frequently lying between the European and Native quarters would in itself, in the climate of India, be an insuperable obstacle to the use by young European children of the Native School of the place. For all these reasons, the Government of India is forced to admit the necessity of separate schools for European children during the age when their habits and principles are in process of formation.

7. Taking it, then, to be beyond doubt that further and special provision must be made for the education of the large numbers of European children of tender age now growing up in ignorance throughout the towns and stations of the Bengal Presidency, the Governor General in Council has carefully considered the proposal, that the necessary funds should be raised by means of an educational rate assessed upon the European population. The weight of opinion among those consulted is decidedly opposed to the levy of any such rate, and the Governor General in Council has himself no doubt that the arguments brought forward against it are valid and sufficient. It would, it seems to him, be a form of class taxation of the most indefensible kind, inasmuch as it would be paid mainly by persons who would themselves get no advantage from it. Where a tax is assessed upon the community at large for general purposes, the fact that an individual tax-payer derives no direct or personal benefit from the expenditure of the proceeds is politically a matter of no moment. But the case is different when a tax is levied on a very limited class for a special object. In the case of the particular tax proposed, it is also to be observed that the classes who would most largely contribute are precisely those upon whom educational charges fall already most heavily, and who frequently pay for the education of the children actually dependent on them sums quite out of proportion to their income. To tax these further for the education of the children of parents less provident, or even less well-to-do, would be in many instances to inflict great and unreasonable hardship. Further, the imposition of an educational cess, if it were devoted mainly (as in fact it would be) to subsidising denominational schools, would at once raise up religious difficulties. Besides all this, there are serious practical difficulties in the way of the levy of a rate, which it is not necessary to describe in detail. The Governor General in Council has no doubt that, unless a general educational rate were levied upon all classes of the community, the assessment of any such rate upon any one particular class is not for a moment to be contemplated.

8. The proposal to make the education of European children compulsory upon their parents is also one which, in the opinion of the Governor General in Council, it would be premature to adopt. It falls to the ground in fact along with the proposal for an educational rate, for it would be impossible to punish a parent for failing to send his child to school, unless a school were in each case provided within reasonable distance of his home, and funds for this are certainly not forthcoming at present.

9. In the absence, then, of any special provision of funds, it remains for the Government to determine the amount of assistance which it is prepared to give from the general revenues to meet the educational wants of the class under consideration. In order to arrive at a conclusion upon this point, it is necessary to enquire more particularly to what extent the existing school accommodation stands in need of extension, and the existing grant-in-aid system of development.

10. A large proportion of the children now without education belong distinctly to the indigent class, being either orphans, or deserted by their fathers, or illegitimate, or the children of men out of work or otherwise unable to support their families. These must, as far as possible, be provided for in free schools and orphanages, towards which the benevolent public and the Government may jointly contribute. The existing institutions of this kind are unable to meet the demands now made upon them for accommodation. Even in Calcutta, where they are largest and most numerous, the applications for admissions are greatly in excess of the number of vacancies, being frequently in the proportion of seven or eight to one. Great difficulty is found in maintaining at the existing level the private contributions on which these institutions largely depend, and it is hopeless to expect that they can be extended without the receipt of substantial aid from some special source. Fortunately the munificent legacy of the late Misses Bruce, amounting to £80,000 (at the present rate of exchange equivalent to nearly ten lakhs of rupees) will enable the Local Government to do nearly all that Lower Bengal requires without incurring any further expenditure. This money is, under the will of the donors, to be devoted, without any religious restrictions or limitations, to

the maintenance and education of "half-caste or Eurasian female children, whether legitimate or otherwise, and in particular orphans and those deserted by their parents" If a scheme can be devised for relieving the existing free schools of their girls, bringing all these upon the Bruce foundation, the accommodation and the funds thus set free will provide all that is necessary for boys. With an improved system of grants-in-aid, to be noticed below, the wants of Bengal in this respect will then be fully met.

11. In the North-Western Provinces and Oudh the demand for free school accommodation is equally urgent, while the present provision is still less adequate. The only Protestant free school in the province for orphans and indigent children is a day school at Allahabad, with a daily average attendance of 90; while there are in the five towns of Allahabad, Agra, Lucknow, Cawnpore, and Benares alone 836 children, most of them very poor, attending at present no school. There can be no doubt that Archdeacon Baly's proposal to expand the present local school at Allahabad into a central free boarding school for the whole of the North-Western Provinces and Oudh is deserving of Government support. The school should ultimately be extended so as to accommodate at least 300 children. The Government of India is prepared to contribute from Imperial funds a maximum sum of one-and-a-half lakhs of rupees to enable the Local Government so to extend it. It is probable, however, that the whole amount of accommodation need not be provided at once. The Local Government must determine the limit of the works to be immediately undertaken; and the plans and estimates (which it is understood have been already drawn up) should be submitted for the approval of the Government of India in the Public Works Department, as it is important to avoid unnecessary outlay, and to arrive, if possible, at some uniform standard of accommodation for such institutions when built or subsidised from Government funds. It will also be for the Local Government to provide for the new school an adequate organisation and establishment.

12. For the Punjab, Archdeacon Baly recommended the expansion of the Lahore Free School, which at present has 24 day scholars and 41 boarders, into a large free school for 200 children to meet the wants of the Punjab and Sind. There does not, however, appear to be any such pressing need for a large orphanage and free school in the Punjab as would warrant the Government at present in making any special grant towards its establishment. It will suffice if the existing railway schools are adequately assisted and developed, and if the Mayo Orphanage and School at Jmla and the existing Free School at Lahore receive more liberal support from grants-in-aid and private contributions. The Government of India will, however, be prepared to consider any application which the Lieutenant Governor of the Punjab may feel called upon to make, should the need of new buildings at Lahore become hereafter manifest.

13. As regards free schools and orphanages, the foregoing arrangements seem to provide all that is immediately required in the way of building accommodation. For their more efficient maintenance, reliance must be placed upon the contributions of private charity and upon the Government grants-in-aid, the latter being so regulated as to give equally proportioned assistance to all classes of institutions, in accordance with the amount of educational work done by each, and without any reference to denominational distinctions. Railway Companies and all other employers of European labour may very properly be called upon to aid in the support of institutions of this class.

14. To meet the case of Europeans above the indigent class, but whose means are still inadequate to meet the whole cost of giving their children a suitable education, what appears to be mainly required, is (1), the provision of increased facilities for sending their children to boarding schools, either in the hills or on the plains as they may themselves prefer; (2), the improvement of the instruction given in existing station schools, and (3), the establishment of schools in all stations now destitute of such institutions where the permanent European population is sufficiently numerous to warrant this.

15. As regards hill schools, the Governor General in Council is himself disposed to attach great value to the effect of a hill residence on growing youths of European descent; but he does not think that the Government of India ought at present either itself to provide additional school accommodation in the hills, or to specially subsidise Hill as opposed to Plains schools. There are many vacancies in the existing hill schools of Lower Bengal, Assam, and the North-Western Provinces, and when these are filled up the extension of existing institutions will always be better and cheaper than the establishment of new schools. In most cases the managers may be expected themselves to undertake such extensions. The Railway Companies have also done a good deal, and are prepared to do more in the way of providing schools in the hills for the children of their European employes. It is only in the Central Provinces and the Punjab that new hill schools seem to be at present somewhat urgently required. In the former province the want will probably be met by the establishment of a railway school at Pachmahi, and if this is made generally available to the European public, the Governor General in Council will favourably consider the question of assisting it by a building grant. In the Punjab what is required is an extension of the Lawrence Asylum at Murree to receive the children of men employed on the Punjab Northern State Railway, the Sind, Punjab and Delhi Railway, and the Indus Valley Railway,—of subordinates in the public service, and of other European parents who must use Indian schools. This matter should receive early attention from the Government of the Punjab. Apart from these special cases, the Government of India believes that the existing provision of hill schools is sufficient for all immediate wants.

16. Increased facilities for making use of these schools will be given by the revised system of Government grants-in-aid and scholarships, to be described hereafter, and also by the introduction on both the State and Guaranteed Railways of a system of free passes for children going to and returning from school when the parent stands in need of this aid. The Public Works Department will be requested to arrange the details of such a system. The Governor General in Council has no doubt that the Railway Administrations will gladly consent to meet the wishes of Government in this respect, as they have already shown themselves fully alive to the importance of placing the means of education within the reach of the poorer classes of Europeans in this country.

17. Though not prepared to build new schools at present in the hills, the Government may very properly aid in the establishment of new schools, or even, in the absence of private effort, itself build

schools at those stations in the plains where there is a permanent European population sufficiently large to justify such a provision. It must rest entirely with the Local Governments to select the stations at which new schools are required, and to settle the number of those which it can cause to be established year by year. But the Governor General in Council desires that European schools may eventually be opened in every station where an average daily attendance of 12 children can be got together. In developing this scheme of European schools, the Local Government should begin with those stations where the permanent European population is largest, and which are most distant from available and suitable schools in other stations; and a further preference should be given to stations where the residents are willing to aid by voluntary contributions and to undertake the management of the local school, receiving only a grant-in-aid from Government. In such cases as those last referred to a building grant might also be often very suitably made.

In considering this matter it should not be forgotten that where the bulk of the European population consists of Railway servants, the Railway Administrations may very properly be moved to establish a school, the Government giving aid in proportion to the number of outsiders likely to benefit by it.

In some stations again regimental schools may, with the consent of the military authorities, be extended and made available for a certain number of pupils from the civil population.

18 Having thus explained the views of Government in the matter of the provision of additional school accommodation, it remains to state the manner in which it is proposed to facilitate the education of European children at schools of all classes. The Governor General in Council considers that this can best be done by following a system of strict religious neutrality or independence, freely using and aiding all schools, denominational or other, so long as they fulfil the condition of giving a sufficient and suitable secular education. The subsidy of Government will, therefore, be given to every school that chooses to submit to the terms of the Government grant-in-aid. These terms will only be such as may be found necessary to give effect to a reasonable system of payment-by-results. The Government will not interfere in any way in the management of any aided school. It will not insist on any particular form of management, or the adoption of any particular text-books or mode of communicating instruction. It will be glad to see a more practical direction given to the instruction in the middle and higher schools, and will specially favour attempts to give a sound commercial or mechanical education to the elder boys. But in general terms it may be assumed that the grant-in-aid will be given with reference to the attendance and individual proficiency of the scholars, and the completeness of the educational appliances and discipline of the institution aided. Every aided institution must, of course, be freely open to the inspection of the Government educational officers, and submit to the tests and standards that may be prescribed for the regulation of the grants-in-aid.

19. The Governor General in Council has no doubt that it is only by the adoption of such a system that the anomalies and inequalities of the present grant-in-aid system as applied to European schools can be rectified, or an adequate stimulus applied to the further development of European education in this country. At present there is no security that the money given by Government is spent in the most economical and profitable manner. Grants are calculated solely with reference to the supposed needs of the schools, and not with any reference to their efficiency, and no inducement is held out to the managers to improve their arrangements, or to the scholars to show increased diligence. No doubt some difficulty may arise in applying the system of payment-by-results from the great want at present of properly trained teachers in many schools, and in introducing the change due allowance must be made for this, and the utmost care taken that no avoidable harm is done to existing schools. The system must be introduced gradually, and with such temporary modifications and adaptations as will enable all really sound institutions to bear the change without injury. As time goes on and the standard of education rises, the conditions of the grants may be modified and made more stringent, but at the outset the chief object to be kept in view is the provision of greater facilities for the education of the poorer classes of European children. In determining the amount of the Government grants, however, due advertance must be had to the fact that in respect of some children the Railway Companies are prepared to contribute. In such cases the payment may be divided between Government and the Companies in such proportions as may be agreed upon. This point of detail will not affect the general principle above laid down.

20. The Governor General in Council is also in favour of the establishment of a system of Government scholarships, by the aid of which boys of ability may be able to rise from the lower schools to the higher, and to pass through the whole course of education up to the universities. He does not share the objection put forward by some authorities to the intermixture of social classes in middle and higher schools. So long as the boys introduced from lower schools are lads of well-tested merit and good character, no evil results can ensue from their admission. But His Excellency in Council is quite of opinion that the Government scholarships must be gained entirely by competition, and that no eleemosynary element should be allowed to enter into their grant. Provision for charitable scholarships must be left to voluntary agencies, only such aid being given by Government as may serve to stimulate and encourage these. The Governor General in Council does not propose that the Government scholarships should be specially attached to hill schools. Though convinced that a hill residence will be found most useful to growing lads, he would leave it entirely optional with the parents to select the school to which their children shall be sent, whether in the hills or in the plains. It will perhaps be desirable that a certain number of scholarships in middle and high schools should be reserved for lads desirous of receiving instruction in any technical schools or colleges that may now exist or be hereafter established. It is doubtful whether ordinary and industrial education can with advantage be combined in the regular schools in the earlier stages of education. Experience seems to show that industrial training can best follow upon a certain amount of general education, though it is quite possible to arrange for continuing and extending the latter as a matter supplementary to the special industrial training of any set of youths. This being so, some provision in the way of scholarships or bursaries for lads desirous of learning trades might very usefully be made. It does not appear necessary to provide any Government scholarships for girls.

21. It is hoped that under arrangements such as are above described it will be unnecessary for Government in many instances itself to undertake the establishment and maintenance of station schools. But where this has to be done, the principle of religious neutrality must be strictly observed in the ordinary course of instruction. Every facility should, however, be given by the manager of the school for the religious instruction of the children at suitable hours by approved ministers of religion, each parent being left free to decide by what minister, if any, his children shall be taught. This method is now successfully followed in regimental schools. It is desirable also that in Government schools the principle of payment-by-results should be applied as far as possible by making the salaries of the teachers depend in part upon the attendance of scholars, their progress, and the general discipline of the school, judged by the same standards as may be applied to aided schools.

22. In carrying into effect the principles laid down in the foregoing paragraphs, it is necessary that the Local Governments should be guided by some uniform rule, and that the managers of schools should know the terms upon which they may hope for Government aid and the amount of assistance they may be able to secure. The Governor General in Council has, therefore, determined to appoint a Committee to draft a Code for regulating the conduct of European education in the Bengal Presidency, so far as this is dependent upon Government support. The general conditions upon which the Government aid shall be given, the mode in which the system of payment-by-results shall be introduced and worked, the standard of education to be required in the different classes of schools, the scales of remuneration suited to each class, the manner in which the Government scholarships should be distributed and awarded—these are all matters which the Committee may usefully consider, and as to which they should advise. It is not desirable that the Committee should be a large one, but at the same time it should be, as far as practicable, representative. The Governor General in Council has, therefore, after careful consideration decided that it shall be constituted as follows:—

President :

A. W. Croft, Esq., Director of Public Instruction, Bengal.

Members :

The Venerable Archdeacon Baly.

The Very Reverend Father Van Impe, Rector of St. Xavier's College, Calcutta.

The Reverend J. Robertson, Principal of the Free Church College, Calcutta, and late Principal of the Doveton Institution.

The Committee will meet in Calcutta as soon as possible after the 1st November, and will endeavour to submit their report and draft Code to Government before the close of the present cold season, so that the new system may come into force from the commencement of the next financial year.

23. In making their proposals, the Committee, while giving due regard to the main object of their appointment, and providing for the early extension of European education in the manner already set forth, must not overlook the fact that Government has, even in its most benevolent designs, to study economy in the expenditure of public funds. From enquiries made it appears that the amount annually spent at present by Government on European and Eurasian education in the provinces more directly under the Supreme Government amounts to Rs 2,01,200, distributed thus—

	Rs
Bengal,	72,000
North-Western Provinces and Oudh,	53,600
Punjab,	46,200
Central Provinces,	12,600
British Burma,	11,000
Assam,	4,000
Ajmere,	1,200
Beear,	600
Total,	2,01,200

It is believed that after taking into account the proceeds of the Bruce Legacy for Calcutta, a further Government expenditure of Rs 1,00,000 per annum would amply meet all the eventual requirements of the case, including the small building grants necessary for the establishment of new schools in outlying stations. Distributed over the Local Governments and Administrations concerned, this sum can probably be easily met from Provincial resources, and the Governor General in Council does not at present propose to make any extra grant from Imperial funds. It will, however, be part of the duty of the Committee to frame as well as they can, on the information which will be laid before them, an estimate for each province of the cost of any scheme put forward by them. The Government of India will then be able to determine, in communication with the Local Governments, whether any special grant from Imperial funds is likely to be required. In framing their proposals, the Committee will bear in mind the wish of the Government of India to limit the whole annual expenditure on European education in the Bengal Presidency to three lakhs of rupees. (That sum should be looked upon as representing the ultimate maximum. During the next few years the schools will only be gradually working up to the full amount of their possible grants-in-aid, and the actual immediate increase of expenditure may probably be very small.)

24. The Governor General in Council has considered the propriety of establishing a training college for teachers—a matter in regard to which very conflicting opinions are to be found in the papers before Government. On the whole, the Government of India has come to the conclusion that the establishment of such a college would at present be premature. The students of a training college should be young men who have already been trained as pupil teachers for at least four or five years. As yet, however, there is no such class in India, and what is immediately required is the introduction in the larger ele-

mentary schools of all denominations of an efficient pupil-teacher system; and this is a subject to which the Committee appointed above will be required to devote very special attention. Grants-in-aid to denominational training colleges may hereafter be made on the necessity being shown, and on compliance with any conditions that it may be deemed proper to lay down in the Code.

25. These are the measures which the Government of India considers it proper to take in order to meet the evils referred to in the opening paragraphs of this Resolution. It cannot hope to remove these all at once, or to see the whole European population of the towns and stations of Upper India brought within the operation of its educational system. But the Governor General in Council requests that each Local Government and Administration will actively and perseveringly give effect to the principles and policy above laid down. The subject must be prominently noticed in the annual educational reports, each of which should show year by year the ascertained European population of all towns and stations where 12 or more children of school-going age are to be found, the total number of such children, and the number under instruction there or elsewhere. In this way the Government of India will be able to judge of the progress made in carrying out its orders.

26. In this Resolution the Governor General in Council has been dealing only with the provinces of the Bengal Presidency. It is believed that in Bombay and Madras sufficient provision for the educational wants of the European population is already made. This belief is not, however, based upon the result of such detailed enquiries as have been made in Bengal. It would be well, therefore, if the Governments of the other Presidencies reviewed the question in the light of the foregoing remarks and orders; and the Governor General in Council would be glad eventually to be informed of the conclusions arrived at by each of them. The attention of the Chief Commissioner of British Burma is also requested to the subject.

27. Two very important matters to which attention is drawn in Archdeacon Baly's reports is the establishment of technical schools, and the provision of employment for European youths when their education is completed. Both of these are matters which urgently call for further consideration. The Governor General in Council is aware that a good deal has already been done both by the Government of Bengal and by the Railway Companies towards the establishment of technical schools, but the Public Works Department of the Government of India will now be requested (in communication, where necessary, with the Military Department) to consider thoroughly the whole question of the opening of such schools in connection with Government factories and railway workshops, and also the introduction of a regular system of apprenticeship. Upon these subjects the information and suggestions set out at pages 20-28 of Archdeacon Baly's report of the 15th May, 1880, should not be overlooked. The Public Works and Military Departments will also consider how far it is possible for Government to employ the European youths of the country when their school years are over. The Governor General in Council believes that there will always be employment for educated European workmen brought up in India, whose knowledge of the country and of the language will give them a great advantage over men coming direct from home. But, nevertheless, it is proper to enquire to what extent Government can hold out direct prospects of engagement to lads of this class. Local Governments will also be invited to report how far a system of competition might be applied to the admission to clerkships in Government offices. Openings might in this way be found for well educated young men of the class under consideration. The Governor General in Council would not propose to reserve any certain proportion of Government appointments of this kind for European youths domiciled in India, but he considers that they might fairly be allowed to compete with educated Natives upon equal terms, if such a system could be adopted without detriment to the public interests.

28. In conclusion, the Governor General in Council desires to express his strong sense of obligation to Archdeacon Baly for the very able and complete reports which he has submitted to Government on this important subject of European education. The work has been to him no doubt a labour of love, but this in no degree detracts from his claim to receive the best thanks of the Government for the assistance which he has rendered to them. The Governor General in Council desires especially to recognise the fair and impartial spirit by which Archdeacon Baly has throughout been actuated, and the liberal breadth of view which has always characterised his proposals.

ORDER.—Ordered, that a copy of this Resolution, with copy of the second report by the Venerable the Archdeacon, be forwarded to all Local Governments and Administrations for information and guidance; to the Public Works Department with reference to paragraphs 11, 16, and 27, to the Military Department with reference to paragraph 27, to the Foreign Department for information and communication to the Chief Commissioner of Ajmere and the Agent, Governor General, Central India, to the Right Reverend the Lord Bishop of Calcutta, to the Senior Chaplain of the Church of Scotland, Calcutta, and to the Secretary to the Eurasian and Anglo-Indian Association for information.

ORDERED also, that this Resolution be communicated to the President and Members of the Committee appointed under paragraph 22, and that it be published in the Supplement to the *Gazette of India*.

EDUCATION OF THE CHILDREN OF EUROPEANS AND EURASIANS IN INDIA.

Summary of replies received from Railway Administrations.

No objection to the conveyance of the children of any Railway servant, free of charge over the line when proceeding to or from a school in India, whether such school be a Railway school or otherwise. With regard to children other than those of Railway servants, the East Indian Railway Company would be prepared to concede a reduction of rates, and carry them in the second class at intermediate class fares, or in the intermediate class at third class fares, with an allowance of free luggage in accordance with the class in which they travel, the concession to include the persons who may be travelling in charge of them, and to apply only when four travel together.

East Indian Railway, General Nos. 425 R.E. & 1613 R.E.

There have always been paid apprentices, both European and Eurasian, in the Locomotive and Carriage and Wagon Departments on this Railway, and the system of apprenticeship has been found to work satisfactorily.

Hopes of employment by this Company in the capacity of paid apprentices cannot be held out to the sons of outsiders, as the sons of the employés of this Railway who have a prior claim to employment, &c., are more than enough to fill any vacancies that may occur in the staff of such apprentices.

The children of Railway employés attending hill schools may be allowed to travel second class at third class fares, but the issue of free passes to these children as proposed by the Government of India, or the concession recommended by the Agent of allowing parents in needy condition to visit the schools twice a year at single fare on each journey, have not been approved by the Board of Directors. The Board are, however, willing to consider a proposal for a further concession, such as reduced fares to the children of necessitous parents. The question of granting a further concession to the school children was discussed with the Northern Bengal Railway authorities, and it was resolved to convey them to and from the hills at half the fare (irrespective of age), and the teachers in charge of children at full fare of the class next below that in which they respectively travel. These further concessions have also been agreed to by the Darjeeling Railway Company, and have been submitted to the Board of Directors for sanction.

Eastern Bengal Railway, General Nos. 425 R.E. & 2717 R.E.

As regards the employment of paid apprentices in the Company's workshops, this Railway is prepared to further the views of the Government of India in this respect, so far as the limited resources of the line will admit.

This Railway already grants free passages to and from school to children whose parents are in its employ, or in that of other railways, but this concession cannot be extended to children unconnected with this Railway service.

Oudh and Rohilkhand Railway, General No. 00653 R.E.

As regards the employment of paid apprentices, it is regretted that in many cases, especially when lads join direct from their homes, it is found that they dislike the manual labour. Apprentices of lower grade of 15 years of age and upwards are paid in accordance with the following scale.—

	Rs.
1st Year,	20
2nd ,,	30
3rd ,,	40
4th ,,	45
5th ,,	50

This Railway has always been in the habit of giving free passes to children going to and returning from the Mussoorie School.

Sind, Punjab and Delhi Railway, General No. 13571 R.E.

As regards the employment of paid apprentices, the Locomotive Superintendent states that he "does not think that 3 per cent. of the youths who start work finish the regular term of six years, and that as a class they are unsatisfactory, and do not pay; the best of them is not equal to a good native, and usually they are taken out of charity." It is evident from this that some improvement is wanted in the present system, and the Consulting Engineer would propose to effect that improvement by framing certain rules.

As regards the question of extending the "Lawrence Asylum at Murree" for the accommodation of the children of employés on the Punjab Railways, Colonel Medley promises a report after communication with the Punjab Government and the Manager, Punjab Northern State Railway.

As regards the arrangements required for the establishment of schools in the plains, the Consulting Engineer says that the Lahore school is not doing its full work at present, probably from the absence of competent teachers. He would propose that for 50 pupils at least three teachers would be required, say at Rs. 200 (average), Rs. 100, and Rs. 50 each, and adding Rs. 100 for servants and contingencies, the total cost of the Lahore school would amount to Rs. 450 per month. He also says that if the Saharanpur school be set down at Rs. 300, and the schools at Phillour, Ghaziabad, and Kotri (Karachi) at Rs. 200 each, to which adding Rs. 500 for the hill school at Mussoorie, the whole cost would amount to Rs. 1,850, or say £2,000 per annum, for which education should be provided for 90 children in the hills, 50 at Lahore, 30 at Saharanpur, 30 at Phillour, Ghaziabad, and Kotri, or 230 in all. In regard to this line the Consulting Engineer makes the following recommendations:—

- 1st. That Government and the Railway Company should recognise the principle and enforce the duty of free and compulsory education in the case of all employés.

- 2nd. That the Agent's proposal be accepted of charging the cost of the Mussoorie hill school, Rs. 20,000, to capital, on condition that Rs. 10,000 be given from the Fine Fund for its enlargement.
- 3rd. That a sum at present not exceeding Rs 500 per month be granted from revenue in partial liquidation of the working expenses of this school.
- 4th. That a sum not exceeding Rs. 2,000 per mensem be granted (half by Government and half from Revenue) for the maintenance and efficiency of the Railway schools at the places above noted.
- 5th. That every encouragement should be given by the Railway Company to inducing the sons of its employes to enter its service, and that the system of apprenticeship should be fairly tried at the workshops.
- 6th. That the schools should be under the general supervision of the Educational Department, and specially controlled by a Committee, consisting of the Agent, the Government Consulting Engineer, and such other persons as those two officers may mutually agree to select.
- 7th. That the accounts shall be regularly audited by the Railway Auditor, and copies furnished to Government and the Board.

Colonel Medley promises a further report on the whole subject.

The Managers of State Railways in Bengal have been directed to grant free passes to European and Eurasian children proceeding to or from the schools to which they belong on the certificate of the Principal, the Head Master, or the Inspector of Schools of the Circle.

Calcutta and South-Eastern, Nalhati, Northern Bengal, Tirhoot and Patna-Gya Railways, General No. 1931 R.E.

Muttra-Hathras, Cawnpore and Furakhabad Railways, General Nos. 1734 R.E.

The Manager says there is no likelihood of using the Mussoorie school, but possibly the Pachmari school may be found convenient and useful to families towards the lower end of the Holkar Railway. He also supposes that the Abu school when further developed will suffice for the requirements of this line. Nothing is said about the proposed East Indian Railway school.

Passes are granted to children from Sind, Punjab and Delhi and Indus Valley State Railways, who wish to attend the schools at Murree. The Manager says that if it is intended that these free passes be extended to the children of all persons of European descent, when the parents stand in need of this aid, various difficulties will arise. If, however, they are to be granted, he would propose that they should be granted on application from the master of the school at which the children are being educated, and suggests that it will be necessary for Government to lay down—What schools are entitled to this privilege? What limit of income entitles parents to such aid? How often in the year such passes are to be granted to any one child? The class of accommodation they are entitled to, &c.

The Manager says that he views any extension of free passes with great suspicion, and considers it would be far simpler for the masters of the schools to pay the fares at once, when necessary, as a debt to the Educational Department. The amount paid would be received by Government in the Railway Department, so that no actual expense to Government be incurred. Greater check would then, in his opinion, be kept on the expenditure, and masters would be more careful in buying tickets than in asking for free passes at the expense of another department.

As regards this line, the Manager also says the concession is really scarcely required, Lahore being probably the only place from which children for Murree would be sent. The third class fare (in a compartment reserved for Europeans) from Lahore to Rawalpindi is Rs 2-4, or for children under 12 years, Rs. 1-2. Probably before this scheme is started it will be Rs. 1-13 and 15 annas. The Manager does not think the payment of these sums would act as an obstacle to parents above the indigent class to sending their children to school.

Nothing is said about the extension of the Lawrence Asylum at Murree for the accommodation of the children of the employes on this Railway, or the Sind, Punjab and Delhi Railway School at Mussoorie, and the arrangements required for the establishment of schools on the plains. Neither does the Manager state whether he communicated his views to the Consulting Engineer at Lahore as to how far the new shops at Rawalpindi are capable of assisting in the development of technical and industrial education amongst children employed in the workshops as apprentices.

This Railway grants at present free passes to children attending schools in the hills on application from their parents.

Indus Valley and Kandahar Railway, General No. 8362 R.E.

As regards the enlargement of the Lawrence Asylum at Murree, to admit say 20 boys and 10 girls of this line on moderate terms would, as the Manager thinks, be a boon to its employes.

Nothing is said about increasing the Sind, Punjab and Delhi Railway School at Mussoorie, so as to admit some of the children of men employed on this line.

As regards the establishment of schools on the plains, the Manager says that as Khanpur is likely to become a large locomotive station, the establishment of a school there seems a necessity, and he hopes to have one opened very shortly. The Manager has not stated what establishments would be required for the purpose.

As regards the new shops at Sukkur being capable of assisting in the development of technical and industrial education amongst children employed in the workshops as apprentices, the Manager is of opinion that when the workshops at Sukkur are in working order, a few lads might be trained there as apprentices.

APPENDIX D.

PROPOSED AMENDMENT OF THE INDIAN RAILWAY ACT.

GOVERNMENT OF INDIA.

LEGISLATIVE DEPARTMENT.

The following Bill was introduced into the Council of the Governor General of India for the purpose of making Laws and Regulations on the 16th February, 1882, and was referred to a Select Committee :—

No. 4 OF 1882.

A Bill to amend the Indian Railway Act, 1879.

WHEREAS it is expedient to amend the Indian Railway Act 1879, in manner hereinafter appearing ;
It is hereby enacted as follows :—

1. This Act may be called "The Indian Railway Act, 1882 ;"

Short title.

Commencement.

and it shall come into force at once.

New sections substituted for section 5 of Act IV of 1879.

2. For section five of the said Act the following sections shall be substituted, namely :—

"5. No Railway, or portion or extension of, or addition to, a Railway, shall be opened for the public conveyance of passengers until the Railway Administration has given to the Governor General in Council notice in writing of the intention of opening the same, and until the Governor General in Council has by an order in writing sanctioned the opening of the same.

"No such sanction shall be given until an officer, appointed by the Governor General in Council to inspect such Railway, portion, extension or addition, has, after inspection thereof, reported in writing to the Governor General in Council that in his opinion the opening of the same would not be attended with danger to the public using the same.

"Notwithstanding anything hereinbefore contained, the Governor General in Council may, in any particular case, by a special order in writing, confer on any officer so appointed power to sanction the opening of such Railway, portion, extension or addition, if in such officer's opinion the opening of the same will not be attended with danger to the public using the same.

"In such case it shall not be necessary to make the report required by the second paragraph of this section.

"5A. The Governor General in Council may at any time cause any Railway which has been opened for the public conveyance of passengers, or any portion thereof, to be inspected by an officer appointed by him to make such inspection.

"5B. Every officer so appointed shall, for the

purpose of such inspection, and subject to the control of the Governor General in Council, have the following powers, namely :—

"(a) he may enter on and inspect the Railway or portion thereof which he has been appointed to inspect ;

"(b) he may by summons under his hand require the attendance of any Railway-servant whom he thinks fit to call before him and examine for the said purpose, and may require such servant to answer, or furnish returns regarding, such inquiries for the said purpose as he thinks fit to make ;

"(c) he may require and enforce the production of all books, papers and documents belonging to or in the possession of any Railway Administration which in his opinion are necessary for the said purpose.

"5C. Whenever any officer so appointed to inspect any Railway or portion thereof reports in writing to the Governor General in Council that in his opinion

the use of such Railway or portion will be attended with danger to the public using the same, the Governor General in Council may, by an order in writing, direct such Railway or portion thereof to be closed for the public conveyance of passengers.

"5D. No Railway or portion thereof which has been closed under section 5C shall be re-opened for the public conveyance of passengers unless and until such Railway or portion has been inspected, and the opening thereof sanctioned, in accordance with the provisions of section five."

3. In section eight of the said Act, in clause (d), the word "and" shall be omitted, and after clause (d) the following clause shall be, and be deemed to have always been, inserted :—

"(dd) for regulating the conduct of the Railway-servants, and".

New section to be substituted for section 21 of Act IV of 1879.

4. For section twenty-one of the said Act the following section shall be substituted :—

"21. Any Railway Administration opening, in contravention of section five, any Railway, or any portion or extension of, or addition to, a Railway, or re-opening in contravention of section 5D any Railway or portion thereof, or keeping any Railway or portion thereof open in contravention of an order of the Governor General in Council under section 5C, shall forfeit to Government the sum of one thousand rupees for every day during which the same remains open in contravention of such section or of such order of the Governor General in Council as the case may be."

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STATEMENT OF OBJECTS AND REASONS.

The object of this Bill is to make one or two amendments of the Indian Railway Act, 1879, which the experience of the last three years has shown to be desirable.

Section 5 of the Act, as it stands at present, does not show as clearly as it should that the sanction of the Governor General in Council is necessary before any railway or portion or extension of, or addition to, a railway is opened for the public conveyance of passengers. To remedy this defect, the section has been recast by the Bill, which makes it clear that the Government Inspector has of himself authority only to inspect and report on the lines for the orders of the Governor General in Council. In order, however, to prevent inconvenience in special cases, an addition has been made to the section enabling the Governor General in Council to delegate to the inspecting officer in special cases the powers of sanctioning the opening of a railway conferred on the Governor General in Council by the section.

The Act does not now empower the Governor General in Council to inspect a line after it has once been opened for the public conveyance of passengers. At present, the absence of such a power is not of much importance, as the Government has full right under its contracts with the various Railway Companies to make what inspections it likes, but, if private enterprise hereafter starts railways independent of Government it may be seriously inconvenient to be unable to inspect such lines and ascertain whether they are being maintained in a safe and efficient state. Certain provisions have, therefore, been inserted after section 5 of the Act which empower Government to cause a line to be inspected by an officer to be appointed for the purpose, define his powers for the purpose of such inspection, authorise the Government to close any line reported not to be in a safe state for the public conveyance of passengers, and provide for the re-opening of such line only after its opening has been declared to be possible without danger to the public. An addition has also been made to section 21 imposing a penalty on any Railway Administration which does not close a railway in compliance with an order by Government to that effect, or reopens a railway which has been closed without the sanction of Government.

Lastly, the Act, as it stands at present, does not empower Railway Administrations to impose fines by their bye-laws on their servants who may be guilty of breach of duty. This power is essential for the enforcement and maintenance of discipline on railways, and the Bill (here following the English Companies Clauses Act, 1845, sections 124, 125) confers the requisite authority.

The 11th February, 1882.

WHITLEY STOKES.

R. J. CROSTHWAITE,
Offg. Secy. to the Govt. of India.

APPENDIX E.

CONTRACT as to Construction, Maintenance, Management and Working, by the Southern Mahratta Railway Company, Limited, of a Railway intended to be called THE SOUTHERN MAHRATTA RAILWAY.

THIS INDENTURE made the 1st day of June 1882 between THE SECRETARY OF STATE IN COUNCIL OF INDIA of the one part and THE SOUTHERN MAHRATTA RAILWAY COMPANY LIMITED of the other part:

WITNESSETH and it is hereby agreed and declared as follows:—

Interpretation of Terms.

1. In this Contract

The expression "The Secretary of State" means the Secretary of State in Council of India :

The expression "The Company" means the Southern Mahratta Railway Company Limited :

The expression "The projected railway" means and includes the four several lines of railway mentioned in the 3rd Section of this Contract and any such of the lines of railway particularized in the 48th Section of this Contract as the Secretary of State may hereafter under the powers conferred on him by that Section require the Company to construct.

Duration of Contract.

2. This contract shall continue in force until the 30th day of June 1932 subject to the provisions hereinafter contained for determining the same.

Constructions of Lines.

3. The Company shall with due diligence and expedition and in accordance in all respects with the directions of the Secretary of State construct on routes to be selected and determined by the Secretary of State and on land to be provided by him as hereinafter stipulated the four several lines of railway hereinafter mentioned (that is to say):—

- (1). A line from the terminus of the West of India Portuguese Guaranteed Railway on the British Frontier *via* Gadak to Bellary.
- (2). A line from Gadak to Sholapur.
- (3). A Branch to Bankapur.
- (4). A branch to Belgaum.

Together with all such stations station yards offices warehouses houses for employes machinery conveniences and works as in the opinion of the Secretary of State shall be necessary or proper for the purposes of the said lines of railway respectively either as regards the due working of the same or as regards the permanence of the same and the protection of the same from destruction or injury by inundation tempest or otherwise. The railways to be constructed by the Company under this section shall be of the metre gauge and shall in general structural character conform in all respects with the now established standard of railways in India on that gauge. Designs and estimates in relation to the construction or execution of all or any of the lines of railway stations and other works to be constructed and executed under this section shall if required be furnished by the Company to the Secretary of State and be subjected to his approval or the Secretary of State may furnish designs to the Company and the Company shall in that case be bound to follow them. It is intended that the lines of railway mentioned in this section shall be called "The Southern Mahratta Railway."

Notification to Company of route of Railways.

4. The Secretary of State shall from time to time notify to the Company the route of the projected railway so far as such route shall from time to time have been determined by him.

Situation of Stations, &c.

5. The Secretary of State shall have power to determine the situation and dimensions of all stations station yard offices warehouses houses for employes conveniences and works to be constructed in connection with or as part of the projected railway.

As to certain existing Surveys, &c.

6. The Secretary of State having caused various surveys and plans to be made and works to be ex-

ected with the view of facilitating and expediting the construction of the projected railway or some part or parts thereof will allow the Company to have the benefit of the same surveys plans and works but the Company shall discharge all the now existing obligations and liabilities of the Secretary of State under contracts for the execution of works relating to the construction of the projected railway or any part or parts thereof.

Land, &c.

7. The Secretary of State shall from time to time provide the land which he shall consider requisite for the construction of the projected railway and for the stations station yards offices warehouses houses for employes conveniences and works necessary or proper for the purposes of the same railway and shall allow the Company to have possession of land so provided. The Company shall from time to time with the sanction of the Secretary of State as soon as practicable go out of possession of and relinquish to the Secretary of State such of the land of which the Company shall have been allowed possession under this section, as shall for the time being have become unnecessary to be retained possession of by the Company for any of the purposes of this Contract. And as often as in the opinion of the Secretary of State it shall appear to be unnecessary that the Company shall retain possession of any particular land of which the Company shall have been allowed possession under this section or of which possession shall have been allowed or delivered to the Company under any other provision in this Contract the Secretary of State shall certify such his opinion to the Company. Upon receipt of such certificate or so soon thereafter as may be the Company shall state in writing whether it acquiesces in the opinion of the Secretary of State or whether it objects thereto and if so the grounds of its objection. If no objection is stated by the Company or if the grounds of its objection (if any) are not in the opinion of the Secretary of State sufficient the Company shall upon the requisition of the Secretary of State go out of possession of the land in question and the Secretary of State shall be exclusively entitled to possession thereof.

Equipment with Rolling Stock, &c

8. The company shall with all due speed equip the projected railway and every part thereof with rolling stock plant and machinery to the satisfaction of the Secretary of State and if the Secretary of State shall be of opinion that the Company shall at any time have failed duly to perform its obligations under this section he may himself from time to time equip or complete the equipment of the projected railway or any part thereof with the particulars or any of the particulars specified in this section.

Opening of the Lines for Traffic.

9. The Company shall from time to time when and as often as an inspecting officer acting on behalf of the Secretary of State shall have certified that any part of the projected railway is fit for the conveyance of passengers and goods is properly equipped with rolling stock plant and machinery forthwith open the same part for public traffic.

Telegraphs.

10 The Secretary of State may from time to time construct such electric telegraphs and telegraphic appliances as he shall think fit along or upon the projected railway or any part or parts thereof or any land or works belonging thereto and may maintain and work the same electric telegraph appliances as he shall think fit and it shall be lawful for him for such purposes or any of them (in addition to the general powers which it is hereby declared that he shall all times have of entering by agent or otherwise upon all or any land of which he shall pursuant to this contract have allowed the Company to have possession) to enter at all times by his agents workmen or others on any part or parts of the projected railway or the lands or works belonging thereto and to erect maintain make do and execute thereon all such building machinery acts and things as the Secretary of State shall consider necessary or proper in relation to the construction maintenance use and working of the said electric telegraphs and telegraphic appliances. The Secretary of State shall be exclusively entitled to the possession of all buildings machinery works and appliances erected or brought by him under the powers conferred on him by this section on the projected railway or on any land or works belonging thereto. The Company shall at all times furnish the Secretary of State with such free passes over the projected railway or any parts thereof as he shall require for persons employed by him in or about or in connection with the construction maintenance working or inspection of the electric telegraphs and telegraphic appliances mentioned in this section or any buildings or works appertaining thereto.

11 The Secretary of State shall from time to time allow the Company to have the exclusive use of any such electric telegraphs and telegraphic appliances as he shall from time to time consider proper to be used by the Company for the purpose of safely or efficiently working the projected railway or any part or parts thereof. The Secretary of State shall maintain and keep in good repair and in good working condition the electric telegraphs and telegraphic appliances of which he shall for the time being allow the Company the use under this section.

12. The Company if so directed by the Secretary of State shall in working any electric telegraphs or telegraphic appliances to the use of which it shall for the time being be entitled under the section last hereinbefore contained observe the rules for the time being in force in the case of State Railway Telegraphs or such of the said rules as the Secretary of State may from time to time prescribe to be observed by the Company.

As to the Maintenance and Management of the Projected Railway.

13. The Company shall keep the projected railway and the stations and other works belonging thereto in good repair in good working condition and fully supplied with rolling stock plant machinery and

stores to the satisfaction of the Secretary of State and whenever the Secretary of State shall be of opinion that the Company is in any default as to any of the matters before mentioned in this section he may in writing notify the fact to the Company specifying in such writing the general nature of the defect and unless the defect be remedied by the Company within one calendar month after the notification thereof by him to the Company may himself remedy it.

14. The Company shall keep the rolling stock machinery and plant for the time being belonging to the projected railway and to every part thereof in good repair and in good working condition to the satisfaction of the Secretary of State.

15. The Company shall maintain a sufficient staff to the satisfaction of the Secretary of State for the purposes of so much of the projected railway as shall for the time being have been opened for public traffic.

16. The Secretary of State may from time to time by notice in writing require the Company to carry out any alteration improvement or addition that may in his opinion be necessary for the safety of passengers or of the public or for the effectual working of the railway to be made in or to any part of the projected railway or any of the stations or works belonging thereto. Such notice shall specify the alteration improvement or addition required and shall also in general terms describe the works to be executed for the purpose of effecting the same. On receiving any such notice the Company shall with all reasonable speed execute the works described therein. The Secretary of State allowing the Company possession of any land that may be requisite for the purposes of such works. If in any case the Company shall neglect to proceed with the works prescribed any such notice as specified in this section or fail to complete the same to the satisfaction of the Secretary of State the Secretary of State may execute the works in respect of which the Company is in default.

17. The Secretary of State may from time to time prohibit the Company from using any engine carriage waggon vehicle machine or appliance of description whatsoever of which the use shall be declared by a duly authorized inspecting officer acting on behalf of the Secretary of State to be attended with danger to passengers or to the public and the Secretary of State may by taking possession of such engine carriage waggon vehicle machine or appliance or by such other means as he shall think fit to employ prevent the Company from using the same.

Police.

18. The Secretary of State shall provide and maintain for the purposes of so much of the projected railway as shall for the time being have been opened for public traffic such a force of police as the Company with the approval of the Secretary of State shall from time to time require with the qualification that in case of difference between the Secretary of State and the Company as to the force of police required for the preservation of law and order the determination of the question shall rest with the Secretary of State. The cost of providing and maintaining the force of police provided and maintained under this section shall as to three-tenths be borne by the Secretary of State as part of the general expenditure of the Government of India and as to the remaining seven-tenths be treated as part of the working expenses of the projected railway or of the part or parts thereof for the time being opened for public traffic.

As to the use and working of the Projected Railway and the Conveyance of Traffic.

19. The Company shall from and after the opening for public traffic of any part of the projected railway cause to be run so many trains at such times at such rates of speed between such places and with such conveniences and accommodations as the Secretary of State shall from time to time require.

20. The Company shall charge such rates and fares for the carriage of goods and passengers as may from time to time be fixed by the Company with the approval of the Secretary of State. Provided that the Secretary of State may require the charges for the conveyance of salt and coal and food grains to be reduced to any rate not below one-fifth of a pie per maund per mile for full waggon loads and may also require passengers to be conveyed at any rate not below two pies per mile in closed carriages provided with seats.

21. The Secretary of State may from time to time if he shall think any alteration or improvement in the working of the projected railway or of any part thereof necessary for the safety of passengers or of the public or for the effectual working of the railway require the Company to effect such alteration or improvement.

22. All services which the Secretary of State may require the Company to perform for the Post Office the Military Department the Police Department or any other Department of State or for high Government officials (including in such services the conveyance of mails as defined by the Post Office Act or Acts for the time being in force in India the conveyance of troops and sailors military and naval establishments horses and other animals used for military purposes guns military stores and equipments the conveyance of police prisoners and paupers the conveyance of telegraph stores instruments officers and workmen and of any public stores whatever) shall be performed by the Company on the same general conditions as may for the time being be in force on State railways of the metre gauge and at such rates as may be approved by the Secretary of State. Provided that nothing in this section contained shall be construed to override the provisions contained in section 10 respecting the grant of free passes.

23. The Company shall convey gold and silver bullion and coin and copper coin belonging to the Secretary of State and the persons in charge thereof at special rates to be from time to time approved by the Secretary of State.

24. The Company shall from time to time if so required give precedence to the demands of the Secretary of State whether for freight or passenger accommodation over all ordinary traffic.

25. All stores intended to be used for any purposes of the projected railway or any part thereof (including stores intended to be used in or about the construction of any part of the projected railway of any works or adjuncts of or pertaining to the same) shall be conveyed by the Company over the projected railway so far as opened for public traffic at rates to be approved by the Secretary of State such rates to be not less than the actual cost of conveyance.

Payment by Company to Government carrying interest at fixed rates.

26. The Company shall within such period and by such instalments as the Secretary of State shall prescribe pay into the Bank of England to the credit of the Secretary of State an aggregate sum of £3,000,000. Provided that the Company may discharge itself in part of its obligations to pay the said aggregate sum of £3,000,000 by paying with the approbation of the Secretary of State any sum or sums of money into any Government Treasury in India approved for the purpose by the Secretary of State and any sum or sums so paid shall be accepted by the Secretary of State as the equivalent of sterling money at the rate of 12 rupees to the pound sterling the Company shall be at liberty from time to time when and as there shall for the time being be any amount carrying interest under the provisions hereinafter contained in favor of the Secretary of State to pay out of its own proper moneys into the Bank of England to the credit of the Secretary of State the equivalent in sterling money (one pound sterling being for this purpose to be treated as the equivalent of 12 rupees) of the whole or any part of such amount. All payments made by the Company under this section shall be made out of the proper moneys of the Company not paid or payable by it under any section of this Contract other than the present section into the Bank of England to the credit of the Secretary of State or into any Government Treasury in India. All moneys paid by the Company under this section shall belong absolutely to the Secretary of State who shall not be deemed a debtor to the Company in respect thereof.

Payment of interest to Company.

27. The Secretary of State will during the continuance of this Contract out of the revenues of India pay to the Company in India half-yearly on the 1st day of June and 1st day of December the equivalent in rupees at the market rate of the day for bills drawn on London payable on demand of interest at the rate of $3\frac{1}{2}$ per cent. per annum on the amount which shall for the time being have been paid by the Company pursuant to this Contract in respect of the aforesaid sum of £3,000,000 and also half-yearly on the 1st day of June and 1st day of December up to and inclusive of the 1st day of June 1887 (if this Contract shall so long continue) the equivalent in rupees at the market rate previously mentioned in this section of further interest at the rate of $\frac{1}{2}$ per cent. per annum on the amount previously mentioned in this section. The Secretary of State shall also during the continuance of this Contract out of the revenues of India pay to the Company in India half-yearly on the 1st day of June and 1st day of December the equivalent in rupees at the market rate previously mentioned in this section of interest at the rate of three per cent. per annum on any amount which for the time being shall under the powers conferred on the Company by the 1st preceding section have been paid by it into the Bank of England to the credit of the Secretary of State in excess of the sum of £3,000,000.

Payments to Government under special agreement.

28. The Company may from time to time with the approbation of the Secretary of State out of its own proper moneys not paid or payable by the Company into the Bank of England to the credit of the Secretary of State or into any Government Treasury in India under any section of this Contract other than the present section pay into the Bank of England to the credit of the Secretary of State any sum or sums of money. All moneys which the Company shall pay to the credit of the Secretary of State under this section shall belong absolutely to the Secretary of State and he shall not be deemed a debtor to the Company in respect thereof but he shall during the continuance of this Contract out of the revenues of India pay to the Company in India an equivalent for interest on all moneys paid by the Company under this section. The rate of the interest for which the equivalent is to be paid under this section and the times at which such equivalent is to be paid shall be agreed between the Secretary of State and the Company and if not otherwise specially agreed the rate shall not in any case exceed $3\frac{1}{2}$ per cent. per annum.

Supply of money by Government.

29. All moneys which the Company shall with the sanction of the Secretary of State require for the purposes of the projected railway whether as regards construction or working shall be supplied to the Company by the Secretary of State according to such arrangements as shall from time to time be made between the Secretary of State and the Company. Provided that the Secretary of State shall as and when from time to time the balance standing to the debit of the Capital Account hereinafter mentioned is (inclusive of any balance for the time being standing to the debit of the Stores Account also hereinafter mentioned) not less in amount than the aggregate amount of the moneys which shall for the time being have been paid by the Company under the provisions hereinbefore contained into the Bank of England to the credit of the Secretary of State converted into rupees at the rate of twelve rupees to the pound sterling and of the moneys (if any) which shall pursuant to the 26th section of this Contract for the time being have been paid by the Company into any Government Treasury or Government Treasury in India in part discharge of the aforesaid sum of £3,000,000 have an absolute right of declining to supply money to the Company to defray expenditure chargeable to Capital Account.

Secretary of State's right to interest.

30. On every occasion on which on the making up of the Capital Account hereinafter mentioned the balance standing to the debit of that account (inclusive of any balance for the time being standing to the

debit of the Stores Account also hereinafter mentioned) exceeds the aggregate amount of the moneys which shall for the time being have been paid by the Company under the provisions hereinbefore contained into the Bank of England to the credit of the Secretary of State converted into rupees at the rate of twelve rupees to the pound sterling and of the moneys (if any) which shall pursuant to the 26th section of this Contract for the time being have been paid by the Company into any Government Treasury or Government Treasuries in India in part discharge of the aforesaid sum £3,000,000 the excess shall carry interest in favor of the Secretary of State at the rate of $4\frac{1}{2}$ per cent. per annum to be computed from the time of the ascertainment of the excess until the Capital Account shall be then next made up.

Receipts of Company.

31. All moneys whatsoever which shall during the continuance of this Contract be received by or on behalf of the Company either in England or in India and whether on its own account or as agent of the Secretary of State or otherwise (excepting the moneys which shall be paid to the Company by the Secretary of State pursuant to this Contract excepting also the moneys which shall be paid by holders of shares in the capital of the Company in respect of their liability to contribute to the assets of the Company in regard to such shares and excepting also the moneys if any which shall be borrowed by the Company with the sanction of the Secretary of State) shall at such times and in such manner as the Secretary of State may from time to time direct be paid without deduction as to moneys received in England by or on behalf of the Company into the Bank of England to the credit of the Secretary of State and as to moneys received in India by or on behalf of the Company into Government Treasury to be from time to time approved for the purpose by the Secretary of State.

32. Of the moneys mentioned in the last preceding section and not the subject of any exception therein contained such as shall be received by or on behalf of the Company prior to the opening for public traffic of any part of the projected railway shall be treated as received on account of capital such as shall arise from the sale of any property on any occasion other than the replacement of the property sold by other property of the same or a similar character shall be treated as received on account of capital the residue shall be treated as received on account of revenue.

Accounts.

33. The Company shall keep the following accounts :—

- (1). A Capital Account.
- (2). A Revenue Account.
- (3). A Stores Account.

And all such other accounts relating to the projected railway and also all such accounts as between the Company and the Secretary of State as the Secretary of State shall from time to time require and if the Secretary of State shall so require separate accounts shall be kept by the Company in respect of different sections of the projected railway. The said accounts shall be kept in such form and under such heads or divisions and with such details as the Secretary of State shall from time to time prescribe. The said accounts so far as the same are kept in India shall be kept in rupees of the Government of India and so far as they are kept in England shall be kept in sterling money. Such of the said accounts as are kept in England shall from time to time be transmitted by the Secretary of State to the Government in India and incorporated in the accounts of the Company in India each account transmitted being for the purpose of such incorporation converted into rupees at the average rate of exchange obtained by the Secretary of State for bills payable on demand drawn on India during the half-year immediately preceding that in which the incorporation is to be effected or if the Secretary of State shall not have drawn bills on India for so much as three months out of the half-year immediately preceding then at the average rate obtained during the half-year immediately preceding that in which the incorporation is to be effected for the best commercial bills payable on demand drawn in London on India such average rate to be decided by the Comptroller General at Calcutta.

34. In the Capital Account the following particulars shall be entered to debit and credit respectively that is to say. To debit :—

- (a). All expenditure by the Company in relation to this Contract which ought as between the Secretary of State and the Company to be treated as on account of capital including such sum as the Secretary of State may allow to be charged in respect of the expenses of and incident to the formation incorporation and management of the Company.
- (b). The cost to the Secretary of State as certified by him of all land of which he shall allow the Company to have possession for any purposes of this Contract.
- (c). The cost to the Secretary of State as certified by him of the said surveys and plans mentioned in the 6th section of this Contract and of any such designs and estimates as the Secretary of State may furnish to the Company under section 3 of this Contract including in the cost of the said surveys and plans all costs incurred by the Secretary of State with a view to procuring the same to be made. Also the fair present value as estimated by the Secretary of State of works mentioned in the 6th section of this Contract.
- (d). The charges of the Government Telegraph Department for rent maintenance and inspection of such electric telegraphs and telegraphic appliances (if any) as the Secretary of State may allow the Company to use in relation to the construction of the projected railway or any part thereof.
- (e). So much as ought pursuant to this Contract from time to time to be charged to capital in

- * respect of the half-yearly amount to be charged by the Secretary of State under his power in that behalf hereinafter mentioned for his supervision and control of the Company.
- (f). Any amount which the Secretary of State may from time to time require to be entered in the Capital Account in respect of the cost to him of such of his legal expenses incurred in relation to this contract or to matters arising out of this contract as he shall determine to be chargeable to capital.
- (g). The cost to the Secretary of State as certified by him of all works acts and things which shall be executed or done by him under any of the provisions of this Contract provided that the cost thereof if executed or done by the Company would have been expenditure on account of capital.

And to credit:—

- (h). The value (to be determined by the Secretary of State) of any land of which possession shall have been allowed by the Secretary of State to the Company for the purposes of this contract and which shall subsequently be relinquished to the Secretary of State under section 7 hereinbefore contained.
- (i). All such of the moneys to be received by or on behalf of the Company as are herein provided to be treated as received on account of capital.

35. The Capital Account shall from time to time as the Secretary of State shall require be made up and the balance thereon ascertained and stated therein. The Secretary of State may from time to time audit the Capital Account and correct errors therein as he shall see fit.

36. The Revenue Account shall contain an account of all such of the moneys to be received by or on behalf of the Company as are herein provided to be treated as received on account of revenue and of all expenditure which ought conformably with this Contract to be treated as on account of revenue. The Revenue Account shall be made up half-yearly to the 30th June and the 31st of December in each year or to such other days as the Secretary of State may from time to time prescribe and shall be regularly submitted by the Company to the Secretary of State who may audit the same either concurrently with or after expenditure or in both ways as he may think fit and may in case of error being discovered therein correct the same within three calendar months after the account containing such error shall have been submitted to him. Every Revenue Account shall be considered as settled at the expiration of three calendar months after the same shall have been submitted to the Secretary of State but nevertheless any error which may subsequently be discovered therein shall be corrected in the then next Revenue Account or in any subsequent Revenue Account or Accounts as the Secretary of State may determine.

37. As soon as possible after the 30th of June and 31st of December in each year or the respective half-yearly days which the Secretary of State may from time to time prescribe for the making up of the Revenue Account the Company shall make up and deliver to the Secretary of State an account of all stores in hand on the half-yearly day immediately preceding the making up of the account now being directed and of all stores which the Company shall for the purposes of fulfilling this Contract have used since as regards the first occasion of making up an account of stores the date of this Contract and since as regards each other occasion of making up an account of stores the date to which the Stores Account was last previously made up showing the purposes for which such stores have been used. As often as any of the stores in hand shall be used by the Company for the purposes of fulfilling this Contract the value of the stores so used as entered in the books of the Company shall be entered in the Capital Account or in the Revenue Account as may be proper. The Stores Account shall besides being made up periodically as above mentioned be made up and balanced from time to time upon the requisition of the Secretary of State.

38. The stores in hand shall be valued at such time or times as the Secretary of State shall direct and in such manner as shall from time to time be agreed upon by the Secretary of State and the Company, and the value of the stores in hand as entered in the books of the Company shall be corrected in accordance with such valuation and all necessary adjustments shall be thereupon made by making entries to debit or credit in the Revenue Account as may be proper.

Appropriation of Expenditure.

59. In any case where any question may or might arise as to whether any expenditure incurred in relation to the projected railway or otherwise is to be treated in the whole or in part as a charge on Capital Account or how the same is to be dealt with the question shall be determined on the general principle that capital is to bear the cost of new works of additional rolling stock plant and machinery and of improvements of and additions to old works rolling stock plant and machinery including the cost of any temporary new work the construction of which is requisite for the construction of a work properly chargeable to capital and that the cost of repairs restorations renewals replacements and substitutions is to be borne by revenue except in cases where repairs restorations renewals replacements or substitutions are effected prior to the opening for public traffic of the portion of the projected railway upon or in respect of which the same are effected in which case the cost thereof is to be chargeable to capital. Provided always that any item of expenditure incurred in respect to any part which shall have been opened for public traffic of the projected railway (although under the terms in this section before contained in strictness chargeable to capital) shall from time to time if not exceeding the sum of 1,000 rupees and may from time to time at the absolute discretion of the Secretary of State if exceeding 1,000 rupees but not exceeding 2,000 rupees (but so that the aggregate expenditure charged to revenue on account of such last mentioned items shall not exceed 15,000 rupees in any half-year) be charged to revenue. Provided also that after the opening

throughout for public traffic of all the four several lines of railway specified in the 3rd section of this Contract no portion of the salaries or allowances of any of the Company's permanent supervising staff although for the time being employed partly or wholly in directing or superintending work the expenditure on which is properly chargeable to capital shall except with the express sanction of the Secretary of State be treated as chargeable to capital and also that after the opening throughout for public traffic of the whole of the four several lines of railway last aforesaid no expenses connected with the engagement from England or with the passage from or to England of any person in the Company's service shall be treated as chargeable to capital unless such person shall be specially engaged to carry out work the cost of which is expenditure so chargeable and shall be actually employed upon such work. Nevertheless the cost of construction of any of the lines mentioned in the 48th section of this Contract shall be borne by capital to the same extent and in the same manner as if the proviso last hereinbefore contained had not been inserted in this Contract.

40. If any difference shall arise between the Secretary of State and the Company as to whether expenditure shall in any particular case be charged to capital or charged to revenue the matter in difference shall unless according to the terms of the section last hereinbefore contained to be solely decided or determined by the Secretary of State be referred to the decision of the Joint Auditor if the Secretary of State and the Company shall have appointed such an officer but in case a Joint Auditor shall not have been appointed then the matter in difference shall be referred for final decision to the Company's Auditor or some other person to be named by the Company and a Government Examiner of Railway Accounts or some other person to be named by the Secretary of State or to an umpire to be named by the referees acting on behalf of the Company and the Secretary of State respectively in case of difference between such referees. The costs of any reference under this section shall unless the Secretary of State shall otherwise direct be treated as working expenses.

Working Expenses.

41. All costs and expenses incurred by the Company with the sanction of the Secretary of State in or about or in connection with the maintenance management and working of the projected railway so as the expenditure be not incurred prior to the opening of some part thereof for public traffic shall be deemed working expenses. All working expenses shall be chargeable to revenue.

In the working expenses there shall be included.—

- (1). Such sum or sums of money as shall from time to time be agreed upon between the Secretary of State and the Company as proper to be allowed in respect of the rent of the Company's office in London office expenses Directors' fees and salaries of clerks and servants except so much (if any) of the sum or sums mentioned in this sub-section as the Secretary of State shall especially determine to be chargeable to capital.
- (2). The costs of and incidental to the preparation of the returns and statistics mentioned in the 58th section of this Contract.
- (3). So much of the cost of providing and maintaining a police force agreeably to this Contract as is not under the terms of this Contract to be borne by the Secretary of State as part of the general expenditure of the Government of India.
- (4). All expenditure incurred by the Company with the sanction of the Secretary of State or by the Secretary of State in keeping so much of the projected railway as shall have been opened for public traffic and the stations and other works belonging thereto in good repair and in good working condition and supplied with rolling stock machinery and plant except such part if any of the expenditure mentioned in this sub-section as shall be properly treated as chargeable to capital.
- (5). All expenditure incurred by the Company with the sanction of the Secretary of State or by the Secretary of State in keeping the rolling stock machinery and plant belonging to so much of the projected railway as shall have been opened for public traffic in good repair and in good working condition.
- (6). All expenditure incurred by the Company with the sanction of the Secretary of State or by the Secretary of State in the execution of any works of which the cost shall be chargeable to revenue.
- (7). So much as ought pursuant to this Contract from time to time to be charged to Revenue in respect of the half-yearly amounts to be charged by the Secretary of State under his power in that behalf hereinafter mentioned for his supervision and control of the Company.
- (8). The charges of the Government Telegraph Department for rent maintenance and inspection of the telegraphs and telegraphic appliances from time to time provided under the 11th section of this Contract for the use of the Company.
- (9). All reasonable legal expenses whether incurred by the Secretary of State or by the Company and all such other expenses as the Secretary of State shall require or allow to be treated as working expenses.

As to the Application of Receipts.

42. Of the moneys to be received by or on behalf of the Company in each half-year during the continuance of this Contract such as are pursuant to this Contract to be treated as received on account of

revenue shall be applied in the first place in or towards the discharge of expenditure attributable to revenue as follows (that is to say) :—

- (1). Primarily in or towards the discharge of expenditure attributable to the half-year to which the receipts relate and
- (2). Secondly in or towards the discharge of expenditure attributable to any previous half-year or half-years and not already discharged out of receipts on account of revenue and
- (3). In the next place in payment to the Secretary of State so far as the same will extend of the interest accrued in his favour under the provisions hereinbefore contained and not previously paid to him and
- (4). In the next place in payment of such sum as shall from time to time be payable by the Company to or for the purposes of any provident institution which shall be established by the Company in connection with the projected railway and
- (5). The surplus if any shall be dealt with as follows (that is to say) up to the 30th day of June 1887 shall belong absolutely to the Secretary of State and as from that day shall be divided between the Secretary of State and the Company in proportion of three-fourths to the former and one-fourth to the latter and the one-fourth belonging to the Company shall be paid over to the Company in India.

Provided that if one equal fourth part of the surplus attributable to any half-year prior to or ending with the 30th day of June 1887 shall exceed one-eighth part of the aggregate equivalent of interest paid under the provisions hereinbefore contained by the Secretary of State to the Company in the same half-year in respect of so much of the aforesaid sum of £3,000,000 as shall then have been paid by the Company pursuant to this Contract then and so often as the same shall happen the Company shall be entitled to the amount of the excess and the Secretary of State shall pay the same amount to the Company in India.

As to Running Powers and other Provisions for Accommodation of other Railway Companies and State Railways.

43. The Secretary of State may from time to time require the Company to allow the use of the projected railway or any part or parts thereof for the passage of engines and trains belonging to other Railways upon the payment of reasonable conditions and restrictions.

44. The Secretary of State may from time to time require the Company to supply other Railway Companies or State Railways upon reasonable terms and conditions with any of the rolling stock appropriated or belonging to the projected railway or any part or parts thereof provided such rolling stock shall not for the time being be required for the purposes of any part of the projected railway.

45. The Secretary of State may from time to time require the Company to execute work in its workshops in respect of rolling stock and machinery belonging to State Railways at such reasonable prices and upon such terms as shall be agreed upon between the Secretary of State and the Company but so nevertheless as not to impede or unduly interfere with the ordinary operations of the Company as carried on therein.

46. The Secretary of State may from time to time require the Company to make reasonable arrangements for the interchange of traffic and rolling stock with railways belonging to other Companies or to the State.

47. The Secretary of State may from time to time require the Company to allow the use of any of the stations belonging to the projected railway for the accommodation of the traffic of any other Railway Company or State Railway upon the payment of reasonable tolls and under reasonable conditions and restrictions and may also require the Company to make such alterations and additions as may in the opinion of the Secretary of State be necessary or convenient for the purposes of such accommodation upon such terms as may be agreed upon between the Secretary of State and the Company.

As to the Construction of Extensions.

48. The Secretary of State may at any time or times during the continuance of this Contract unless and until he shall under the provisions hereinafter contained had given notice to the Company of the determination by him of this Contract require the Company to construct all or any of the following lines of railway that is to say

- (1). An extension from Belgaum to join the Great Indian Peninsula Railway at or east of Poona.
- (2). A branch to Karwar.
- (3). A branch to Hurrihar.

And as from the time when and as often as the Secretary of State shall under this section have required the Company to construct any of the lines of railway last aforesaid the Company shall in addition to its other obligations and liabilities be under all such obligations and liabilities as it would have been subject to under this Contract if the line or lines of railway under this section required to be constructed had by the 3rd section of this Contract been provided to be constructed in addition to the lines of Railway in such section specified. And all the provisions of the 3rd section of this Contract shall apply *mutatis mutandis* in respect of any line or lines of railway which shall under this section be required to be constructed. Provided that if the Secretary of State shall require the Company to construct a branch to Karwar the Company shall have the benefit of an existing survey made on behalf of the Secretary of State of a line or railway from

Karwar to Hubli. Provided also that if and as often as the Secretary of State shall at the time when he shall require the Company to construct any extension or branch mentioned in this section have caused any surveys or plans to be made (other than the surveys before mentioned in this section) or works to be executed with the view of facilitating or expediting the construction of the same extension or branch he shall allow the Company to have the benefit of the same surveys plans and works respectively and upon the Company becoming entitled under this section to the benefit of the existing survey in this section mentioned or of any other surveys or any plans or works the cost to the Secretary of State (as certified by him) of the survey or surveys plans or works to the benefit whereof the Company shall from time to time become entitled under the provisions of this section (including as regards all surveys and plans the cost to the Secretary of State of procuring the same to be made) shall be entered to debit in the Capital Account.

Construction Acquisition and Working of Auxiliary or Branch Railways.

49. The Secretary of State may require the Company on such terms and conditions as shall be agreed upon between himself and the Company in each case to construct or acquire either absolutely or on lease for a term of years or otherwise any railway on the metre gauge convenient to be worked as auxiliary to or in connection with the projected railway or any part of it and to work on such terms and conditions as may in each case be agreed upon between the Secretary of State and the Company any railway so constructed or acquired as mentioned in this section or any other railway on the metre gauge convenient to be worked as auxiliary to or in connection with the projected railway or any part of it.

The Company to comply with the requirements of the Secretary of State.

50. The Company shall with all reasonable speed ^{comply} with all such requirements as the Secretary of State shall from time to time make in accordance with any with the ^{act.} ^{pointment of a Government Director.} ^{part ther}

51. In all matters not herein especially provided for relating to the fulfilment and performance by the Company of this Contract so far as to be fulfilled or performed by the Company the Company shall be subject to the supervision and control of the Secretary of State. The Secretary of State shall be entitled to make a charge half-yearly for his supervision and control of the Company. The said half-yearly charge shall be a mileage rate of 40 rupees for every mile of the projected railway so far as the time being either constructed or under construction. The half-yearly charge to be made by the Secretary of State under this section shall be charged to capital so far as made prior to the opening for public traffic of any part of the projected railway and as from the time when any part of the projected railway shall have been opened for public traffic until the whole thereof shall have been so opened the half-yearly charge under this section shall from time to time be apportioned between revenue and capital in such manner as that so much of the half-yearly charge as bears the same proportion to the entirety thereof as the length of railway opened for public traffic at the time when the half-yearly charge is made bears to the whole length of railway on which the same charge is to be calculated shall be charged to revenue and that the residue thereof shall be charged to capital. As from the time when the whole of the projected railway shall have been opened for public traffic the half-yearly charge to be made by the Secretary of State under this section shall be charged to revenue exclusively.

52. For the purpose of inspecting the railways and works to be executed by the Company under this Contract either whilst under construction or subsequently and of inspecting the projected railway and the stations and other works rolling stock plant machinery and stores to belong thereto and the electric telegraphs and telegraphic appliances for the time being provided under this Contract for the use of the Company and for the purpose of auditing the accounts of the Company or otherwise exercising such supervision and control as are intended to be reserved to the Secretary of State by this Contract the Secretary of State may from time to time appoint such person or persons as he may think proper with such powers as he may consider necessary or expedient and the Company shall afford every person so appointed all reasonable facilities for the purpose of enabling him to perform the duties entrusted to him by the Secretary of State.

53. The Company shall record and keep in proper books full and particular accounts of all its transactions and proceedings including full and true minutes of all its meetings of Directors communications with India and correspondence so as at all times to exhibit fully and truly the state of its affairs and the Secretary of State or any person or persons appointed by him in that behalf shall at all reasonable times have free access to all the books accounts papers and documents of the Company with power to call for and make copies of or extracts from the same.

54. The Secretary of State may from time to time appoint any one person to be a Director of the Company. The Government Director shall be ex-officio a member of all Committees appointed by the Board of Directors of the Company or by the Company in relation to the projected railway or any matter connected therewith and he may moreover exercise at his direction an absolute veto in all proceedings whatever at the Board of Directors. The Government Director shall not be removeable except by the Secretary of State. The Secretary of State may from time to time as often as occasion shall require appoint a person to represent the Government Director at any meeting of the Board of Directors or at any Committee meeting at which the Government Director may not be present and the person so appointed shall have all such rights and may exercise all such powers as the Government Director if present would have had or might have exercised.

Miscellaneous Provisions.

55. The Company shall not during the continuance of this Contract without the sanction of the

Secretary of State in writing first obtained engage in or carry on any business other than the business provided by this Contract to be carried on by the Company or borrow any money or increase or reduce its capital.

56. The Company shall not during the continuance of this Contract alter vary or add to its Articles of Association without the sanction of the Secretary of State.

57. The Company shall not during the continuance of this Contract without the sanction of the Secretary of State in writing first obtained acquire any property in India. If the Company shall in contravention of this section acquire any property such property shall not be disposed of by the Company without the sanction in writing of the Secretary of State and the Secretary of State may at any time during the continuance of this Contract or within one calendar month after the determination thereof purchase such property from the Company at the price actually paid by the Company for the same and if the purchase money shall be paid to the Company during the continuance of this Contract the expenditure shall be carried to Capital Account.

58. The Company shall from time to time make such returns and furnish such statistics in such form and under such heads and divisions and with such details as the Secretary of State may from time to time require. The cost of preparing such returns and statistics and incidental thereto shall be treated as part of the working expenses of the projected railway.

59. The Secretary of State shall promote the passing by the Legislature in India of any Act or Acts which may be required to enable the Company to carry into effect this Contract.

60. No claim shall be made upon the Secretary of State by the Company for compensation in respect of any act of the Indian Legislature of general applicability by reason of its prejudicially affecting the projected railway or the profits thereof.

61. The Company may if it shall think it expedient and shall if required by the Secretary of State at any time after the opening for public traffic of any part of the projected railway maintain and manage a Provident Institution and a Savings Bank for the benefit of the servants of the Company upon such terms and under such rules and regulations as shall from time to time be approved by the Secretary of State.

62. The Secretary of State may at any time after the whole of the four several lines of railway specified in the 3rd section of this Contract shall have been opened throughout for public traffic require the Company to establish and maintain out of contributions from revenue and on terms to be agreed upon between the Secretary of State and the Company Reserve Funds for the purposes of insuring property whether appropriated to the projected railway or in the custody of the Company as common carriers or in any other capacity against damage by fire and of making good deteriorations of permanent-way and rolling stock.

63. Any notice determination decision direction requirement requisition appointment certificate or expression of opinion approval or sanction to be given or signified on the part of the Secretary of State for any of the purposes of or in relation to this Contract or any of the powers or provisions herein contained shall be sufficient and binding if in writing signed by the Secretary of State or one of his Under-Secretaries or by a Secretary of the Government of Bombay or by any other officer or servant authorized to act on behalf of the Secretary of State in respect of the matters to which the same shall relate and the Secretary of State shall not in any case be bound in respect of any of the matters aforesaid unless by some writing signed in the manner before mentioned in this section.

64. The Company shall at all times during the continuance of this Contract keep an office established at some place in India to be determined from time to time by the Secretary of State and shall keep at the said office an authorized Agent or Committee of Agency with whom the Secretary of State and the Government of India or other officer or officers deputed in that behalf may communicate on affairs concerning this Contract and the duties and liabilities of the parties hereto under this Contract and all drafts drawn and receipts given by the said Agent or Committee of Agency or under his or their authority on behalf of the Company in relation to this Contract or any of the duties or liabilities of the Company under this Contract shall be binding on the Company and every notice to be given to the Company (save any notice with respect to the determination of this Contract as hereinafter provided) shall be sufficiently given if left at the said office or personally served on the said Agent or any member of the said Committee of Agency.

As to the Termination and Expiration of the Contract and Repayments to Company.

65. The Secretary of State may determine this Contract either on the 30th of June 1907 the 30th of June 1917 or the 30th of June 1927 on giving to the Company in London not less than twelve calendar months' previous notice in writing of such determination. The Secretary of State may also if default shall be made by the Company in duly paying the aforesaid sum of £3,000,000 or any instalment thereof pursuant to this Contract or in the construction and completion in conformity with this Contract of the projected railway or any part thereof and the stations and other works thereof or in the due equipment pursuant to this Contract of the projected railway or any part thereof with rolling stock machinery or plant or in case there shall be any breach on the part of the Company of any of the provisions of this Contract or in case at any time after the whole of the four lines of railway specified in the 3rd section of this Contract shall have been opened throughout for public traffic the projected railway or any part thereof shall in the opinion of the Secretary of State be in course of gross mismanagement by the Company or be worked at a loss and have been so worked for not less than three half-years continuously up to the time of the exercise by the Secretary of State of the powers now being conferred on him determine this Contract by giving to the Company in London six calendar months' previous notice in writing of such determination. The Company may determine this Contract on the 30th of June 1888 or on the 30th of June in any

subsequent year on giving to the Secretary of State not less than twelve calendar months' previous notice in writing. Upon the day on which this Contract shall expire by efflux of time or terminate under any notice given by the Secretary of State or by the Company under this section the Company shall deliver to the Secretary of State possession of all land of which he shall have allowed the Company possession under or for the purposes of this Contract (except only such lands as may previously have been already re-delivered to him or sold with his sanction) together with the stations station yards offices warehouses for employes conveniences rails machinery fixtures and plant then erected or being on the land to be delivered up under this section or anywise belonging to the projected railway or any part thereof and also deliver to the Secretary of State possession of any office in England of the Company and deliver to the Secretary of State all rolling stock moveable machinery and plant belonging or appropriated either as regards purposes of construction or working or otherwise to the projected railway or any part thereof or any of the works or adjuncts thereof and all stores in hand or in course of delivery on that day and all plans books surveys sections printings writings and documents whatsoever in anywise connected with or with the construction of projected railway or any part thereof or any of the works or adjuncts thereof and any electric telegraphs telegraphic appliances and other property belonging to the Secretary of State and then in the possession of the Company in reference to this Contract including all furniture and tenants' fixtures appropriated to the office in England of the Company. The Company will also on the day on which this Contract shall so expire or terminate as last above mentioned refund to the Secretary of State any money belonging to the Secretary of State which shall then be under the control or in the hands of the Company or any of its officials or agents and the Secretary of State shall be bound to indemnify the Company its property and effects against all such then existing debts and liabilities (if any) incurred by the Company with the sanction of the Secretary of State in relation to this Contract as would but for the expiration or termination of this Contract to be fulfilled or discharged by the Company at cost which would under this Contract have been properly charged to capital or revenue. The Company if required by the Secretary of State shall at any time after possession of any office in London of the Company shall have been under this section delivered to the Secretary of State execute at the cost of the Secretary of State to any person nominated in that behalf by him a proper assignment or assurance of the office last aforesaid.

66. The termination of this Contract under the section last hereinbefore contained whether the notice under which the same shall terminate shall have been given by the Secretary of State or by the Company shall be without prejudice to the rights of either party against the other in respect of any covenant herein contained which may have been broken previously to the termination of this Contract.

67. All land of which the Secretary of State shall allow the Company to have possession for any of the purposes of this Contract and everything to be constructed thereon and all rails plant machinery rolling stock stores fixtures and implements of every description acquired by the Company for the purpose of constructing maintaining equipping keeping up the equipment of or working the projected railway or any part thereof or any stations station-yards offices warehouses for employes or works upon any land of which the Secretary of State shall so allow the Company to have possession as aforesaid or for any other purposes of the projected railway are hereby declared to be respectively the property of the Secretary of State. The Company shall not be entitled to any remuneration from the Secretary of State in respect of its services under this Contract.

68. At the expiration of this Contract by efflux of time unless this Contract shall have previously been determined under the provisions herein contained or if this Contract shall be so previously determined then upon the day appointed for termination of this Contract by the notice which shall determine the same the Secretary of State shall at his option out of the revenues of India either pay to the Company in London an amount equal to the amount which shall then have been paid by the Company conformably with this Contract in respect of the said sum of £3,000,000 and also an amount equal to the aggregate of any such sum or sums of money (other than in respect of the said sum of £3,000,000 or any part or parts thereof) as shall have been paid by the Company into the Bank of England to the credit of the Secretary of State under the 26th and 28th sections of this Contract or under either of such sections or out of the Revenues aforesaid pay to the Company in India the equivalent in rupees at the market rate of the day for bills drawn on London payable on demand of the aggregate of the amounts which if the Secretary of State had exercised his option under this section of making payment in London would under this section have been payable by him to the Company in London.

Arbitration.

69. If any dispute question or controversy shall at any time arise between the Secretary of State and the Company touching this Contract or any clause or thing herein contained or the construction hereof or any matter connected with this Contract or the operation of the same or the rights duties or liabilities of either party in relation to the premises then and in every such case the matter in difference shall be referred to two Arbitrators or their Umpire pursuant to and so as with regard to the mode and consequences of the reference and in all other respects to conform to the provisions in that behalf contained in the Common Law Procedure Act 1854 or any subsisting statutory modification thereof and upon every such reference the Arbitrators and Umpire shall respectively have power to examine witnesses upon oath or affirmation and either to fix settle and determine the amount of costs of the reference and award respectively or incidental thereto to be paid by both parties or by either party or to direct the same to be taxed either as between solicitor and client or otherwise and to direct and award where and by and to whom such costs shall be paid and every or any such reference may be made a rule of Her Majesty's High Court of Justice or of the High Court of Judicature at Bombay on the application of the Secretary of State or of the Company and either the Secretary of State or the Company may instruct counsel to consent thereto for the other party.

In witness whereof Lieutenant-General Richard Stachey Companion of the most Exalted Order of the Star of India and Andrew Cassels Esquire being two Members of the Council of India have hereunto set their hands and seals and the Southern Mahratta Railway Company Limited have hereunto caused their common seal to be affixed the day and year first above written.

APPENDIX F.

ASSAM LIGHT RAILWAYS AND TRADING COMPANY.

Concessions granted to above Company for the construction of a line of Railway from Dibrugarh to Sadya with branch to Makum.

This indenture made the twenty-sixth day of May one thousand eight hundred and eighty between the Secretary of State for India in Council for himself and his successors in Office and Assigns hereinafter called "the said Secretary of State" (in which term shall moreover be included all servants and officers of Government to whom any powers shall expressly or by virtue of their appointment be given to act in any matter or thing relating to this agreement) of the one part and David Thomas Shaw, Francis Finlayson, Evan Alexander Jack, John Horne, and Patrick Playfair, who carry on business in co-partnership at Calcutta as merchants and agents under the style or firm of Shaw Finlayson and Company (hereinafter called "the said firm") acting in the premises for and on behalf of a Company already incorporated or intended to be shortly incorporated to be called "The Assam Railway Company Limited" of the other part *Whereby* it is agreed as follows.—

1. The said Company (in which term shall be included when the context shall admit of such interpretation all servants and officers of the Company) shall construct and equip to the satisfaction of the said Secretary of State and in conformity with the specification hereto annexed and such schedules drawings plans and estimates as have been or may from time to time be submitted to and approved of by the Secretary of State (a) within twenty-four months from the first day of December one thousand eight hundred and eighty a railway extending from the terminus of the steamer lines on the banks of the Brahmaputra River near Dibrugarh along the Government road towards Sadiya to the fifty-first mile and (b) within thirty months from the said first day of December one thousand eight hundred and eighty a branch line of twenty-four miles from Doom-Dooma to opposite the petroleum godown on the Dehing River about three miles from Makum and (c) at such time or times as may be agreed upon such other branch line or lines as may be sanctioned from time to time by the said Secretary of State (and especially a branch line from Dibrugarh to Nagaghoor) and another branch from Pantollah to Hopewell on the Rungagora Road) and the word "railway" used in this agreement shall include all branches as well as the main line;

2. The said Company shall at all times keep up and provide all rolling stock necessary for the purposes of the said railway and shall maintain the said railway and also the portion of the roads on which the rails are laid and all rolling stock and other equipment thereof respectively in good order to the satisfaction of the said Secretary of State and shall carry on the work of common carriers thereupon at rates and fares to be from time to time approved by the said Secretary of State.

3. The said Company shall accept the position of common carriers and shall be subject to all Acts Regulations and Rules for the time being in force in India with regard to railways and shall if deemed necessary by the said Secretary of State become the subject of a special Act of the Legislative Council for India for the purpose of fixing the relations between the Secretary of State and the said Company and otherwise providing for its constitution liabilities and powers.

4. The said Company shall for the first six miles for the terminus near Dibrugarh reserve along the road which may be given over to them under Clause eleven hereof a strip of land not less than twelve feet wide for use as a common cart-road and running continuously along one side of the railway and shall also reserve upon the rest of the said road and every other road or part of a road which may be given over to them under Clause eleven hereof a strip of land not less than six feet wide for use as a bridle path for horses cattle and foot passengers and running continuously along one side of the railway. Provided always that in the event of the exigencies of the said Company making it necessary to use a greater breadth of the roads than will admit of a strip of twelve and six feet respectively being reserved as aforesaid the said Company shall before using the extra breadth required by them widen or reconstruct the road so as to give and ensure the preservation of the prescribed width.

5. The said Company shall carry goods parcels luggage passengers live stock minerals stores and all other articles for which conveyance may be required at rates and fares to be from time to time approved by the said Secretary of State and shall also carry to the mail troops and stores of Government at rates to be agreed upon from time to time but not exceeding those now paid for their conveyance in the district concerned and shall when required give precedence to the demands of the said Secretary of State whether for freight or passenger accommodation.

6. The said Company shall from time to time run such trains between such places and at such times periods and speed as may from time to time be sufficient to carry the mails goods and passengers and other traffic of the said railway and they shall run at least one train each way daily over the whole length of the railway.

7. If and whenever from any cause whatsoever the traffic of the railway shall be interrupted or its equipment be injured or out of order the said Company shall pending the resumption of traffic or restoration of equipment as the case may be carry by animal or other power all such passengers goods mails

and other things as they may be under engagement to carry. Provided always that if the interruption be caused by no act negligence or default on the part of the said Company the said Secretary of State shall notwithstanding the provisions of Clause fifteen allow a reasonable time for the restoration of the said railway or equipment or road for the carriage of such passengers goods mails and other things as aforesaid.

8. The said Company shall be entitled to fell and use without payment of royalty on such Government land as may be assigned for the purpose any timber required for the purpose of the railway either in the original construction or subsequent maintenance of the line and for the fuel but not for sale or export. Provided always that no timber felled under this clause shall be burnt where it falls but must be stacked and stored for fuel or must be utilised for the other requirements of the said Company. Provided also that nothing in the preceding proviso contained shall be held to prevent the said Company burning scrub and underwood (when it shall be necessary so to do for clearance purposes) in the manner usual in the district. Provided also that the right conferred upon the said Company in this clause shall be limited to a period of five years from the date on which the line is opened (under the Government subsidy) to traffic and shall be exercised strictly subject to the following conditions:—

1st.—That the localities where the timber is cut on Government land by the said Company shall be only those selected defined and assigned by the Forest Department.

2nd.—That no trees be cut by the said Company on Government land except such as are marked for the purpose by officers of the Forest Department.

3rd.—That all cut timber not removed on to the premises of the said Company before the expiry of the said period of five years shall become the property of Government.

9. The accounts of the said Company shall be submitted in such form as the said Secretary of State shall from time to time approve and shall be subject to audit by the Government account officers and all particulars of every nature or kind and specially all statistics of traffic required or asked for by the said Secretary of State shall be furnished by the said Company with all possible despatch.

10. The said Company shall pay all money received by the said Company for the carriage of goods passengers live stock minerals stores and all other articles and for mails troops and Government stores or otherwise from the use of the railway into the Government Treasury at Dibrugarh on or before the fifteenth day of each month for the month preceding and shall not withdraw any such moneys nor give or enter into any contracts or orders or directions bearing on the revenue receipts or expenditure or the working of the Railway without the consent either of the Government Directors hereinafter mentioned or should no Government Directors be appointed of the Chief or Superintending Engineer of Assam.

11. The said Secretary of State shall subject to the provisions of these presents allow to the said Company the use free of costs of such portions of the Sidiya Jaipur Rungagora and Sibsagar roads as may be required for the main line and also such portions of Government lands or roads as may be required for the construction of the aforesaid branch lines or of any other lines that may be approved by the said Secretary of State and also the use of all roadside land now the property of Government which may be required by the said Company for the purpose of building stations sidings, &c., it being expressly understood that it shall be entirely in the option of Government of what lands they shall allow the use under this Clause.

12. The said Secretary of State shall at all times hereafter at his own expense uphold and maintain the cart-road and bridle-paths to be reserved by the said Company under Clause four of these presents with all bridges embankments walls fences culverts and other works now or hereafter to be constructed for the protection upkeep and maintenance thereof. Provided always that the said Company shall have the option of contracting under a separate agreement for the maintenance of the same road and bridle-paths respectively.

13. When the main line has been completed with the equipments thereof to the satisfaction of the said Secretary of State and has been opened throughout its whole length for public traffic the said Secretary of State shall at the expiration of twelve months from the date of opening and at the expiration of each succeeding period of twelve months until the end of twenty years from the date of opening the said main line give to the said Company an annual subsidy to be reckoned from the time when the said main line shall be opened of such amount (but not exceeding in any one year the sum of rupees eighty thousand) as together with the net earnings of the said Company on the said main line shall yield five per cent. on the paid-up capital of the said Company independent or exclusive of the cost of the Makum branch. Provided always and it is hereby expressly agreed and declared that until the said main line shall have been completed and opened throughout its whole length for public traffic as aforesaid the said Secretary of State shall upon any section or part or sections or parts thereof being completed with the equipment thereof to his satisfaction and opened for public traffic give to the said Company in respect of each such section or part a portion of the aforesaid subsidy proportioned to the length of the section opened *et* upon one-fifth of the said line being opened one-fifth of the said subsidy shall be payable on the same terms as those upon which the whole subsidy is payable on the opening of the whole line and the amount of the subsidy payable for any section or part shall be payable until the completion and opening of the whole main line. Provided also that if the net earnings for any year shall themselves be sufficient to give the required dividend of five per cent. no part of the said subsidy shall be payable and in no case shall the amount of subsidy paid exceed rupees eighty thousand and provided also that such subsidy shall at all times be subject to deduction under Clause fifteen hereof.

14. When in addition to the main line the Makum branch shall have also been completed with its equipment to the satisfaction of the said Secretary of State and the main line and the said branch shall have been open throughout their respective length for public traffic the said Secretary of State shall at the expiration of twelve months from the date of the opening of the said Makum branch and at the expiration

of each succeeding period of twelve months until the end of twenty years from the date of such opening give to the said Company an annual subsidy of such amount (but not exceeding in any one year the sum of rupees twenty thousand) as together with the whole net earnings of the said Company on the Makum branch shall yield five per cent. on the cost of making the Makum branch. Provided always and it is hereby expressly agreed and declared that until the said branch shall have been completed and open throughout its whole length for public traffic as aforesaid the said Secretary of State shall upon any section or part or sections or parts thereof being completed with the equipment thereof to his satisfaction and open for public traffic give to the said Company in respect of each such section or part a portion of the aforesaid subsidy proportioned to the length of the section opened, *ex. gr.* upon one-fifth of the said branch being opened one-fifth of the said subsidy shall be payable on the same terms as those upon which the whole subsidy is payable on the opening of the whole branch and the amount of the subsidy payable for any section or part shall be payable until the completion and opening of the whole branch. Provided always that if such net earnings either alone or together with the surplus net earnings over five per cent. of the said main line and any other branches which may be constructed for any year shall be sufficient to give the required dividend of five per cent. under this clause no part of the said subsidy shall be payable and in no case shall the amount of subsidy paid under this clause exceed rupees twenty thousand. Provided also that such subsidy shall at all times be subject to deduction under Clause sixteen hereof.

15. If the Company do not complete the works and equip the Railway according to these presents within the period specified in Clause one or if they shall for the space of thirty days after notice in writing in that behalf by the said Secretary of State fail or neglect to maintain the said Railway roads rolling stock and other equipment in good order as provided in Clause two it shall be lawful for the said Secretary of State to enter upon the premises of the said Company and take possession thereof and of the rolling stock and other equipment as aforesaid and execute all such repairs and works which may be necessary for the efficient working of the said Railway.

16. If the said company shall fail to perform any of the terms of Clause two for any time extending over fourteen days in any one year the said Secretary of State shall be at liberty to deduct from the subsidy (if any) payable under Clause thirteen or fourteen as the case may be for that year a sum not exceeding rupees two hundred and ten if the provision of Clauses thirteen shall be in operation or rupees two hundred and sixty-two if the provisions of Clauses thirteen and fourteen together shall be in operation for each day that the said Company may be in default and in case the default shall extend over six months the said Secretary of State shall be freed and discharged from all liabilities or obligations imposed on him by this agreement and he shall be at liberty to call on the said Company forthwith to remove their rails sleepers and plant and all other their property and to deliver up to him the possession of the lands roads and other property made over to the said Company under this agreement and the said Company shall bear and pay all the expenses which may be incurred in restoring the said lands and all roads to their original condition for which expenses the said Secretary of State shall have a first lien on all the property of the said Company.

17. It shall be lawful for the said Secretary of State during the aforesaid period of twenty years from the opening of the main line to appoint two Directors who shall have the right to regulate rates fares and tolls to examine all accounts letters and papers connected with the administration and working of the railway and the revenue earnings and expenditure thereof and to disallow all charges not in their opinion legitimately debitable to revenue according to the system or principle that may at the time be in force on State Railways in regard to the distribution of expenditure between capital and revenue. In the event of the office of either Director or of both Directors being at any time vacant the Chief or Superintending Engineer of Assam shall exercise the powers of a Director or of both Directors as the case may be.

18. If after the expiration of five years from the date of opening the main line the net profits of the said Company shall amount to a sum exceeding twelve per cent. of their paid-up capital the said Secretary of State shall be at liberty to require the said Company to make and the said Company shall thereupon make such reduction in the tariff and rates as he may think necessary. Provided that such reduction shall not lead to a diminution of net profits below twelve per cent.

19. The said Secretary of State shall have the option of purchasing the Railway and its rolling stock and other equipments and property of the said Company at the expiration of the first five years from the date of opening the main line and at subsequent intervals of five years by paying the said Company twenty per cent. in excess of the value (to be determined in case of difference by arbitration) of their property as a dividend-paying investment. Provided always that twelve months' notice at the least of the intention to exercise this option of purchase shall be given to the said Company.

20. In case any dispute doubt or difference shall arise between the said Secretary of State and the said Company upon any thing herein contained or in anywise relating to this Agreement the same shall upon the request in writing of either party be referred to the arbitration of two indifferent persons one to be chosen by each party in difference within thirty days after such request shall have been received and in case either of the parties in difference shall neglect or refuse to nominate an arbitrator then the other party shall nominate another arbitrator and the two arbitrators so to be appointed shall before proceeding in the reference nominate another indifferent person to be umpire and the said arbitrators shall make their award in writing within three months after such reference shall be made or in case the arbitrators shall not agree to make their award within that time then the matters in difference shall be referred to the umpire who shall make his award in writing within two months next after the same shall have been so referred to him and such arbitrators and umpire shall have all the powers and authorities given by any law made in that behalf and the award of the two arbitrators or of the umpire (as the case may be) shall be final and conclusive between the parties and to that end it is agreed that any submission or reference to arbitration under or by virtue of this Clause may be made a rule of any court of competent jurisdiction pursuant to the Act for the time being in force in India relating to Civil Procedure.

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21. This agreement shall not take effect and no liability shall be incurred under it on the part of either of the parties hereto unless a Company shall be formed and registered within twelve calendar months from the date hereof and the said firm shall in no case incur any personal liability by reason of their being parties to this agreement. *In witness* whereof the said parties to these presents have hereunto set their respective hands and seals the day and year first above written.

This Indenture made the twenty-fifth day of July one thousand eight hundred and eighty one between the Secretary of State for India in Council for himself and his successors in Office and assigns hereinafter called the said Secretary of State of the one part and David Thomas Shaw, Francis Finlayson, Evan Alexander Jack, John Horne and Patrick Playfair who carry on business in Copartnership at Calcutta as Merchants and Agents under the style or firm of Shaw Finlayson and Company hereafter called "the said firm" acting in the premises for and on behalf of a Company intended to be shortly incorporated to be called "The Assam Railways Company Limited" of the other part *Whereby* it is agreed that a certain indenture of agreement dated the twenty-sixth day of May one thousand eight hundred and eighty and made between the said parties hereto shall be altered and modified as follows:—

1. The time for constructing the respective Railways authorized by the said indenture shall be extended as follows —(a) for the Railway along the Government road towards Sadiya until twenty-four months from the fifteenth of May one thousand eight hundred and eighty-one and (b) for the Branch Line from Doom-Dooma until thirty-six months from the fifteenth day of May one thousand eight hundred and eighty-one and in case the said Company shall be prevented by force majeure or by any cause not within their control from completing the said Railway and Branch Line within the said times then due allowance shall be made for such force majeure or other causes and the respective times for completion shall be proportionately extended. The construction of any Branch Line or lines other than that from Doom-Dooma aforesaid shall not be obligatory upon the said Company.

2. The said Secretary of State in determining whether the said Railway and Branch Line are constructed and equipped to his satisfaction shall pay due regard to the limited quantity and special character of the traffic that is to be expected in this as yet undeveloped and sparsely peopled district.

3. Clause 3 of the said Indenture dated twenty-sixth May one thousand eight hundred and eighty shall be altered and as altered shall stand as follows:—

The said Company shall accept the position of common carriers and shall be subject to all Acts regulations and rules for the time being in force in India with regard to Railways and shall if deemed necessary by the said Secretary of State become the subject of a special Act of the Legislative Council for India for the purpose of giving effect to the stipulations of this agreement between the said Secretary of State and the said Company and otherwise providing for its constitution liabilities and powers.

4. The said Company after opening for traffic the Railway or Branch Line or any section thereof respectively shall be entitled to have an open credit with the Government Treasury at Dibrugarh for such amount as the said Company may from time to time require for its working expenses not exceeding the amount of its actual payments into the said Treasury up to which limit the said Company are to be entitled at any time or times to draw money from the said Government Treasury.

5. The said Secretary of State shall from time to time when thereunto required exercise all such powers as Government may possess for a compulsory purchase (when necessary and provided the said Secretary of State shall concur in such necessity) of all such lands as the said Company may require for the purpose of its Railways Branch Lines Stations and Works.

6. In case the said Secretary of State shall at any time or times decide to authorise the construction of any other line or lines of Railway or Tramway in the District of Luckimpore the said Company shall have the preferential option of undertaking the contract with Government for the construction and working of any such Railways or Tramways as may affect directly or indirectly the traffic of the respective districts in which the Railways and Branch Lines of the said Company are or may be situate.

In witness whereof the said parties to these presents have hereunto set their respective hands and seals the day and year first above written.

General Specification referred to in the foregoing Agreement.

1. The railway is to be laid on a gauge of one metre.
2. Before commencing work, the Company to submit a working plan and section, with drawings and estimates of all works, for the approval of the Superintending Engineer, Assam.
3. The width of the railway formation is to be not less than 9 feet exclusive of the width for the road as specified in the agreement. The railway formation is to have side slopes of 1 in 2 in embankment and 1 in 1½ in small cuttings from the road. Side drains in cuttings are to be provided sufficient to keep the formation dry and their width to be extra of formation.
4. The formation surface of banks and cuttings must be carefully formed so that water cannot remain upon it.
5. *Bridging.*—The bridges of the existing road must be altered (where required) to the full width of formation. They must also be strengthened (where required) so as to bear without undue strain the greatest load that can possibly be brought upon them by the rolling stock used. On girder bridges the

sleepers are to be securely fixed to the girders and protected between the rails from fire. A sufficient bed of timbers is to be provided under the girders and a sufficient cushion of earth over all arches to prevent the masonry suffering from the vibration of the trains.

6. Level crossings to be provided for all existing roads crossing or meeting the railway and at such other places as the local authorities may require. They are to be provided with guard rails, and the surface of the crossing road is to be made up to the level of the rails, which should be kept as near as possible to the level of the Dibrugarh and Sadiya Road at the place.

7. Sleepers to be not less than 6 feet long 8 inches wide and 4 inches deep. There are to be 2,400 to the mile.

8. The rails, crossings and switches are to be of steel. The rails are to weigh not less than 30 lbs. per yard. They are to be fished with 2 fish-plates and 4 bolts to each joint and fastened to the joint sleepers with fang-bolts and to the other sleepers with dog-spikes, 4 to each sleeper.

9. Sidings are to be provided at such places as the Superintending Engineer, Assam, may require.

10. Rolling stock is to be provided sufficient in the opinion of the Superintending Engineer, Assam, for the efficient and regular conduct of the traffic without undue wear and tear to the stock. Drawings of the rolling stock to be submitted for approval by the Superintending Engineer of Assam.

11. All permanent-way materials, rolling stock and other material obtained in England to be subject to the approval of the Superintending Engineer, Assam, who may subject them to the tests, mechanical and chemical, specified for similar material provided by contract for State Railways, and reject such as fail to comply with these tests.

12. All materials obtained or manufactured in India and used in the line or its equipment to be subject to the approval of the Superintending Engineer, Assam, or his Deputy, and to be liable to be tested as he may see fit.

13. All work executed in India on the line or its equipments to be subject to the approval of the Superintending Engineer, Assam, or his Deputy, and executed to his satisfaction. Before being opened to public traffic, the line must be passed by an officer who will be nominated by the Government of India for the purpose.

- Claims.** **CLAUSE 9.**—That claims for goods or parcels be settled by the Railway in whose custody the loss or damage occurred, that when this cannot be ascertained with certainty, the claim be paid in mileage proportion, but in such cases the consent of both Railways shall be obtained before settlement is made.
- The week.** **CLAUSE 10.**—That the week shall in all cases end at 12 o'clock on Saturday night—, when the 30th June or 31st December do not fall on a Saturday, two returns shall be rendered, one for the period commencing from the first day of the last week to the end of the month, and another from the first day of the next month up to and including the second Saturday of that month.
- Returns.**
- Extension of agree-
ment to connected
line** **CLAUSE 11.**—That the principle of this agreement be extended by each Railway to any other Railway working in connection with it, the two Railways, parties to the agreement, being responsible to each other for all through traffic so forwarded.
- Construction of a-
greement. Settlement
by arbitration.** **CLAUSE 12.**—All questions which may arise in carrying out these arrangements upon which the Traffic Managers of the two Railways cannot agree, shall be referred to the Agents of the respective Railways, and in case of any difference of opinion between the two Railways as to the construction of any part of this Agreement, or as to its application to any particular case, it shall be open to either Company to call for an arbitration to be conducted in the ordinary way.
- Duration of agree-
ment.** **CLAUSE 13.**—This Agreement shall come into force on and from 1st February, 1881, and terminate on the expiration of two months' notice from either party desiring to withdraw from it.
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APPENDIX H.

REVISED WORKING AGREEMENT BETWEEN THE EAST INDIAN AND SIND, PUNJAB AND DELHI RAILWAYS.

Extract from the Minutes of East Indian Railway Official Meeting No. 46 held at Calcutta on 18th September, 1879; Resolution No. 1166.

Duration of Agreement.	CLAUSE 1.—This agreement shall come into force on and from the 1st September, 1879, and shall be subject to revision from time to time, but shall remain in force until the expiration of six months' notice from either Company desiring to revise or cancel it, except as regards any clauses in respect of which a shorter term of notice is specially fixed.
Extent of through booking.	CLAUSE 2.—Traffic of all kinds shall be booked through between any station on the East Indian Railway and any station on the Sind, Punjab and Delhi Railway except such small stations as may be excluded by the Traffic Managers of the two lines, it being understood that Calcutta is closed for coaching traffic excepting parcels.
Charges and regulations affecting through traffic.	CLAUSE 3.—I. The through rates, fares and charges shall be the sum of the local rates, fares and charges of the two Companies to Gazeabad as published in the printed tariff of each company, but terminal charges at the Junction shall be excluded from the through rates. II. The rules and conditions in force in respect of local traffic on either Railway shall apply to through traffic.
Minimum charges.	III. In cases of minimum charges common to both lines, the two lines shall be taken as one.
One month's notice required of tariff alterations relating to through traffic.	IV. No exception to this clause and no alteration in the published rates, fares, charges, rules and conditions affecting through traffic shall be made unless one month's notice shall have been given to the Traffic Management of the other Railway by the Traffic Management of the Railway intending to make any such exception or alteration.
Responsibility regarding collection of charges	CLAUSE 4.—I. Each Railway shall be responsible for collecting all charges due to the other on all received traffic with the exceptions noted below, for which the forwarding Railway shall be responsible:— (1). Charges on live stock of every description. (2). Charges on all perishable articles booked either as goods or parcels. (3). Charges on Commissariat and Ordnance stores booked as prepaid. (4). Errors under Rs. 20 either way, in freight paid by credit note or ledger account. (5). Undercharges in fares of passenger tickets, freight on passengers' luggage, and in charges for insurance. (6). Charges on all articles booked and carried with owner. II. The receiving Railway shall not reduce below the charge mentioned in the invoice or through way bill without the consent of the forwarding Railway except in the case of overcharges, the evident result of error in classification or computation of freight.
Reducing Invoice charge.	
Distances for calculating freight charges.	CLAUSE 5.—I. The distances between East Indian Railway stations and Gazeabad and Sind, Punjab and Delhi Railway stations and Gazeabad for computing charges shall be those given in the published tariffs of the respective Companies. II. But the rates and fares to be charged by either Company shall be furnished in lump sums in the form of station to station rates, and not at mileage rates for subsequent computation by stations.
Rates and fares to be furnished in lump sums	
Telegrams.	CLAUSE 6.—Telegrams on the joint business of the two Companies shall be interchanged free.
Exchange of goods stock.	CLAUSE 7.—The exchange of goods stock between the two Companies shall extend to the whole of the lines of either Company and to branches that may be worked by them respectively, as well as to other railways working in connection with the East Indian Railway and the Sind, Punjab and Delhi Railway.
Exchange of coaching stock.	CLAUSE 8.—The exchange of coaching stock shall be subject in extent to mutual arrangement between the respective Railways.
Forwarding Railway to accept wagons for back loading.	CLAUSE 9.—The receiving Railway may call upon the forwarding Railway to accept empty wagons for back loading with a view to equalize the ton-mileage.

- Receiving Railway to supply wagons for back loading. **CLAUSE 10.—I.** The Railway on which through traffic originates shall provide wagons for such traffic. But when the through traffic offering is more than the wagon stock of the sending Railway can cope with, it may call on the receiving Railway to place a certain daily average capacity of wagon stock at its disposal at the junction for traffic to and *via* the receiving line; and in the event of failure to comply within one week, the sending line shall be entitled to charge two pies per ton-mile on all traffic to the extent of the wagon stock short supplied which it may send through in its own stock: provided that the receiving Railway shall not be required to supply more wagons than sufficient to maintain an equal interchange of stock based on the carrying capacity. Open wagons shall be accepted if supplied with proper sheets and ropes.
- II. The sending Railway shall pay mileage at the rate specified in clause 17 on all through traffic, with which such wagons are returned to the owning line.
- Trans-shipment at Junction. **CLAUSE 11.—I.** When the contents of any wagon aggregate less than 81 maunds of through traffic, such contents shall be trans-shipped at Gazeabad.
- II. The Traffic Managers of the two Companies shall be at liberty to make exceptions by mutual agreement as to the amount to be trans-shipped in cases of consignments, which from their bulk or weight fully occupy a wagon or require exceptional care, such as furniture, glassware, stationery, millinery, pictures, musical instruments, &c., &c.
- Division sheets. **CLAUSE 12.—I.** The Audit offices of the two Companies shall exchange weekly division sheets: each Company to have in division its local rates and fares except in the case of minimum charges common to both lines which shall be divided by mileage, and to account for all inwards through traffic within six weeks from the date the invoices pass Gazeabad Junction. A monthly settlement of accounts based on division sheets, bills and statements *as rendered* shall be made by transfer certificate on the understanding that all errors brought to notice will be adjusted without delay in subsequent accounts by the responsible Company.
- Responsibility regarding rolling stock. **CLAUSE 13.—I.** So soon as the rolling stock of either Company passes into the custody or possession of the other Company, such other Company shall be responsible for all and every contingency that may arise from the use of such stock while it remains in their possession. Except that, when the contingency is clearly traceable to defect of material or workmanship, the actual repair or replacement of the vehicle in which there was such defect, but not of any other vehicle, or any other consequent damage, shall be effected at the expense of the owning Company.
- II. The cost of repairs arising from ordinary wear and tear shall be always borne by the owning Company, but cases of palpable damage (such as dropping heavy weights into wagons, and so damaging the bottoms, neglect of greasing or oiling, and other similar neglects), and all cases of accidents or collisions shall be borne by the Company in whose custody or possession the stock may be at the time the damage occurs.
- Liability as regards cost of repairs to stock. **III.—**When stock is damaged in such a way as to admit of its running to the owning line for repairs, this course shall be adopted. If the damage is slight, but still of such a nature as to prevent the wagon from running (*e.g.*, a broken buffer) the repairs may be effected by the foreign Railway, and for such material as may be sent by the owning Railway for the necessary repairs no freight shall be charged for any line over which it may be carried, but when the damage is very serious the vehicle shall be loaded up for transport to the owning line.
- Sending home damaged stock. **IV.** Six additional days shall be allowed in case of damage to the stock of either Railway on the line of another Railway for the repairs of such stock, and no demurrage shall be charged for those six days. But if the damage is such as will require longer than six days to complete the repair, the stock shall be returned to the owning Railway. If not sent within the six additional days, whether repaired or not, demurrage shall be charged after the expiration of the six days unless specially exempted by the Traffic Manager of the owning Railway.
- Stock unable to run home. **V.** Notice shall be sent within two months to the owning Railway in all cases how and when the damage took place and the nature of it, and if not so sent, any time free of demurrage shall not be claimed.
- Free time allowed for damaged stock. **VI.** Unless the claim for the cost of repairs of damaged stock be sent to the Company which is responsible for the payment of such claim within three months of the time at which the repairs are completed, the claim shall be forfeited.
- Notice of damage to stock. **VII.** If the cost of repairs to, or replacement of, damaged stock be not paid within three months from the date of submission of claim, interest thereon shall be chargeable at the rate of 5 per cent. per annum from the date of submission of claim.
- Forfeiture of cost of repairs. **CLAUSE 14.—I.** No goods damageable by fire or water, or goods sheeted, shall be allowed to leave the line of the owning Company in open wagons, except under special arrangement and except as provided in clause 10.
- Interest chargeable on cost of repairs. **II.** But when open trucks laden with damageable goods are accepted, the receiving Company shall become liable for subsequent damage, provided the goods are handed over under a description implying that they are damageable by fire, water, or atmospheric causes.
- Damageable goods in open trucks.

APPENDIX H—continued.

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Handing over stock at Junction.	<p>CLAUSE 15.—I. All stock shall be considered as handed over when entered in the number-taker's book at the Junction station, and it shall be so entered directly it is put into the lines or sidings in which such stock is usually placed for that purpose.</p>									
Number-takers.	<p>II. The number-taker or takers to be joint servants of both Companies, and work under instructions approved by the Traffic Managers of both Companies.</p>									
Definition of coaching and merchandise stock.	<p>CLAUSE 16.—Passenger carriages, horse boxes, carriage trucks, mail vans, brake-vans, passenger road or luggage vans, shall be in all cases reckoned as coaching vehicles, whether they run upon passenger or goods trains. All other kinds of vehicles shall be reckoned as goods vehicles.</p>									
Mileage charges.	<p>CLAUSE 17.—I. A mileage charge of seven pies shall be made for coaching vehicles, both on the outwards journey and in returning, double horse boxes when containing more than three horses to be counted as two vehicles, but no mileage shall be charged on vehicles of the following descriptions when returning empty to the owning Company's line :—</p> <table border="0" style="margin-left: 40px;"> <tr> <td>Horse boxes.</td> <td style="border-left: 1px solid black; padding-left: 5px;"></td> <td>Hospital carriages.</td> </tr> <tr> <td>Carriage trucks.</td> <td style="border-left: 1px solid black; padding-left: 5px;"></td> <td>Prison vans.</td> </tr> <tr> <td colspan="3" style="text-align: center;">Special carriages not used for ordinary traffic.</td> </tr> </table> <p>II. Mileage shall be paid to the sending Railway for goods vehicles of all descriptions at the rate of two-thirds ($\frac{2}{3}$ds) of a pie per ton, or fraction of a ton of goods conveyed in either direction in such vehicles, in respect of every mile a goods vehicle of one Railway may carry goods on the line of the other Railway or any Railway connected therewith.</p> <p>III. Mileage shall be paid on the weight entered in invoice for charges.</p> <p>CLAUSE 18.—Mileage shall not be charged on merchandise vehicles when running empty.</p>	Horse boxes.		Hospital carriages.	Carriage trucks.		Prison vans.	Special carriages not used for ordinary traffic.		
Horse boxes.		Hospital carriages.								
Carriage trucks.		Prison vans.								
Special carriages not used for ordinary traffic.										
Time allowed free of demurrage. Coaching vehicles.	<p>CLAUSE 19.—Coaching vehicles sent through from one Railway to the other or any line beyond shall be allowed one hour for every $12\frac{1}{2}$ miles or portion of $12\frac{1}{2}$ miles run in going and returning, and 24 hours extra at destination free of demurrage.</p>									
Time allowed free of demurrage. Goods vehicles.	<p>CLAUSE 20.—I. No demurrage shall be charged on the wagons from either Company sent through to the line of the other Company or any line beyond provided they are returned within the time arrived at by allowing one hour for every $6\frac{1}{2}$ miles or portion of $6\frac{1}{2}$ miles run in going and returning; mileage to be reckoned on the total distance run foreign in each direction separately. 24 hours shall be allowed at destination for unloading and 24 hours for reloading, and 12 hours shall be allowed at intermediate stations for each of these operations.</p> <p>II. But no allowance shall be made for detention at Junctions.</p>									
Demurrage charges.	<p>CLAUSE 21.—On vehicles detained beyond the time named in clauses 13, 19 and 20, demurrage shall be charged as follows :—</p> <p><i>Coaching vehicles</i>—At the rate of eight annas per hour.</p> <p><i>Merchandise vehicles</i>—At the rate of one anna per ton of carrying capacity per hour.</p>									
Loading vehicle short of owning lines.	<p>CLAUSE 22.—In case any merchandise vehicles are loaded on the homeward journey to any station short of or not beyond the junction with the owning Railway, the Audit offices of the respective Companies shall duly and correctly account for the same in their mileage returns to each other, and the mileage charges due under clause 17 shall be allowed to the owning Railway for the distance the vehicles are run loaded. When in such cases the distance run loaded is over two or more Railways, each line shall pay its proper share of the mileage charges.</p>									
Penalty for mis-sending.	<p>CLAUSE 23 —I. No return vehicle shall be run, whether loaded or empty, unless otherwise mutually arranged, on any other than the exact route to its own line by which it was received, under a penalty of rupees twenty-two per diem from the time it was mis-sent, until it returns to a station on the route by which it was received.</p>									
Calculation of penalty.	<p>II. In calculating penalty the date on which the vehicle is wrongly sent shall be included, and the date on which it returns to a station on the route by which it was received shall be omitted.</p> <p>III. Vehicles may be loaded on their return journey to any station on the owning line or beyond.</p>									
Diverting vehicles to branches.	<p>IV. But either Company may divert a vehicle of the other Company to any short branches of its own (to wit the Singharron, Burrakur or Kurhurballee branches on the East Indian Railway) for a load to the line of the owning line, but not beyond.</p>									
E. I. Ry. to divert P. N. S. Ry. vehicles.	<p>V. The East Indian Railway may divert wagons of the Punjab Northern State Railway to branches for a load of coal to the Punjab Northern State Railway.</p> <p>VI. Penalty is to be paid in every instance when a vehicle is mis-sent, even if it should reach the owning Railway within the time allowed under clauses 19 and 20.</p>									

- Liability of line originating mis-sending. VII. For the wrong running of a vehicle on the Railway which mis-sends it, penalty shall be levied as provided in the first paragraph of this clause, but for the wrong running on a Railway other than the Railway which originates the mis-sending, the time on which to calculate the penalty recoverable from the Railway originating the mis-sending shall be determined in the case of merchandise vehicles at the rate of one hour for every $6\frac{1}{2}$ miles or portion of $6\frac{1}{2}$ miles wrongly run by the vehicle, together with 24 hours for unloading at destination, and in the case of coaching vehicles at the rate of one hour for every $12\frac{1}{2}$ miles or portion of $12\frac{1}{2}$ miles, and 24 hours extra, any detention in excess of this time to be charged against the detaining Railway at the demurrage rate provided in clause 21. The penalty of Rs. 22 shall be leviable for 24 hours, or part thereof.
- Trans-shipment to prevent wrong running. VIII. Penalty paying vehicles shall also be subject to the provisions of clauses 17 and 24.
- Owning line to receive mileage and penalty dues. IX. If a vehicle be loaded with goods for a station, the running to which would take the vehicle out of its exact route homewards, and the load be trans-shipped at some point before the vehicle runs out of its proper route, the vehicle then running home by the proper route, then no penalty shall be due on the vehicle, but only mileage for the distance it ran loaded.
- Inspection of accounts. X. The Auditors of the respective Companies shall specially advise each other whenever a vehicle has been mis-sent.
- Definition of through traffic. CLAUSE 24.—Whatever amount is paid for mileage and penalty for wrong sending by any Railway for the use of vehicles of other Railway, shall in all cases belong to, and be paid over to, the owning Railway.
- Goods claims. CLAUSE 25.—The accounts referring to any mileage or demurrage question in which any sending Railway is concerned shall be open to the inspection of such Railway.
- Statements as to through wagon loads. CLAUSE 26.—Through traffic is to be understood in all cases to mean coaching and merchandise traffic which may be booked or invoiced in accordance with the terms of this Agreement, through from any station on one of the two contracting lines or any line beyond to any station on the other or any line beyond.
- Trans-shipped goods and parcels. CLAUSE 27.—I. Goods claims shall be settled by the Company in whose custody the loss or damage occurred; when this cannot be ascertained with certainty the claim shall be paid in mileage proportion but in such cases the consent of both Companies shall be obtained before settlement is made.
- The week Returns. II. Each Company shall accept the statements of the other Company with respect to the loads of wagons, unless the number-takers at the Junction notice and record that the loads have been interfered with, when the actual contents and their condition must be ascertained and recorded by a responsible officer of the joint station, failing which the sending Company's statement shall be accepted.
- The day. CLAUSE 28.—All trans-shipped goods and parcels shall be checked by the receiving Company, and receipt duly given in the agreed form, the work being arranged for by the East Indian Railway Company, the Sind, Punjab and Delhi Railway Company paying half the cost.
- Dies non. CLAUSE 29.—Cancelled by subsequent agreement, see Appendix L, page liii
- Extension of Agreement to connected line. CLAUSE 30 —1. The week shall in all cases end at 12 o'clock on Saturday night. When the 30th June and 31st December do not fall on a Saturday, two returns shall be rendered, one for the period commencing from the first day of the last week to the end of the month, and another from the first day of the next month up to and including the first Saturday of that month.
- Agreement relating to Ghaziabad Junction Station. II. The day shall in all cases be reckoned as 24 hours, commencing at 12 o'clock at night, part of a day being reckoned as a day. Madras time shall be adopted in all cases. Sundays, Christmas day, and Good Friday shall be treated as ordinary working days and no dies non shall be allowed.
- CLAUSE 31.—The principle of this Agreement shall be extended by each Company to any other Railway working in connection with it, the two Companies, parties to this Agreement, being responsible to each other for all through traffic so forwarded.
- CLAUSE 32.—The following clauses extracted from the Agreement between the East Indian Railway Company and the Sind, Punjab and Delhi Railway Company made 16th September, 1868, show the arrangements agreed to in respect of Gazeabad Junction:—
- "17. The East Indian Company shall and will construct and maintain the said buildings and conveniences at the Gazeabad station, in accordance with the plans or drawings hereinbefore mentioned, for the accommodation of the traffic of the Scinde Company, but such buildings and conveniences shall form part of the said station, and shall be under the absolute control of the East Indian Company.
- "18. The Scinde Company shall, for the use of such buildings and other accommodation so to be provided as aforesaid by the East Indian Company, pay to them interest at the rate of five per cent. per annum on the cost of such buildings and conveniences, which shall have been incurred with the sanction of the Government, and a further payment of

APPENDIX H—*concluded.*

five per cent. on such cost, to cover the expense of maintaining the said buildings and conveniences.

"19. When the said buildings and conveniences so provided as aforesaid shall cease to be required for the purpose of the traffic of the Scinde Company, the value thereof, certified as aforesaid, shall be paid to the East Indian Company by the Scinde Company."

Arbitration.

CLAUSE 33.—All questions which may arise in carrying out these arrangements upon which the Traffic Managers of the two Companies cannot agree, shall be referred to the Agents of the respective Companies, and in cases of any difference of opinion between the two Companies as to the construction of any part of this Agreement, or as to its application to any particular case, it shall be open to either Company to call for an arbitration to be conducted in the ordinary way.

APPENDIX J.

WORKING AGREEMENT BETWEEN THE EAST INDIAN AND GREAT INDIAN PENINSULA RAILWAY COMPANIES.

*Extract from the Minutes of East Indian Railway Official Meeting No. 46, held at Calcutta on 18th
September, 1879, Resolution No. 1166.*

Duration of Agree- ment.	CLAUSE 1.—I. This Agreement shall come into force on and from the 1st September, 1879, in supersession of previous working Agreements, and shall be subject to revision from time to time, but shall remain in force until the expiration of six months' notice from either Company desiring to revise or cancel it, except as regards any clauses in respect of which a shorter term of notice is specially fixed.
Rates, fares, &c, relating to through traffic.	II. All rates, fares, classification, rules, conditions and general arrangements relating to through traffic between the East Indian and Great Indian Peninsula Railways, as in force on the 1st September, 1879, shall remain in force until cancelled or modified on one month's notice as provided in clause 4 of this Agreement.
Extent of through booking.	CLAUSE 2.—Coaching and merchandise traffic of all kinds shall be booked through between all stations of both Railways, at which those respective descriptions of traffic are booked from time to time. No coaching traffic, parcels only excepted, shall be booked to Calcutta.
Through rates and fares.	CLAUSE 3.—I. The through rates and fares shall be the sum of the through rates and fares of each Railway respectively, between Jubbulpore and the stations concerned. No terminal shall be charged upon through traffic at Jubbulpore by either Company. The through rates and fares shall be supplied by each Railway to the other from time to time.
Minimum charges.	II. In the case of through minimum charges, which are common to both Railways, the two lines shall be treated as one, and the minimum amount actually paid shall be divided upon mileage.
Local rules and conditions to apply to through traffic.	III. The rules and conditions in force upon each Railway in respect of local traffic shall apply to through traffic, but shall be subject to alteration on one month's notice as provided in clause 4.
One month's notice required of tariff al- terations relating to through traffic.	CLAUSE 4.—No alteration of rate, fare, classification, rules or conditions relating to through traffic shall be made by either Company without one month's previous notice to the other.
Responsibility for collection of charges.	CLAUSE 5.—I. Each Railway shall be responsible for collecting all charges due to the other on all received traffic with the exceptions noted below, for which the forwarding Railway shall be responsible. <ol style="list-style-type: none">(1). Charges on live stock of every description.(2). Charges on all perishable articles booked either as goods or parcels.(3). Charges on Commissariat and Ordnance stores booked as prepaid.(4). All errors under Rs. 20 either way in freight paid by credit note or ledger account.(5). Undercharges in fares of passenger tickets, freight on passengers' luggage, and in charges for insurance.(6). Charges on all articles booked and carried with owner. II. The receiving Railway shall not reduce below the charge mentioned in the invoice or through way bill without consent of the forwarding Company, except in the case of overcharges, the evident result of errors in classification, or computation of freight.
Distances from Junction.	CLAUSE 6.—I. The distances between Jubbulpore and the stations of each Railway respectively, shall be supplied by each Railway to the other from time to time.
Rates to be fur- nished in lump sums.	II. But the actual amounts to be charged by each Company upon through traffic shall be furnished by the other Company, in the form of station to station rates in lump sums, in order to avoid any calculation of charges according to distance by stations.
Telegrams.	CLAUSE 7.—Telegrams on the joint business of the two Companies shall be inter- changed free.

- Through mail service.** **CLAUSE 8.**—As far as can be arranged from time to time, a daily through mail service shall be maintained between Howrah and Bombay. The stock necessary for this purpose shall run through upon the usual mileage terms as defined in clause 20, but as far as possible the Traffic Managers of the two Railways shall arrange to adjust the mileage account so that the payments by each Company to the other may be equalized.
- Exchange of goods stock.** **CLAUSE 9.**—The interchange of goods stock between the two Railways shall extend to the whole of the lines of either Company and to branches that may be worked by them, as well as to all other Railways with which there is through Railway communication.
- Exchange of coaching stock.** **CLAUSE 10.**—The exchange of coaching stock to be subject in extent to mutual agreement between the respective Railways.
- Trans-shipment.** **CLAUSE 11.**—I. The contents of any wagon which do not aggregate 81 maunds of through traffic shall be trans-shipped at Jubbulpore.
II. The Traffic Managers shall be at liberty to make exceptions by mutual agreement as to the amount to be trans-shipped in case of consignments which from their bulk or weight fully occupy a wagon, or require exceptional care, such as furniture, glass-ware, stationery, millinery, pictures, musical instruments, &c., &c.
- Division sheets.** **CLAUSE 12.**—The Audit offices of the two Companies shall exchange weekly division sheets: each Company to have in division its own rates and fares as quoted for through traffic in accordance with clause 3, except in the case of minimum charges common to both lines which shall be divided by mileage, and to account for all inwards through traffic within six weeks from the date the invoices pass Jubbulpore Junction. A monthly settlement of accounts based on division sheets, bills and statements as rendered, shall be made by transfer certificate on the understanding that all errors brought to notice will be adjusted without delay in subsequent accounts by the responsible Company.
- Oiling and greasing vehicles.** **CLAUSE 13.**—I. Each Company shall make its own arrangements for oiling and greasing vehicles leaving Jubbulpore Junction.
II. Arrangements for oiling, &c., of engines, to be made by the Locomotive Superintendents of the two Companies.
- Responsibility regarding rolling stock.** **CLAUSE 14.**—I. So soon as the rolling stock of either Company passes into the custody or possession of the other Company, such other Company shall be responsible for all and every contingency that may arise from the use of such stock, while it remains in their possession. Except that when the contingency is clearly traceable to defect of material or workmanship, the actual repair or replacement of the vehicle in which there was such defect, but not of any other vehicle, or any other consequent damage, shall be at the expense of the owning Company.
II. The cost of repairs arising from ordinary wear and tear shall be always borne by the owning Company; but cases of palpable damage (such as dropping heavy weights into wagons and so damaging the bottoms, neglect of greasing or oiling, and other similar neglects), and all cases of accidents or collision, shall be borne by the Company in whose custody or possession the stock may be at the time the damage occurs.
III. When stock is damaged in such a way as to admit of its running to the owning line for repairs, this course shall be adopted. If the damage is slight, but still of such a nature as to prevent the wagon from running (*e. g.*, a broken buffer), the repairs may be effected by the foreign Railway, and for such material as may be sent by the owning Company for the necessary repairs no freight shall be charged for any line over which it may be carried; but when the damage is very serious, the vehicle shall be loaded up for transport to the owning line.
- Liability as regards cost of repairs to stock.** **IV.** Six additional days shall be allowed in case of damage to the stock of either Railway on the line of another Railway for the repairs of such stock, and no demurrage shall be charged for those six days. But if the damage is such as will require longer than six days to complete the repair, the stock shall be returned to the owning Railway. If not sent within the six additional days, whether repaired or not, demurrage shall be charged after the expiration of the six days unless specially exempted by the Traffic Manager of the owning Railway.
- Sending home damaged stock unable to run home.** **V.** Unless the claim for the cost of repairs of damaged stock be sent to the Company responsible for the payment of it, within three months of the time at which the repairs are completed, the claim shall be forfeited.
- Free time allowed for damaged stock.** **VI.** If the cost of repairs to, or replacement of, damaged stock be not paid within three months from the date of submission of claim, interest thereon shall be chargeable at the rate of 5 per cent. per annum, from the date of submission of claim.
- Forfeiture of cost of repairs.** **VII.** Notice shall be sent within two months by each Railway to the other in all cases how and when the damage took place and the nature of it, and if not so sent, any time free of demurrage shall not be claimed.
- Interest chargeable on cost of repairs.** **CLAUSE 15.**—I. No goods damageable by fire, or goods sheeted, shall be allowed to the owning Company in open wagons except under special arrangement, provided in clause 34.
- Notice of damage**
Damage in open wag.

II. But when open trucks laden with damageable goods are accepted, the receiving Company shall become liable for subsequent damage, provided the goods are handed over under a description implying that they are damageable by fire, water or atmospheric causes.

Limits of E. I. Ry. jurisdiction at Jubbulpore.

CLAUSE 16.—The East Indian Railway Company shall take charge of the Railway from the distant signal on the Bombay side of the Jubbulpore station, and for the purpose of these arrangements their liability shall commence at that point in accordance with the spirit of the Agreement made between the Boards of Directors referred to in clause 17.

Agreement relating to Jubbulpore Junction.

CLAUSE 17.—The staff of the joint station at Jubbulpore shall deal with all through and local traffic of both Railways in terms of the arrangement made by the Boards of Directors of the two Companies, and specified in the following paras I to VI, except that instead of each Company paying one-half of the entire cost of station staff as is provided in para. II, the cost of the joint station working, including all the station staff, shall be apportioned in proportion to the number of passengers and the weight of goods traffic, local and through, using the station. The division of expenses of maintenance and renewal of such parts of the station premises, sidings, &c., as are used in common by both Railways, shall be divided equally between the two Companies as provided in para. II.

I. The Great Indian Peninsula Railway Company to pay an annual rental calculated at the rate of seven and a half ($7\frac{1}{2}$) per cent. upon half the expenditure agreed upon between the Chief Engineers of the two Companies, as the necessary expenditure on the station for working the traffic of the two lines.

II. Each Company to pay one-half of the entire cost of the station staff, and of maintenance and renewal of such parts of station works as are used in common by both Companies.

III. Each Company to have equal rights in respect of the occupation of the station and of the use of the station staff.

IV. The Company which appoints the Station Master and staff, shall be responsible for accidents or injury to rolling stock or traffic within the station or any limits within which the said staff takes charge of the same arising from any default of that staff, and for any loss from undue delay or obstructions to traffic caused by any acts, whether of commission or omission, of the station staff.

V. The station staff to be appointed by the Agent of the East Indian Railway Company.

VI. The trains of the Great Indian Peninsula Railway to be under the orders of the station staff at a signal to be placed one mile on the Bombay side from the Junction.

Handing over stock at Junction.

CLAUSE 18.—I. All stock shall be considered as handed over when entered in the number-taker's book at the Junction station, and it shall be so entered directly it is put into the lines or sidings in which such stock is usually placed for that purpose. No charge shall be made for demurrage on East Indian and Great Indian Peninsula Railway wagons at Jubbulpore unless they contain through loads, in which case the time free of demurrage as provided in clause 22 shall commence from the time of entry in the number-taker's books.

Number-takers.

II. The number-taker or takers shall be included in the joint staff, and work under instructions approved by the Traffic Managers of both Companies.

Definition of coaching and merchandise vehicles.

CLAUSE 19.—Passenger carriages, horse boxes, carriage trucks, brake-vans, passenger road or luggage vans, shall be in all cases reckoned as coaching vehicles, whether they run upon passenger or goods trains. All other kinds of vehicles shall be reckoned as goods vehicles.

Mileage charges.

CLAUSE 20.—I. A mileage charge of seven pies shall be fixed for coaching vehicles, both on the outwards journey and in returning, double horse boxes when containing more than three horses counting as two vehicles, but no mileage shall be charged on vehicles of the following description when returning empty to the owning Company's line.—

Horse boxes.	}	Hospital carriages.
Carriage trucks.		Prison vans.
Special carriages not used for ordinary traffic.		

II. Mileage shall be paid to the sending Railway for goods vehicles of all descriptions at the rate of two-thirds ($\frac{2}{3}$) of a pie per ton, or fraction of a ton of goods conveyed in either direction in such vehicles, in respect of every mile a goods vehicle of one Railway may carry goods on the line of the other Railway or any Railway connected therewith.

III. Mileage shall be paid on the weight entered in invoice for charges.

IV. Mileage shall not be charged on merchandise vehicles when running empty.

Time allowed free of demurrage. Coaching vehicles.

CLAUSE 21.—Coaching vehicles sent through from one Railway to the other or any line beyond shall be allowed one hour for every $12\frac{1}{2}$ miles or portion of $12\frac{1}{2}$ miles run going and returning, and 24 hours extra at destination, free of demurrage.

Time allowed free of demurrage.

CLAUSE 22.—I. No demurrage shall be charged on the wagons from either Company sent through to the line of the other Company of any line beyond, provided they are

- Merchandise vehicles, returned within the time arrived at by allowing one hour for every $6\frac{1}{2}$ miles or portion of $6\frac{1}{2}$ miles run in going and returning; mileage to be reckoned on the total distance run foreign in each direction separately. 24 hours shall be allowed at destination for unloading and 24 hours for re-loading, and 12 hours shall be allowed at intermediate stations for each of these operations.
- II. But no allowance shall be made for detention at junctions.
- Demurrage charges. **CLAUSE 23.**—On vehicles detained beyond the time named in clauses 14, 21 and 22 demurrage shall be charged as follows:—
Coaching Vehicles—At the rate of eight annas per hour.
Merchandise Vehicles—At the rate of one anna per ton of carrying capacity per hour.
- Loading vehicles short of owing line. **CLAUSE 24.**—In case any merchandise vehicles are loaded on the homeward journey to any station short of or not beyond the Junction with the owing Railway, the Audit offices of the respective Companies shall duly and correctly account for the same in their mileage returns to each other, and the mileage charges due under clause 20 shall be allowed to the owing Railway for the distance the vehicles are run loaded.
- Penalty for mis-sending. **CLAUSE 25**—I. No return vehicle shall be run, whether loaded or empty, unless otherwise mutually arranged, on any other than the exact route to its own line by which it was received, under a penalty of rupees twenty-two per diem from the time it was mis-sent, until it returns to a station on the route by which it was received.
- Calculation of penalty. II. In calculating penalty the date on which the vehicle is wrongly sent shall be included, and the date on which it returns to station on the route by which it was received shall be omitted.
- III. Vehicles may be loaded on their return journey to any station on the owing line or beyond.
- IV. Penalty shall be paid in every instance when a vehicle is mis-sent even if it should reach the owing line within the time allowed under clauses 21 and 22.
- Liability of line originating mis-sending. V. For the wrong running of a vehicle on the Railway which mis-sends it, penalty shall be levied as provided in the first paragraph of this clause, but for the wrong running on a Railway other than the Railway which originates the mis-sending, the time on which to calculate the penalty recoverable from the Railway originating the mis-sending shall be determined in the case of merchandise vehicles at the rate of one hour for every $6\frac{1}{2}$ miles or portion of $6\frac{1}{2}$ miles wrongly run by the vehicle, together with 24 hours at destination for unloading, and in the case of coaching vehicles at the rate of one hour for every $12\frac{1}{2}$ miles or portion of $12\frac{1}{2}$ miles, and 24 hours extra, any detention in excess of this time to be charged against the detaining Railway at the demurrage rate provided in clause 23. The penalty of Rs. 22 shall be leviable for 24 hours or part thereof.
- VI. Penalty paying vehicles shall also be subject to the provisions of clauses 20 and 26.
- Trans-shipment to prevent wrong running. VII. If a vehicle be loaded with goods for a station the running to which would take the vehicle out of its exact route homeward, and the load be trans-shipped at some point before the vehicle runs out of its proper route, the vehicle then running home by the proper route, then no penalty shall be due on the vehicle, but only mileage for the distance it ran loaded.
- VIII. The Auditors of the respective Companies shall specially advise each other whenever a vehicle has been mis-sent.
- Owing line to receive mileage and penalty dues. **CLAUSE 26.**—Whatever amount is paid for mileage and penalty for wrong sending by any Railway for the use of vehicles of other Railways, shall in all cases belong to and be paid over to the owing Railway.
- Inspection of accounts. **CLAUSE 27.**—The accounts referring to any mileage or demurrage question in which any sending Railway is concerned shall be open to the inspection of such Railway.
- Definition of through traffic. **CLAUSE 28.**—I. Through traffic shall be understood in all cases to mean coaching and merchandise traffic which may be booked or invoiced in accordance with the terms of this Agreement through from any station on one of the two contracting lines or any line beyond to any station on the other or any line beyond.
- II. Traffic booked or invoiced by either of the two Railways to or from Jubbulpore, is not to be considered as through traffic, although dealt with by the joint staff.
- Jubbulpore station books. **CLAUSE 29.**—The Jubbulpore station books shall be kept by the joint staff, but all such books and all through goods shall be at all times open to inspection by an authorized officer of either Company.
- Goods claims. **CLAUSE 30**—I. Goods claims shall be settled by the Company in whose custody the loss or damage occurred, and when this cannot be ascertained with certainty, the claim shall be paid in mileage proportion, but in such cases the consent of both Companies shall be obtained before settlement is made.

- Statements as to through wagon loads. II. Each Company shall accept the statements of the other Company with respect to the loads of wagons, unless the number-takers at the Junction notice and record that the loads have been interfered with, when the actual contents and their condition must be ascertained and recorded by a responsible officer of the joint staff, failing which the sending Company's statement shall be accepted.
- Trans-shipments at Jubbulpore. CLAUSE 31.—All trans-shipments at Jubbulpore shall be performed by the joint staff, or under arrangements to be made by the two Traffic Managers, the cost to be divided in the same way as other joint station expenses.
- The week. Returns. CLAUSE 32.—I. The week shall in all cases end at 12 o'clock on Saturday night. When the 30th June and 31st December do not fall on a Saturday, two returns shall be rendered, one for the period commencing from the first day of the last week to the end of the month, and another from the first day of the next month up to and including the first Saturday of that month.
- The day. *Dies non*. II. The day shall in all cases be reckoned as 24 hours commencing at 12 o'clock at night, part of a day being reckoned as a day. Madras time shall be adopted in all cases. Sundays, Christmas day and Good Friday shall be treated as ordinary working days, and no *dies non* shall be allowed.
- Forwarding Railway to accept wagons for back loading. CLAUSE 33.—The receiving Railway may call upon the forwarding Railway to accept empty wagons for back loading with a view to equalize the ton-mileage.
- Receiving Railway to supply wagons for back loading. CLAUSE 34.—I. The Railway on which through traffic originates shall provide wagons for such traffic. But when the through traffic offering is more than the wagon stock of the sending Railway can cope with, it may call on the receiving Railway to place a certain daily average capacity of wagon stock at its disposal at the Junction for traffic to, and *via* the receiving line; and in the event of failure to comply within one week, the sending line shall be entitled to charge two pies per ton-mile on all traffic to the extent of the wagon stock short supplied, which it may send through in its own stock; provided that the receiving Railway shall not be required to supply more wagons than sufficient to maintain an equal interchange of stock based on the carrying capacity. Open wagons shall be accepted if supplied with proper sheets and ropes.
- II. The sending Railway shall pay mileage at the rate specified in clause 20 on all through traffic with which such wagons are returned to the owning line.
- Extension of Agreement to connected lines. CLAUSE 35.—The principle of this Agreement shall be extended by each Company to any other Company working in connection with it, the two Companies, parties to the Agreement, being responsible to each other for all through traffic so forwarded.
- Construction of Agreement. Settlement by arbitration. CLAUSE 36.—All questions which may arise in carrying out these arrangements upon which the Traffic Managers of the two Companies cannot agree, shall be referred to the Agents of the respective Companies, and in case of any difference of opinion between the two Companies as to the construction of any part of this Agreement or as to its application to any particular case, it shall be open to either Company to call for an arbitration to be conducted in the ordinary way.
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APPENDIX K.

WORKING AGREEMENT BETWEEN THE EAST INDIAN AND OUDH AND ROHILKHAND RAILWAYS.

Extract from Minutes of East Indian Railway Official Meeting No. 46 held at Calcutta on the 18th September, 1879; Resolution No. 1166.

- Duration of Agreement. This Agreement shall come into force, on and from the 1st September, 1879, and shall be subject to revision from time to time, but shall remain in force until the expiration of six months' notice from either Company desiring to revise or cancel it, except as regards any clause in respect of which a shorter term of notice is specially fixed.
- Extent of through booking. **CLAUSE 1.—I.** All descriptions of coaching and merchandise traffic shall be booked unrestrictedly between stations on each line, save and except such small stations as may from time to time be specially exempted by either Company.
- II. No passengers, horses, dogs, or carriages shall be booked through *via* the Benares route.
- III. No coaching traffic, parcels only excepted, shall be booked to Calcutta.
- Charges and regulations affecting through traffic. **CLAUSE 2.—I.** The through rates, fares and charges shall be the sum of the local rates, fares and charges of the two Companies as published from time to time in the printed tariff of each Company.
- II. The rules and conditions in force in respect of local traffic on either Railway shall apply to through traffic.
- III. No exception to this clause, and no alteration in the published rates, fares, charges, rules and conditions affecting through traffic shall be made unless one month's notice shall have previously been given to the Traffic Management of the other Railway by the Traffic Management of the Railway intending to make any such exception or alteration.
- One month's notice required of tariff alterations affecting through traffic.
- Minimum charges. **IV.** In all cases of minimum charges on through consignments, the East Indian Railway and Oudh and Rohilkhand Railway shall be taken as one line.
- Responsibility regarding collection of charges. **CLAUSE 3.—I.** Each Railway shall be responsible for collecting all charges due to the other on all received traffic with the exceptions noted below, for which the forwarding Railway shall be responsible :—
- (1). Charges on live stock of every description.
 - (2). Charges on all perishable articles booked either as goods or parcels.
 - (3). Charges on all articles booked and carried with owner.
 - (4). Charges on Commissariat and Ordnance stores booked as prepaid.
 - (5). For errors under Rs. 20 either way in freight paid by credit note or a ledger account.
 - (6). Undercharges in fares of passenger tickets, freight on passengers' luggage and in charges for insurance.
- II. The receiving Railway shall not reduce below the charge mentioned in the invoice or through way bill without the consent of the forwarding Railway, except in the case of overcharges, the evident result of error in classification or computation of freight.
- Reducing below invoice charge.
- Telegrams. **CLAUSE 4.—**Telegrams on the joint business of the two Companies shall be interchanged free.
- Distances for calculating freight charges. **CLAUSE 5.—I.** The distance between East Indian Railway stations and Oudh and Rohilkhand Railway stations for computing charges shall be those given in the published tariff of the respective Companies.
- II. But the rates and fares to be charged by either Company shall be furnished in lump sums, in the form of station to station rates and not at mileage rates for subsequent computation by stations.
- Rates and fares to be furnished in lump sums.
- Working of Allyghur Junction. **CLAUSE 6.—**The Allyghur Junction station shall be worked by the East Indian Railway Company, who shall appoint a joint staff to deal with all through and local traffic of both Companies, coaching and merchandise, and the cost of the joint station working including staff shall be apportioned in proportion to the number of passengers and the weight of goods using the station in local and through traffic between the two lines.
- Working of Cawnpore Junction. **CLAUSE 7.—I.** The Cawnpore Junction shall be worked by a joint staff to be appointed by the East Indian Railway: the cost of that staff and of stores supplied for their use, and also the cost of shunting to be apportioned between the through and local traffic

in proportion to the weight of goods and number of passengers: the East Indian Railway to bear the whole of the amount apportioned to local traffic, the amount apportioned to through traffic to be divided equally between the two Companies.

Payment in respect of Junction accommodation.

II. That in respect of accommodation, &c., at Cawnpore and Allyghur Junctions, the Oudh and Rohilkhand Railway shall pay to the East Indian Railway such rent as may be agreed upon from time to time between the two Companies.

Limit of jurisdiction at Junctions.

CLAUSE 8.—The East Indian Railway shall take charge of the Allyghur Junction station from and including the Oudh and Rohilkhand Railway auxiliary signal, and all shunting and train working done within the limits of the East Indian Railway yard shall be done by East Indian Railway Locomotives, payment for such work being arranged under clause 35 of this Agreement. But this is not to prevent the Oudh and Rohilkhand Railway Company's engines from working on the Oudh and Rohilkhand lines proper within the Allyghur station.

II. As regards the Junction at Cawnpore, the Oudh and Rohilkhand Railway shall bring their trains by their own engines into the East Indian Railway yard, so as to allow the East Indian Railway engines to attach to the rear of such trains and to take them to the East Indian Railway station.

Left luggage and demurrage receipts at Junctions.

CLAUSE 9. Receipts from left luggage and demurrage on local goods at Cawnpore and Allyghur Junctions shall be credited to the East Indian Railway, which Railway is responsible for the safe custody of luggage and local goods.

No pontage to be charged for Cawnpore Bridge.

CLAUSE 10.—No pontage shall be charged by the Oudh and Rohilkhand Railway for the Cawnpore Bridge unless one month's previous notice shall have been given by the Agent of the Oudh and Rohilkhand Railway to the Agent of the East Indian Railway.

Division sheets.

CLAUSE 11.—The Audit officers of the two Companies shall exchange weekly division sheets: each Company to have in division its local rates and fares except in the case of minimum charges common to both lines which shall be divided in mileage proportion, and to account for all inwards through traffic within six weeks from the date the invoices pass the Junction. A monthly settlement of accounts based on division sheets, bills and statements as rendered, shall be made by transfer certificate, on the understanding that all errors brought to notice will be adjusted without delay in subsequent accounts by the responsible Company.

Extent of interchange of stock.

CLAUSE 12.—The interchange of goods stock between the two Companies shall extend to the whole of the lines of either Company, to branches that may be worked by them respectively, as well as to other Railways working in connection with the East Indian Railway and the Oudh and Rohilkhand Railway, but coaching stock shall be exchanged only under arrangements to be made between the two Traffic Managers, or their representatives on the spot, as may be necessary for public convenience, except in the case of loaded horse boxes or luggage vans and carriage trucks which may be run through to destination on either line, or lines beyond, without restriction as in the case of goods vehicles.

Trans-shipment at Junctions.

CLAUSE 13.—I. The contents of any wagon which do not aggregate (81) eighty-one maunds of through traffic shall be trans-shipped at the Junction.

II. The Traffic Managements of the two Companies shall be at liberty to make exceptions by mutual agreement as to the amount to be trans-shipped in cases of consignments which from their bulk or weight fully occupy a wagon or require exceptional care, such as furniture, glassware, stationery, millinery, pictures, musical instruments, &c., &c.

Oiling or greasing vehicles.

CLAUSE 14.—All vehicles shall be oiled or greased when necessary at the Junctions by the Company towards whose line such vehicles are about to travel.

Responsibility regarding rolling stock

CLAUSE 15.—I. So soon as the rolling stock of either Company passes into the custody or the possession of the other Company, such other Company shall be responsible for all and every contingency that may arise from the use of such stock while it remains in their possession. Except that, when the contingency is clearly traceable to defect of material or workmanship, the actual repair or replacement of the vehicle in which there was such defect but not of any other vehicle or any other consequent damage shall be at the expense of the owning Company.

Liability as regards cost of repairs to stock.

II. The cost of repairs arising from ordinary wear and tear shall be always borne by the owning Company, but in cases of palpable damage (such as by dropping heavy weights into wagons, and so damaging the bottoms, neglect of greasing or oiling and other similar neglects), and in all cases of accident or collision, the cost of repairs shall be borne by the Company in whose custody or possession the stock may be at the time the damage occurs.

Sending home damaged stock. Stock unable to run home.

III. When stock is damaged in such a way as to admit of its running to the owning line for repairs, this course shall be adopted. If the damage is slight, but still of such a nature as to prevent the wagon from running (e.g., a broken buffer), the repair may be effected by the foreign Railway, and for such material as may be sent by the owning Company for the necessary repairs no freight shall be charged for any line over which it may be carried, but when the damage is very serious, the vehicle shall be loaded up for transport to the owning line.

APPENDIX K—*continued.*

- Free time allowed for damaged stock. IV. Six additional days shall be allowed in case of damage to the stock of either Railway on the line of another Railway for the repairs of such stock, and no demurrage shall be charged for those six days. But if in the opinion of the Carriage Superintendent, the damage is such as will require longer than six days to complete the repair, the stock shall be returned to the owning Railway. If not sent within the six additional days, whether repaired or not, demurrage shall be charged after the expiration of the six days unless specially exempted by the Traffic Manager of the owning Railway.
- Notice of damage to stock. V. Notice shall be sent within two months to the owning Railway, through the respective Traffic Managements in all cases, how and when the damage took place and the nature of it, and if not so sent, any time free of demurrage shall not be claimed.
- Forfeiture of cost of repairs. VI. Unless the claim for the cost of repairs of damaged stock be sent to the Company which is responsible for the payment of it within three months of the time at which the repairs are completed, the claim shall be forfeited.
- Interest chargeable on cost of repairs. VII. If the cost of repairs to, or replacement of, damaged stock be not paid within three months from the date of submission of claim, interest thereon shall be chargeable at the rate of 5 per cent. per annum from the date of submission of claim.
- Damageable goods in open trucks. CLAUSE 16.—I. No goods damageable by fire or water, or goods sheeted, shall be allowed to leave the owning line in open wagons, except under special arrangement and except as provided in clause 20.
II. But when open trucks laden with damageable goods are accepted, the receiving Company shall become liable for subsequent damage, provided the goods are handed over under a description implying that they are damageable by fire, water, or atmospheric causes.
- Number-taker. CLAUSE 17.—A number-taker shall note the arrival and departure of every train passing the Junction, and enter in writing in his books the number and description of every vehicle arriving at and leaving the station, giving trains and dates, and distinguishing, in goods traffic, empty from loaded and covered from open vehicles, and furnishing the necessary returns for both Companies, such number-taker or takers to be joint servants of both Companies, and to work under instructions approved by the Traffic Managers of both Companies.
- Forwarding Railway to accept wagons for back loading. CLAUSE 18.—The receiving Railway may call upon the forwarding Railway to accept empty wagons for back loading, provided that return loads are available, with a view to equalize the ton-mileage.
- Handing over stock at Junction. CLAUSE 19.—All stock shall be considered as handed over when entered in the number-taker's book at the Junction station, and it shall be so entered directly it is put into the lines or sidings in which such stock is usually placed for that purpose.
- Receiving Railway to supply wagons for back loading. CLAUSE 20 —I. The Railway on which through traffic originates shall provide wagons for such traffic. But when the through traffic offering is more than the wagon stock of the sending Railway can cope with, it may call on the receiving Railway to place a certain daily average capacity of wagon stock at its disposal at the Junction for traffic to and *via* the receiving line, and in the event of failure to comply within one week, the sending line shall be entitled to charge two pies per ton-mile on all traffic to the extent of the wagon stock short supplied which it may send through in its own stock; provided that the receiving Railway shall not be required to supply more wagons than sufficient to maintain an equal interchange of stock based on the carrying capacity. Open wagons to be accepted if supplied with proper sheets and ropes.
II. The sending Railway shall pay mileage at the rate specified in clause 22 on all through traffic with which such wagons are returned to the owning line.
- Definition of coaching and merchandise vehicles. CLAUSE 21.—Passenger carriages, horse boxes, carriage trucks, brake-vans and passenger, road or luggage vans, shall be, in all cases, reckoned as coaching vehicles, irrespective of load or whether they run upon passenger or goods trains. All other kinds of vehicles shall be reckoned as goods vehicles.
- Mileage charges. CLAUSE 22.—I. A mileage charge of seven pies shall be fixed for coaching vehicles both on the outwards journey and in returning, double horse boxes when containing more than three horses to be counted as two vehicles, but no mileage shall be charged on vehicles of the following description when returning empty to the owning Company's line:—
Horse boxes. | Hospital carriages.
Carriage trucks. | Prison vans.
Special carriages not used for ordinary traffic.
II. Mileage shall be paid to the sending Railway for goods vehicles of all descriptions at the rate of ($\frac{2}{3}$ rds) two-thirds of a pie per ton or fraction of a ton of goods conveyed in either direction in such vehicles, in respect of every mile a goods vehicle of one Railway may carry goods on the line of the other Railway, or any Railway connected therewith.
III. Mileage shall be paid on the weight entered in invoice for charges.
CLAUSE 23.—Mileage shall not be charged on merchandise vehicles when running empty.

- Time allowed free of demurrage. Coaching vehicles. **CLAUSE 24.**—Coaching vehicles sent through from one Railway to the other or any line beyond to be allowed one hour for every (12½) twelve-and-a-half miles or portion of 12½ miles run in going and returning, and (24) twenty-four hours extra at destination, free of demurrage.
- Time allowed free of demurrage. Merchandise vehicles. **CLAUSE 25.**—I. No demurrage shall be charged on the wagons from either Company sent through to the line of the other Company or any line beyond, provided they are returned within the time arrived at by allowing one hour for every (6½) six and a half miles or portion of (6½) six-and-a-half miles run in going and returning, mileage to be reckoned on the total distance run foreign in each direction separately. (24) twenty-four hours shall be allowed at destination for unloading, and (24) twenty-four hours for re-loading, and (12) twelve hours shall be allowed at intermediate stations for each of these operations.
II. But no allowance shall be made for detention at Junctions.
- Demurrage charges. **CLAUSE 26.**—On vehicles detained beyond the time named in clauses 15, 24 and 25, demurrage shall be charged as follows:—
Coaching Vehicles—At the rate of (8) eight annas per hour.
Merchandise Vehicles—At the rate of (1) one anna per ton of carrying capacity per hour.
- Loading vehicles short of owning line. **CLAUSE 27.**—In case any merchandise vehicles are loaded on the homeward journey to any station short of or not beyond the Junction with the owning Railway, the Audit offices of the respective Companies shall duly and correctly account for the same in their mileage returns to each other, and the mileage charges due under clause 22 shall be allowed to the owning Railway for the distance the vehicles are run loaded. When in such cases the distance run loaded is over two or more Railways, each line shall pay its proper share of the mileage charges.
- Route for return vehicles. Penalty for mis-sending. **CLAUSE 28.**—I. All vehicles loaded and empty, shall be returned to the Junction from which they were received, and no return vehicle shall be run, whether loaded or empty unless otherwise mutually arranged, on any other than the exact route to its own line by which it was received, under a penalty of (22) twenty-two rupees per diem from the time it was mis-sent until it returns to a station on the route by which it was received.
II. In calculating penalty, the date on which the vehicle is wrongly sent shall be included, and the date on which it returns to a station on the route by which it was received shall be omitted.
III. Vehicles may be loaded on their return journey to any station on the owning line, and on lines beyond working in conjunction therewith subject to the conditions of this Agreement.
- Diverting vehicles to branches. **IV.** Either Company may divert a vehicle belonging to the other Company to any short branches of its own (*viz.*, the Singharron, Burrakur, or Kurhurballee branches on the East Indian Railway or the Byramghat branch on the Oudh and Rohilkhand Railway) for a load for the owning line. This paragraph to be subject to alteration on one month's notice.
V. Penalty is to be paid in every instance when a vehicle is mis-sent, even if it should reach the owning railway within the time allowed under clauses 24 and 25.
- Liability of line originating mis-sending. **VI.** For the wrong running of a vehicle on the Railway which mis-sends it, penalty shall be levied as provided in the first paragraph of this clause, but for the wrong running on a Railway other than the Railway which originates the mis-sending, the time on which to calculate the penalty recoverable from the Railway originating the mis-sending shall be determined in the case of merchandise vehicles at the rate of one hour for every 6½ miles or portion of 6½ miles wrongly run by the vehicle, together with 24 hours for unloading at destination, and in the case of coaching vehicles at the rate of one hour for every 12½ miles or portion of 12½ miles and 24 hours extra, any detention of vehicles in excess of this time to be charged against the detaining Railway at the demurrage rate provided in clause 26. The penalty of Rs. 22 shall be leviable for 24 hours or part thereof.
- Trans-shipment to prevent wrong running. **VII.** Penalty paying vehicles shall also be subject to the provisions of clauses 22 and 29.
VIII. If a vehicle be loaded with goods for a station, the running to which would take the vehicle out of its exact route homewards, and the load be trans-shipped at some point before the vehicle runs out of its proper route, the vehicle then running home by the proper route, then no penalty shall be due on the vehicle, but only mileage for the distance it ran loaded.
IX. The Auditors of the respective Companies shall specially advise each other whenever a vehicle has been mis-sent.
- Owning line to receive mileage and penalty dues. **CLAUSE 29.**—Whatever amount is paid for mileage, and penalty for wrong sending by any Railway for the use of vehicles of other Railways, shall in all cases belong to and be paid over to the owning Railway.
- Inspection of accounts. **CLAUSE 30.**—The accounts referring to any mileage or demurrage question in which any sending Railway is concerned shall be open to the inspection of such Railway.

- Definition of through traffic.** **CLAUSE 31.**—Through traffic is to be understood in all cases to mean traffic which may be booked or invoiced through in accordance with the terms of this Agreement, from any station on one of the two contracting lines, to any station on the other, or to or from any station of any other Railway working in connection with the East Indian and Oudh and Rohilkhand Railways.
- Goods claims.** **CLAUSE 32.**—Goods claims shall be settled by the Company in whose custody the loss or damage may have occurred, and when this cannot be ascertained with certainty, the claim shall be paid in mileage proportion, but in such cases the consent of both Companies shall be obtained before settlement is made.
- Statement as to through wagon loads.** **CLAUSE 33.**—Each Company shall accept the statement of the other Company with respect to the loads of wagons, unless the number-taker at the Junction notice and record that the loads have been interfered with, when the actual contents and their condition must be ascertained and recorded by a responsible officer of the joint staff, failing which, the sending Company's statement is to be accepted.
- Handling of O. & R. Ry. local traffic at Allyghur.** **CLAUSE 34.**—Local goods traffic of the Oudh and Rohilkhand Railway received at or despatched from the Allyghur Junction shall be handled by the East Indian Railway contractors at the current rates, the charge to be paid in the first instance by the East Indian Railway, and debited in account to the Oudh and Rohilkhand Railway.
- Payment for Junction station accommodation.** **CLAUSE 35.**—The terms of payment for Junction station accommodation, shunting, use of lines, tank, well, &c., shall be from time to time arranged between the Agencies of the two Companies.
- The week. Returns.** **CLAUSE 36.**—The week shall in all cases end at 12 o'clock on Saturday night. When the 30th June and 31st December do not fall on a Saturday, two returns shall be rendered, one for the days from date of last return to the last day of the half-year ending on the 30th June or 31st December as the case may be, and the other for the commencing days of the next half-year up to and including the first Saturday.
- The day.** **CLAUSE 37.**—The day shall in all cases be reckoned as (24) twenty-four hours, commencing at 12 o'clock at night, part of a day to be reckoned as a day. Madras time shall be adopted in all cases. Sundays, Christmas day and Good Friday shall be treated as ordinary working days, and no *dies non* shall be allowed.
- Extension of Agreement to connected lines.** **CLAUSE 38.**—The principle of this Agreement shall be extended by each Company to any other Railways working in connection with it, the two Companies, parties to this Agreement being responsible to each other for all through traffic so forwarded.
- Construction of Agreement settlement by arbitration.** **CLAUSE 39.**—All questions which may arise in carrying out these arrangements, upon which the Traffic Managers of the two Companies cannot agree, shall be referred to the Agents of the respective Companies, and in case of any difference of opinion between the two Companies as to the construction of any part of this Agreement, or as to its application to any particular case, it shall be open to either Company to call for an arbitration, to be conducted in the ordinary way.

APPENDIX L.

REVISED ARRANGEMENTS IN LIEU OF CLAUSE 29 OF THE WORKING AGREEMENT DATED SEPTEMBER 1st, 1879, BETWEEN THE SIND, PUNJAB AND DELHI AND THE EAST INDIAN RAILWAYS. (SEE ALSO APPENDIX H.)

(a).—LINE FROM GHAZEEABAD JUNCTION INTO DELHI STATION.

1. From and after the 1st April, 1881, the Sind, Punjab and Delhi Railway shall run and haul their own trains over the East Indian Railway line between Ghazeeabad and Delhi, and have the joint use of the Delhi-Shahdera Station and Sidings upon the following conditions :—

2. The Sind, Punjab and Delhi Railway passenger and mixed trains shall be worked into and from the present East Indian Railway passenger station.

3. The Sind, Punjab and Delhi Railway goods trains shall be worked into the Sind, Punjab and Delhi Railway Company's own yard and station.

4. All merchandise traffic between Delhi and stations on the Sind, Punjab and Delhi Railway, shall be booked by the Sind, Punjab and Delhi Railway Company, and carried by its own trains.

5. All coaching traffic to Sind, Punjab and Delhi Railway stations originating at Delhi or Delhi-Shahdera stations, shall be booked by the East Indian Railway Company, and carried in Sind, Punjab and Delhi Railway Company's trains, and all coaching traffic booked in Sind, Punjab and Delhi Railway trains and terminating at Delhi and Delhi-Shahdera stations, shall be received and dealt with by the East Indian Railway Company.

6. All through goods traffic from Sind, Punjab and Delhi Railway stations to the Rajputana-Malwa State Railway and *vice versa*, shall be made over at Ghazeeabad and hauled on East Indian Railway trains between Ghazeeabad and Delhi Junctions, subject to the usual arrangements for through booking. All outwards Rajputana-Malwa State Railway goods from Delhi to Sind, Punjab and Delhi Railway shall be loaded in Sind, Punjab and Delhi Railway wagons.

7. Passengers and luggage may be booked by Sind, Punjab and Delhi Railway trains between Ghazeeabad, Delhi, Delhi-Shahdera stations, and stations on the Rajputana-Malwa State Railway and connected lines, but no other class of traffic either coaching or goods shall be booked in Sind, Punjab and Delhi Railway trains between those points.

8. The East Indian Railway shall be entitled to all the traffic earnings attributable to the length of line between Ghazeeabad Junction and Delhi station, and carried in Sind, Punjab and Delhi Railway trains, such traffic earnings being calculated upon a length of 13 miles at the rates and fares per mile received by the Sind, Punjab and Delhi Railway for each class of traffic. But in the event of any considerable reduction in the rates and fares of the Sind, Punjab and Delhi Railway without previous consent of the East Indian Railway, the amount of rebate to be allowed to the Sind, Punjab and Delhi Railway under Clause 9 shall be proportionately reduced.

9. The Sind, Punjab and Delhi Railway Company in consideration of performing the haulage and necessary train service, and, in the case of the goods traffic, of providing station and shed accommodation, as well as station staff, shall be entitled to the following rebates upon the traffic earnings referred to in Clause 8, that is to say :—

On Coaching traffic 25 per cent.

On Goods „ 50 „

10. For mileage and demurrage purposes, the line between Ghazeeabad and Delhi shall be treated as part of the Sind, Punjab and Delhi Railway system; no charge being made to East Indian Railway for vehicles of Sind, Punjab and Delhi Railway and connected lines, unless they are attached to East Indian Railway trains for East Indian Railway service, but the Sind, Punjab and Delhi Railway shall pay the usual mileage and demurrage charges on all vehicles belonging to East Indian Railway and connected lines when used for Sind, Punjab and Delhi Railway service on Sind, Punjab and Delhi Railway trains. Empty East Indian Railway stock may be considered as returned to the parent line at Delhi. No stock of East Indian Railway and connected lines shall be attached to Sind, Punjab and Delhi Railway trains starting from Delhi, except by previous arrangement with the Traffic Department of the Sind, Punjab and Delhi Railway.

11. The Sind, Punjab and Delhi Railway shall be entitled to store on the premises of the East Indian Railway at Delhi, a sufficient number of spare vehicles to provide for the exigencies of the traffic arising at that station, but shall not use the station as a depôt for surplus stock.

A charge of 2 annas per vehicle per mile shall be credited to the traffic earnings referred to in Clause 8 for all vehicles attached to a Sind, Punjab and Delhi Railway train running over the line in *both directions without load*, but no charge shall be made for vehicles running empty in one direction and loaded on the other.

APPENDIX M.

PROPOSED TERMS FOR WORKING OF THE SINDIA STATE RAILWAY.

*Extract from East Indian Railway Official Meeting No. 47, held at Calcutta on 4th November, 1880;
Resolution No. 1106.*

Submitted Draft Memorandum of the proposed terms for working the Sindia State Railway, North Section.

Read the following:—

Demi-official letter, dated Simla, 21st October, 1879, from General Trevor to B. Leshe, Esq.

“About Sindia Railway I have not heard from Luard’s office, but if you can agree to the following terms we may arrange matters:—

- “1.—East Indian Railway Company to take over the Sindia Line as far as Dholepore station from 1st January, 1880, and to work and maintain it as an extension of their Toondla-Agra Branch, providing all necessary stock, traffic and maintenance as well as Locomotive staff.
- “2.—The same tariff of rates and fares to be in force on the Dholepore extension as on the East Indian Railway.
- “3.—The Company to be paid for working and for use of their stock the same rate per traffic train mile as may have been incurred by them in the working of their line in the half-year, with an addition of three annas per train mile for extra cost of coal due to longer lead.
- “4.—Company to be guaranteed against any actual loss in carrying on working of Dholepore extension, the loss to be computed for actual extra charges incurred by the Company in having undertaken extra work, and not to include charges for establishment that would have had to be kept up by the Company whether they had charge or not of the extension.
- “5.—In case the Company in any one year lay out larger sums on the maintenance of the extension than on the maintenance of their own line, the difference to be made good by Government and vice versa.
- “6.—The net profits at the end of each half-year to be divided between the Government and the Company in the proportion of $\frac{2}{3}$ ths to the former and $\frac{1}{3}$ ths to the latter.
- “7.—The agreement to stay in force till the completion of the Chumbul bridge, and to be terminable on that date or on six months’ notice from either side.

“I have put in an addition of three annas to the ordinary mileage rate on main line instead of Jubbulpore rate, as that will be non-existent after the close of the year, three annas fully covers the difference of cost of fuel in main and Jubbulpore lines.

“I have also put in a clause that if we guarantee you against excess maintenance charges, you in the other hand return us the difference in case you do not spend as much on our line as you do on your own. I have made this clause extend over the year not half-year.

“I propose the agreement should come into force on the 1st of next year. But I hope you will take over the working a little earlier in order to enable us to open on the other side of the river on that date.”

Letter No. 841G, dated Calcutta, 21st November, 1879, from the Agent, East Indian Railway, to the Consulting Engineer to the Government of India for Guaranteed Railways, Calcutta.

“I have the honor to attach copy of a demi-official letter, dated 21st ultimo, from General Trevor, proposing terms for working the Sindia State Railway as far as Dholepore by this Company.

“The terms on the whole appear to me to be such as the Company can accept, but as regards the stipulations of paras. 4 and 5, some modification seems to be desirable.

“Para. 4 provides that the Company shall be guaranteed against actual loss, that is, as explained when the Company’s remuneration calculated as laid down in para. 3, is not sufficient to cover the Company’s expenditure on the working of the Sindia line which would not have been incurred unless in working this line, the Government will make good the balance. And para. 5 provides that if the actual cost of maintenance of permanent way should be less than the cost on the East Indian Railway, the Company shall charge Govern-

ment the actual cost. Practically these provisions will render it necessary to keep up accounts of the expenditure incurred on account of the Sindia line, and it would seem if such accounts are to be prepared, almost as well to charge to the Sindia line the actual cost of working at once—I would therefore propose as the simpler plan that the East Indian Railway train mile rates be merely charged for working and maintenance generally, and that when the receipts from the traffic on the Sindia line are not sufficient to pay the Company's charges calculated on this basis, the Government make good the difference.

"With this modification all the terms proposed by General Trevor are accepted provisionally as an experimental measure, subject to the sanction of the Board of Directors.

"I understand that the Government of India are anxious that the Company should take over the working of the Sindia State line with as little delay as possible, and I therefore desire not to cause delay by further discussion of the terms and conditions at present. An endeavour will be made to take over the working of the Sindia line by the 15th or 20th proximo."

Agent's letter to the Board of Directors, East Indian Railway Company London, No. 173, dated Calcutta, 28th November, 1879.

"PARA. 23. WORKING THE SINDIA STATE RAILWAY BY THE EAST INDIAN RAILWAY COMPANY.—I have lately been in communication with General Trevor, the Director General of Railways, regarding a proposal that this Company shall work the Sindia line for the present, as far as Dholepore, a distance of 37 miles from Agra. The proposal is limited to the length to Dholepore, because the river Chumbal which runs south of that station is at present unbridged, and there is in consequence no connection with the southern extension of the Sindia line. The Government are anxious that the Company should take over the working as soon as possible to admit of the traffic staff and rolling stock now on the Agra to Dholepore section being transferred across the river for service in the length south of the Chumbal to Gwalior. In this view General Trevor in a demi-official letter, dated 21st ultimo, proposed certain terms on which the Company should take over the working, and with one or two modifications I have accepted these terms provisionally as an experimental measure subject to the Board's sanction. The terms as modified by me are as follows:—

"(1).—The East Indian Railway Company to take over the Sindia line as far as Dholepore station and work and maintain it as an extension of their Agra Branch, providing all necessary stock and traffic maintenance and locomotive staff.

"(2).—The East Indian Railway tariff rates and fares to be in force on the Sindia line worked by the East Indian Railway.

"(3).—The Company to be paid for working and for use of their stock the same rate per traffic train mile as may have been incurred by them in working the East Indian Railway for the same period, with an addition of 3 annas per train mile for extra cost of coal due to longer lead from the collieries.

"(4).—If the revenue of the Sindia line should not be sufficient to pay the Company's charges calculated on this basis, Government to make good the deficiency.

"(5).—The net profits at the end of each half-year to be divided between the Government and the Company in the proportion of $\frac{3}{5}$ ths to the former, and $\frac{2}{5}$ ths to the latter.

"(6).—The arrangement to continue in force until the completion of the Chumbal Bridge, and to be terminable on that date or on six months' notice from either side.

"The rate per traffic train mile includes repairs and maintenance of stock, but nothing for interest on cost of stock, so that if receipts fall short of working expenses calculated on this basis this Company will have obtained no return for its stock working on the Sindia Railway; but as it is probable the receipts will exceed the working expenses, the Company's share of the net profits may be assumed to include the remuneration for use of rolling stock.

"General Trevor has not yet signified his acceptance of the terms as modified, but when he does so I will advise the Board.

In order to meet the views of Government, the Traffic Manager is arranging to work the traffic as far as Dholepore from the 15th proximo."

Letter No. 046 R.T. of 31st December, 1879, from the Government of India, P. W. D., to the Consulting Engineer to the Government of India for Guaranteed Railways, Calcutta, (received with Consulting Engineer's docket No. 31 of 5th January, 1880).

"Referring to your letter No. 4629 of the 1st instant, I am directed to state that the proposed modifications suggested by Mr. Leslie in the terms for working the Agra-Dholepore Railway, may be accepted, provided it be clearly understood that "the East Indian Railway train mile rates" referred to in the 3rd para. of Mr. Leslie's letter are the actual rates and not the enhanced rates previously agreed upon as noted in the 3rd para. of General Trevor's demi-official note."

Letter No. 33G, dated 16th January, 1880, from the Agent East India Railway Company, to the Consulting Engineer to the Government of India for Guaranteed Railways, Calcutta.

"With reference to letter No. 046 R.T. of 31st ultimo from the Government of India, P. W. Depart-

ment, copy received under your docket No. 31 of 5th instant, I have the honor to remark that there appears to be some misapprehension regarding the tenor of my letter No. 841G of 21st November last. In this letter I suggested certain modifications in the terms proposed by General Trevor, but the modifications so suggested were not intended to give this Company any increased benefit. They were put forward merely on the ground of greater convenience in giving effect to the arrangement proposed by General Trevor.

“The train mile rate referred to in my letter was therefore still the train mile rate as defined in the 3rd para. of General Trevor’s demi-official letter of the 21st October last, viz, the same rate per traffic train mile as may have been incurred by this Company in working the East Indian Railway in the half-year, with an addition of three annas per train mile for extra cost of coal due to longer lead.

“If there is no objection I will now have the arrangement recorded at an Official Meeting.”

Letter No. 092½ R.T., from the Government of India, P. W. D., to the Consulting Engineer to the Government of India for Guaranteed Railways, Calcutta, (received with Consulting Engineer’s docket No. 478 of 2nd February, 1880).

“In reply to the Consulting Engineer’s endorsement No. 284, dated 20th January, 1880, forwarding Agent, East Indian Railway Company’s letter, dated 16th instant, No. 33G, the undersigned is directed to state that the formal agreement can be drawn up as proposed by Mr. Leslie and forwarded for sanction of the Government of India.”

Letter No. 13, dated 6th February, 1880, from the Board of Directors East India Railway Company to their Agent.

“WORKING THE SINDIA STATE RAILWAY.—The Board have had under their consideration certain proposals set forth in para. 23 of your letter No. 173 of 28th November, for the working by the Company—in continuation of the Branch line service between the Toondla Junction and Agra—of that part of the Sindia State Railway, 37 miles in length, extending from Agra to the Chumbul River near Dholepore.

“It is proposed that—

- “(1). The East Indian Railway Company shall take over the Sindia line as far as Dholepore station, and work and maintain it as an extension of their Agra Branch, providing all necessary stock, and traffic, maintenance, and locomotive staff.
- “(2). That the East Indian Railway tariff rates and fares shall be in force on the Sindia line worked by the East Indian Railway.
- “(3). That the Company shall be paid for working, and for use of their stock, the same rate per traffic train mile as may have been incurred by them in working the East Indian Railway for the same period; with an addition of 3 annas per train mile for extra cost of coal, due to longer lead from the Collieries.
- “(4). That in the event of the revenue of the Sindia line not being sufficient to pay the Company’s charges calculated on this basis, Government shall make good the deficiency.
- “(5). That the net profits at the end of each half-year shall be divided between the Government and the Company, in the proportion of $\frac{3}{8}$ ths to the former and $\frac{5}{8}$ ths to the latter.
- “(6). That the arrangement shall continue in force until the completion of the Chumbul Bridge, and shall be terminable on that date, or on six months’ notice from either side.

“In section 45 of the new Contract, it is provided that the Secretary of State may require the Company ‘to work any auxiliary or Branch Railway of the same gauge, in connection with any Railway forming part of the Undertaking,’ on ‘such terms and conditions as may in each case be agreed upon.’

“As the Sindia State Railway appears to come within the definition of the section, it might be convenient to consider the proposals for working the line from that point of view, but, as the arrangement is, in this case, to be only temporary, the Board think that it would be better to make such an one as will enable the Government and the Company to judge what would be fair and reasonable on future occasions.

“It appears to the Board that whilst the Government, on the one hand, obtain the immediate advantage of the experience of the Company’s officers in the management and working of Railway Traffic, and are relieved of the cost of providing and maintaining Rolling and Locomotive Stock, the Company, on the other hand, are entitled to a reasonable expectation of a fair compensation for their extra responsibilities, and for the use of the stock of the Undertaking employed on the line.

“In the opinion of the Board, the terms proposed require further consideration. An allowance for the cost of working the line, and for the use of the Company’s Stock, upon the basis of the ‘same rate per traffic train mile as may have been incurred by them in working the East Indian Railway, for the same period,’ even with an ‘addition of 3 annas per train mile for extra cost of coal,’ can afford no fair standard of remuneration for the services to be rendered, and for the use of the stock. It is evident that the cost per train mile in the case of the main line of the East Indian Railway, where the train mileage is equal to an average of eight trains a day, each way, must be less than the cost of any train mileage that can be expected on the Sindia line, where, for some time to come, the mileage will hardly exceed two trains each way, inasmuch as the general working charges, which form a large proportion of the whole, will be spread over a much greater area in the former case than in the latter.

"Unless, therefore, some other plan can be devised for assessing the working cost, having in view the differing conditions of the main line and proposed branch service, it appears to the Board that it will be necessary, however much it may be deprecated on the ground of convenience, to keep for a time, until the results shall have been ascertained by experience, a separate account of the working of any lines not taken into and forming part of the Undertaking. Such a plan might be made on the principle of a scale in which the limited service required on the branch line should bear a given proportion to the traffic service on the main line.

"It appears to the Board that the Company should be allowed a fair charge to cover interest on the Capital invested in the Locomotive and Rolling Stock employed to work the line;—also that the Government should undertake to find the Capital required for all buildings and fixed plant, necessary for working the line;—and that questions as to maintenance of the way, works, and buildings, should rest on the same basis as that upon which the general Undertaking is worked.

"It is proposed that the arrangement shall continue in force until the completion of the Chumbul bridge, and be terminable on that date, or on six months' notice on either side. The Board have no information regarding the bridge, and can only therefore sanction an arrangement terminable by notice.

"The Board will have no objection to a temporary arrangement being entered into, subject to the modifications suggested in this letter, and to further consideration of the terms of any contract for a prolonged period of time. In the meanwhile, they have to request you to forward, for their better information, a descriptive account of the line in general terms, and some account also of the traffic upon it since it was opened to the public in 1877."

Letter No. 178G, dated Calcutta, 15th March, 1880, from the Agent, East Indian Railway Company, to the Consulting Engineer.

"With reference to letter No. 092½R.T., dated 24th January, 1880, from the Government of India in the P. W. Department, copy received under your docket No. 478, dated 2nd ultimo, regarding the terms on which this Company is to work the North Sindia line, I have the honor to invite attention to letter No. 13, dated 6th ultimo, from the Board of Directors (copy attached), in which they state that in their opinion the terms proposed require further consideration.

"In order to give effect to the views of the Board, I have under preparation a draft of the terms for working the North Sindia line on the basis indicated by the Board, and I hope to communicate these terms shortly.

"It should, I have the honor to remark, be understood that the terms which may ultimately be agreed upon will have retrospective effect on and from the 16th December last, the date from which the Company commenced working the line."

Letter No. 380R.T., dated Simla, 21st May, 1880, from Government of India, P. W. D., to the Consulting Engineer to Government of India for Guaranteed Railways, Calcutta, (received with Consulting Engineer's docket No. 2068 of 27th idem).

"I am directed to acknowledge the receipt of your endorsement No. 1110, dated the 19th March, 1880, forwarding copy of a letter No. 178G of the 15th idem, from the Agent of the East Indian Railway, with enclosure, on the subject of the proposed terms for the working of the Sindia State Railway.

"2. I am to state that after giving careful consideration to the suggestions of the Board of Directors contained in their letter No. 13 of 6th February, 1880, the Government of India is not disposed to allow the East Indian Railway Company to work the Sindia State Railway in terms of actual cost. The terms will have to be arranged on a basis not dissimilar to that proposed by the Government of India, and the Agent of the Company ought now, after 6 months' experience, to be able to put forward some proposal which will be fair to his Company as well to Government."

Letter No. 606G, dated Calcutta, 14th August, 1880, from the Agent, East Indian Railway Company, to the Consulting Engineer.

"I have the honor to acknowledge receipt of your letter No. 3211 of the 10th instant, drawing attention to your docket No. 2068 of the 27th May last, with regard to the terms upon which it is proposed that the Company should work the Sindia State Railway as a part of the Undertaking, and to state that before entering into further discussion with a view to deciding such terms, I should be glad to be favored with the remarks of the Government of India on the views put forward in my letter No. 469G of the 28th June last on the subject of the Company's position under the Contract in respect of taking over State branch railways as a part of the Undertaking of the East Indian Railway."

Letter No. 1112R.T., dated Simla, 14th September, 1880, from Government of India, P. W. D., to the Consulting Engineer to Government of India for Guaranteed Railways, Calcutta, (received with Consulting Engineer's docket No. 3777 of 18th idem).

"I am directed to acknowledge the receipt of your endorsement No. 3376, dated the 19th August, 1880, and annexure, and in reply to communicate the following remarks on the question of the terms for the working of the State Branch lines by the East Indian Railway Company,

"2. In his letter No. 469G, dated the 28th June, 1880, the Agent intimates that if a branch line is

fully equipped, Government might require the Railway Company to work it at the same percentage on gross earnings as their own line. This proposal seems unobjectionable; but there are two points connected with it that require elucidation, viz., first, the State Branch lines are generally devoid of equipment; and, secondly, some arrangement is needed as to how provision should be made for additions and improvements demanded by the Company.

“3. As regards the equipment of the line, I am to observe that interest on the value of the Rolling Stock, both locomotive and coaching and goods of the East Indian Railway Company, is equal to about $3\frac{1}{2}$ per cent. on the annual receipts. As besides Rolling Stock, the equipment of a line includes workshops, &c., the Government of India will, instead of equipping branches, be ready to allow 5 per cent. on gross earnings, for use of equipment.

“4. With reference to the question of the incidence of charges for improvements debitable to Capital account, the Government of India would propose that the Company carry out the improvements, &c., they consider necessary, on the same conditions as on their own Undertaking, *i. e.*, the Government to find the money and the Company to re-imburse to Government the interest on it as provided in Section 28 of the Contract.

“5. I am to state that the Government of India will be glad to hear that the above proposals have the concurrence of the Agent of the Company.”

Resolved, that the above correspondence be recorded for reference to the Board of Directors as to the proposal of the Government of India, the accounts of the line being in the meantime provisionally kept on the terms laid down in General Trevor's demi-official letter of 21st October, 1879, as modified in the letter of the 21st November, 1879, from the Agent to the Consulting Engineer. On a final settlement being come to of the terms and conditions on which the line shall be worked, these terms to have retrospective effect to the date of the line being taken over by the Company, say from the 1st January, 1880.

APPENDIX N.

WORKING AGREEMENT BETWEEN THE EAST INDIAN AND THE NALHATI STATE RAILWAYS.

Extract from East Indian Official Meeting No. 64, held at Calcutta on 31st December, 1879, Resolution No. 1580.

Submitted Officiating Consulting Engineer's docket No. 4956 of 23rd December, 1879, and connected correspondence; also the revised Working Agreement between the East Indian and the Nalhati State Railway.

In supersession of Resolution 403 of Official Meeting No. 30, held on 16th May, 1872,—and in continuation of Resolution 1166 of Official Meeting No. 46, held on 18th September, 1879—

RESOLVED, that the following revised Working Agreement be recorded, with effect from 1st October, 1879:—

Extent of through booking.	<p>“CLAUSE 1.—That goods and parcels of all kinds be booked through between any station on the East Indian Railway and any station on the Nalhati State Railway, except such small stations as may be excluded by the Traffic Managers of the two lines.</p> <p>“Also that passengers and their luggage be booked through between Azimgunge station on the Nalhati State Railway and all stations on the East Indian Railway at which such traffic is booked.</p>
Through rates and fares.	<p>“CLAUSE 2.—That the through rates, fares and charges be the sum of the local rates fares and charges of the two Railways, as published in the printed tariffs of each Railway.</p>
Charges and regulations affecting through traffic.	<p>“That the rates and conditions in force in respect of local traffic on either Railway shall apply to through traffic, and no exception shall be made to this Clause unless one month's notice shall have been given to the management of the other Railway by the Management of the Railway intending to make any such exception.</p>
Definition of through traffic.	<p>“CLAUSE 3.—Through traffic is to be understood in all cases to mean coaching and merchandise traffic which may be booked or invoiced in accordance with the terms of this agreement through from any station on one of the two contracting lines to any station on the other.</p>
Rules for calculating freight.	<p>“CLAUSE 4.—That the East Indian Railway rules for calculating freight be adopted by the Nalhati State Railway, but that each Railway shall quote lump sum station-to-station rates and not mileage rates.</p>
Responsibility regarding collection of charges.	<p>“CLAUSE 5.—That each Railway shall be responsible for collecting all charges due to the other on all received traffic with the exceptions noted below, for which the forwarding Railway shall be responsible—</p> <ol style="list-style-type: none">(1). Charges on Live stock of every description.(2). Charges on all perishable articles booked either as goods or parcels.(3). Charges on Commissariat and Ordnance stores booked as prepaid.(4). Errors under Rs. 20 either way in freight paid by credit note or ledger account.(5). Undercharges in fares of passenger tickets, freight on passengers' luggage, and in charges for insurance.(6). Charges on all articles booked and carried with owner.
Trans-shipment of coal not to be charged for.	<p>“CLAUSE 6.—No charge shall be made for trans-shipment of coal, the work being done free of charge by the Nalhati State Railway.</p>
Minimum charge.	<p>“CLAUSE 7.—The lowest payment to the Nalhati State Railway for any single consignment of goods passing over the Nalhati State Railway line will be One Rupee, the East Indian Railway minimum charge being One Rupee.</p>
Cost of trans-shipment of goods other than coal to be borne equally by both Railways.	<p>“CLAUSE 8.—The cost of the trans-shipment of goods (except coal as specified in Clause 6) at the Nalhati station shall be borne equally by both Railways, either the East Indian Railway Company or the Nalhati State Railway, as may be agreed upon, doing the work at rates which shall be agreed to by both Railways.</p>
Telegrams.	<p>“CLAUSE 9.—That telegrams on the joint business of the two Railways be interchanged free.</p>
Accounts.	<p>“That neither Railway shall make any charge to the other in respect of the accounts necessary for through traffic and the division of freight.</p>

- Division sheets. "CLAUSE 10.—That the Audit offices of the two Railways exchange weekly division sheets: each Railway to have in division its local rates and fares and to account for all inwards through traffic within six weeks from the date the Invoices pass the Junction. That a monthly settlement of accounts, based on division sheets, bills and statements as rendered be made by transfer certificate on the understanding that all errors brought to notice will be adjusted without delay in subsequent accounts by the responsible Railway.
- Through traffic to have no preference over local traffic. "CLAUSE 11.—Through traffic to or from either Railway shall have no preference in any respect over traffic tendered for despatch locally at Nalhati.
- Deficiency of rolling stock. "CLAUSE 12.—If at any time either line should find itself unable either from want of vehicle stock or engine power or from any cause beyond its own control to receive and forward all the traffic tendered or likely to be tendered by the other line, it shall be competent to the receiving line, to give notice (of not less than fourteen days) to the said other line of the maximum quantity it will be prepared to receive and forward, and of the period during which the restriction will be necessary, and during such period the said Railway shall not be bound to receive more than the quantity so specified.
- Claims for compensation. "CLAUSE 13.—That goods claims be settled by the Railway in whose custody the loss or damage occurred; that when this cannot be ascertained with certainty, the claim be paid in mileage proportion, but in such cases the consent of both Railways shall be obtained before settlement is made.
- Extension of agreement to connected lines. "CLAUSE 14.—That the principle of this agreement be extended by each Railway to any other Railway working in connection with it, the two Railways, parties to the agreement, being responsible to each other for all through traffic so forwarded.
- Construction of agreement. Settlement by arbitration. "CLAUSE 15.—All questions which may arise in carrying out these arrangements, upon which the Traffic Managers of the two Railways cannot agree, shall be referred to the Agent of the East Indian Railway, and the Director of State Railways, North-Eastern System, or other Controlling Officer, and in case of any difference of opinion between the two Railways as to the construction of any part of this agreement, or as to its application to any particular case, it shall be open to either Railway to call for an arbitration, to be conducted in the ordinary way.
- Duration of agreement. "CLAUSE 16.—This agreement shall terminate on the expiration of two months' notice from either party desiring to withdraw from it."

APPENDIX O.

WORKING AGREEMENT BETWEEN THE BHAVNAGAR-GONDAL AND BOMBAY, BARODA AND CENTRAL INDIA RAILWAYS FOR WORKING THE WADHWAN JUNCTION STATION.

AGREEMENT proposed between Bhavnagar-Gondal Railway and the Bombay, Baroda and Central India Railway Company for the interchange of Traffic between the Bhavnagar-Gondal Railway and the Bombay, Baroda and Central India Railway (hereafter called the Railway Company).

1. This agreement for interchange of traffic and working to be in force for one year from 1st January, 1882, and subsequently until the expiration of not less than six months' notice, which may be given either by the Bhavnagar-Gondal Railway or the Bombay, Baroda and Central India Railway Company at any time, but which is to expire only on the 30th June or the 31st December in any year.

2. During the continuance of this agreement the Bhavnagar-Gondal Railway will be entitled to work their trains into and out of the Station provided for the purpose at Wadhwan Junction, having the joint and equal use of the booking offices, goods sheds, platforms, and all other premises and buildings.

3. The cost of erecting all other premises which are used for traffic purposes by both Railways, and of such alterations and additions as may be, from time to time, required to be used in common by both Railways, is to be ascertained, and the plans and estimates of future alterations and additions are to be agreed upon, from time to time, between the two Railways before any new work is commenced. The expenditure thus incurred and agreed upon is to be provided by the Railway Company, and an annual rental at the rate of seven-and-a-half per cent. upon the total amount spent, from time to time, is to be charged to a "Joint Station Expenses" Account.

4. The actual cost for maintenance and renewal of such parts of the Station premises as are used in common by both Railways for traffic purposes, and as are charged against Revenue, is to be also debited to the "Joint Station Expenses" Account.

5. The cost of laying in and maintaining such of the sidings as are required by the Bhavnagar-Gondal Railway within the limits of the Wadhwan Junction Station, from time to time, is to be borne by the Bhavnagar-Gondal Railway, and the cost of laying in and maintaining such of the sidings as are required, from time to time, within the limits of that Station, by the Railway Company, is to be borne by the Railway Company.

6. Upon the termination of this agreement the Bhavnagar-Gondal Railway is to compensate the Railway Company, at the time of the expiry of this agreement, for any expenditure upon Station buildings, sheds or premises which the Railway Company may have incurred in order to accommodate the traffic of the Bhavnagar-Gondal Railway. The amount of compensation to be paid to the Railway Company to be agreed upon by the Consulting Engineer to the Government of Bombay and the Chief Engineers of the two Railways, due regard being given to the utilization of the premises by the Railway Company, or to the necessity for their removal; and inasmuch as under the provision of Clause 5 the Bhavnagar-Gondal Railway will lay in sidings upon land belonging to the Railway Company, it is expressly agreed that at the expiration of this agreement the Bhavnagar-Gondal Railway will at their own expense remove all such sidings from the Railway Company's land.

7. All the work of additions and alterations within the limits of the Railway Company's Station at Wadhwan Junction is to be done upon plans and estimates agreed upon, from time to time, before the work is commenced, and under the general control of the Engineer of the Railway Company. All maintenance within the limits of the Station is also to be done under the general control of the Railway Company's Engineers.

8. This agreement is not to be held as giving to the Bhavnagar-Gondal Railway any authority or permission or right to erect buildings or sheds, or lay in sidings, &c, within the Railway Company's boundaries at Wadhwan Junction Station, except as provided for herein, and any notice to terminate this agreement is to be considered and accepted, as also notice of the withdrawal, from the expiration of such notice, of all the rights and privileges given under it to the Bhavnagar-Gondal Railway to enter or use the Railway Company's Station and land at Wadhwan Junction.

9. The Station staff at Wadhwan Junction will deal with all traffic, through as well as local, and the traffic of the two Railways is to be dealt with in the same manner, as if it belonged to one only, no undue preference being given to that relating to either Railway.

10. The staff at Wadhwan Junction Station to be appointed by the Railway Company who are to have the exclusive control of the stations and sidings, &c, within the Station limits. It is, however, hereby agreed that their staff shall comply with all reasonable requests and instructions of the Traffic Department of the Bhavnagar-Gondal Railway as to the mode and manner of conducting such duties, to receive and comply with all circulars issued for guidance of the Bhavnagar-Gondal Railway staff, whether issued by the Traffic Superintendent in regard to make-up of trains or other details of working the Bhavnagar-Gondal Railway traffic, or from the Bhavnagar-Gondal Railway Audit Office in regard to rendering accounts, dealing with cash, &c., which may arrive in Bhavnagar-Gondal Railway trains from Stations outside the limits of this agreement.

11. The distant signals on either side of the Wadhwan Junction Station, both on the Bhavnagar-Gondal Railway and on the Bombay, Baroda and Central India Railway are to be considered and accepted as the limits of the Station, and the trains and engines and traffic as well as the staff of both Railways are to be under the control of the Station staff at Wadhwan Junction within the limits of the Station as thus defined. The whole of the Station staff employed at Wadhwan Junction to be paid by the Bombay, Baroda and Central India Railway Company.
12. The staff of the Bhavnagar-Gondal Railway are, while within the limits of the Wadhwan Junction Station, to obey and to be bound by all the rules and regulations, and also all instructions which may be from time to time in force, or which may be issued by the authorities of the Railway Company, who are to have the same rights and control over the staff of the Bhavnagar-Gondal Railway while within the limits of that Station as if they were the staff of the Railway Company itself.
13. Passengers of all classes, luggage, parcels, dogs, &c., are to be booked through between such Stations of both Railways with which the Railway Company may have through booking arrangements as may be, from time to time, arranged between the Traffic Superintendent of the Bhavnagar-Gondal Railway and the Traffic Manager of the Bombay, Baroda and Central India Railway.
14. Goods are to be invoiced and booked through to and from all goods booking stations on both Railways, and also between all goods-booking Stations of other Railways with which the Bombay, Baroda and Central India Railway book through, from time to time.
15. Consignments of goods of not less than 14 seers in weight are to be booked through between the two Railways, but the minimum charge upon goods traffic booked through is to be for 20 seers, and no less charge is to be made than eight annas upon goods traffic, or than eight annas upon parcels traffic, booked through.
16. Packages of less than 14 seers in weight are to be booked through as parcels. The minimum charge is to be divided in mileage proportion between the two Railways.
17. Each Railway is to supply the other, from time to time, with the rates and fares between Wadhwan Junction and their respective Stations. The through rates and fares are to be in all cases the sum of the local rates and fares of each Railway to Wadhwan Junction, including terminals and cartage. Inasmuch as the gauges of the two Railways are different, all goods, &c, will have to be trans-shipped at Wadhwan Junction, but no terminals at the interchange Station will be charged by either Railway upon through traffic.
18. Traffic booked between Stations of the Railway Company and of the Bhavnagar-Gondal Railway except Wadhwan Junction, or between Stations of Railways reached *via* Bombay, Baroda and Central India Railway and Stations of the Bhavnagar-Gondal Railway, is to be considered as through traffic.
19. Traffic booked by either Railway to the Wadhwan Junction Station is to be considered as local traffic.
20. No alteration of rates or fares or classification affecting the through traffic is to be made by either Railway without one month's previous notice to the other, and such notices are to be given only by the Traffic Superintendent of the Bhavnagar-Gondal Railway and the Traffic Manager of the Bombay, Baroda and Central India Railway to each other respectively.
21. Each Railway is to be responsible for collecting the proportion due to the other Railway upon all through traffic and upon goods traffic invoiced through "to pay." The receiving Station is to check the invoices, and to be responsible for collecting any amounts that may be undercharged by the forwarding Station, but the receiving Station is not to reduce below the charge mentioned in invoice or through way bill without the consent of the forwarding Railway, except only in cases of errors in rate or calculation, which may be corrected.
22. The mileages to Wadhwan Junction from Stations on each Railway are to be taken in regard to all charges and all arrangements made in this agreement at the distances which may be quoted, from time to time, by each Railway.
23. The Division of the receipts on through traffic is to be carried out weekly by the Audit offices of the two Railways, without reference to the end of a month, except on the 30th of June and 31st of December in each year, when returns for odd days completing those months respectively will be required, and the traffic will be divided up to the end of those months accordingly. The weekly accounts are to be made up to Saturdays inclusive, and settlements are to be made monthly on accounts which are to be closed on the last Saturday of each month. And each Railway is to have in such division its own local rates and fares, except in the case of minimum charges, which are to be divided as provided for in Clause 15.
24. Each Railway will be responsible for greasing and oiling, and for the examination and proper condition of stock leaving Wadhwan Junction Station for their own lines respectively.
25. The Station staff at Wadhwan Junction are to submit all such statements, returns, &c., as either Railway may require, direct to the authorities of that Railway, from time to time.
26. The through traffic books and statements, &c, of all sorts at Wadhwan Junction, and all through goods, are to be at all times open to inspection by any authorized Officers of either Railway.
27. All sums realized by the sale of lost property, unclaimed goods, licenses, &c., collected at Wadhwan Junction are to be credited to the "Joint Station Expenses" Account.
28. The cost of the Joint Station working, including staff and all expenditure which is in accordance with this agreement (after deducting credits as per preceding clause), to be charged against the "Joint Sta-

tion Expenses" Account, and paid by the two Railways in proportion to the weight of the total traffic, through and local (less Railway material), of each Railway in and out of the Station. The weight to be considered as due to the coaching traffic is to be ascertained upon the basis laid down in Schedule A, clause 35, of this Agreement.

29. Telegrams on the joint business of the two Railways to be interchanged free.

30. The account for Joint Station Expenses under Clause 28 to be submitted by the Railway Company to the Bhavnagar-Gondal Railway within two months after the end of each half-year, and to be paid within one month after submission.

31. The division of traffic receipts under Clauses 13 to 19 to be settled by the Railway Company and the Bhavnagar-Gondal Railway by cash payment.

32. Upon all amounts due as above, the accounts for which are not settled as rendered (errors being subsequently adjusted) within the specified time as named above, interest at the rate of five per cent. per annum is to be paid until the money is actually paid by the Bhavnagar-Gondal Railway to the Railway Company, or by the Railway Company to the Bhavnagar-Gondal Railway, as the case may be.

33. All questions of dispute which may arise in carrying out these arrangements as to the construction of any part of this agreement, or its application to any particular case, or as to the cost of the Station to be used in common, or as to the amount for which either Railway is liable for damage of stock, or injury or loss, at the Junction Station, or with respect to any other questions which may arise, to be settled by arbitration, in some way to be arranged by the Committee of Management of the Bhavnagar-Gondal Railway and the Board of Directors of the Railway Company.

34. This agreement to be subject to the sanction of the Board of Directors of the Railway Company, of the Government of Bombay, and of the Government of India.

SCHEDULE A.

35. The following are the weights to be allowed under the provisions of Clause 28 of this Agreement for each description of coaching traffic, viz.—

1. For each passenger, of whatever class	..	..	..	..	..	1 cwt.
For each child's ticket	..	..	..	..	..	56 lbs.
2. For each horse or head of horned cattle	..	..	..	..	..	1 ton.
3. For each sheep, calf, goat, or pig	..	..	..	..	..	56 lbs.
4. For each dog or other small animal	..	..	..	..	..	1 cwt.
5. Parcels at actual weight.						
6. Carriage, each	..	..	..	..	..	3 tons.

SCHEDULE B.

36. The cost of buildings, &c., at Wadhwan is as follows:—

	Rs.	A.	P.
Station building, including platform	29,661	8	0
Latrines	260	4	0
Servants' Quarters	1,899	3	0
Police Quarters	1,735	12	0
Bungalow for Refreshment Rooms	20,541	2	0
Total	54,098	0	0
The portion therefore chargeable to Bhavnagar-Gondal Railway is	27,048	0	0
And the amount of rent to be charged monthly at $7\frac{1}{2}$ per cent. (<i>vide</i> para. 3 of the Agreement) will be	169	0	0
Plus rent of land for use of Station yard	10	0	0
Total	179	0	0
Less $7\frac{1}{2}$ per cent. on value of sidings paid by Bhavnagar-Gondal Railway, viz. :—	30	0	0
Net charge monthly	149	0	0

APPENDIX P.

WORKING AGREEMENT BETWEEN THE INDUS VALLEY AND SIND, PUNJAB AND DELHI RAILWAYS. (SEE ALSO APPENDIX Q.)

- Duration of Agreement.** **CLAUSE 1.**—This Agreement shall come into force on and from the and shall be subject to revision from time to time, but shall remain in force until the expiration of three months' notice from either Railway desiring to revise or cancel it, except as regards any clauses in respect of which a shorter term of notice is specially fixed.
- Extent of through booking.** **CLAUSE 2.**—Traffic of all kinds shall be booked through between any station on the Indus Valley Railway and any station on the Sind, Punjab and Delhi Railway except such small stations as may be excluded by the Traffic Management of the two lines.
- Charges and regulations affecting through traffic.** **CLAUSE 3.**—I. The through rates, fares and charges shall be the sum of the local rates, fares and charges of the two Railways to Mooltan Cantonment or Kotri Junction as published in the printed tariff of each Railway, but terminal charges at the Junction shall be excluded from the through rates.
II. The rules and conditions in force in respect of local traffic on either Railway shall apply to through traffic.
- Minimum charges.** **III.** In cases of minimum charges common to both lines, the two lines shall be taken as one.
- One month's notice required of tariff alterations relating to through traffic.** **IV.** No exception to this clause, and no alteration in the published rates, fares, charges, rules, and conditions affecting through traffic, shall be made unless one month's notice shall have been given to the Traffic Management of the other Railway by the Traffic Management of the Railway intending to make any such exception or alteration.
- Responsibility regarding collection of charges.** **CLAUSE 4.**—I. Each Railway shall be responsible for collecting all charges due to the other on all received traffic with the exceptions noted below, for which the forwarding Railway shall be responsible :—
(1). Charges on live stock of every description.
(2). Charges on all perishable articles booked either as goods or parcels.
(3). Charges on Commissariat and Ordnance stores booked as pre-paid.
(4). Errors under Rs. 20 either way, in freight paid by credit note or ledger account.
(5). Undercharges in fares of passenger tickets, freight on passengers' luggage, and in charges for insurance.
(6). Charges on all articles booked and carried with owner.
II. The receiving Railway shall not reduce below the charge mentioned in the invoice or through way bill without the consent of the forwarding Railway except in the case of overcharges, the evident result of error in classification or computation of freight.
- Reducing invoice charge.**
- Distances for calculating freight charges.** **CLAUSE 5.**—I. The distances between the Indus Valley Railway stations and Mooltan Cantonment or Kotri and the distances between the Sind, Punjab and Delhi Railway stations and Mooltan Cantonment or Kotri Junction for computing charges shall be those given in the published tariffs of the respective Railways.
II. But the rates and fares to be charged by either Railway shall be furnished in lump sums in the form of station to station rates, and not at mileage rates for subsequent computation by stations.
- Rates and fares to be furnished in lump sums.**
- Telegrams.** **CLAUSE 6.** Telegrams on the joint business of the two Railways shall be interchanged free.
- Exchange of goods stock.** **CLAUSE 7.** The exchange of goods stock between the two Railways shall extend to the whole of the lines of either Railway and to branches that may be worked by them respectively, as well as to other Railways working in connection with the Indus Valley Railway and the Sind, Punjab and Delhi Railway.
- Exchange of coaching stock.** **CLAUSE 8.**—The exchange of coaching stock shall be subject in extent to mutual arrangement between the respective Railways.
- Forwarding Railway to accept wagons for back loading.** **CLAUSE 9.**—The receiving Railway may call upon the forwarding Railway to accept empty wagons for back loading with a view to equalize the ton-mileage.
This clause shall be brought into force only when the daily average excess of wagons

passing the Junction in one direction exceeds for one week thirty per diem, and in that case the forwarding Railway shall not be called upon to take more than one-third of such number in empties. The demurrage on these empties to be paid at the rate of two pies per ton of carrying capacity per hour instead of at the demurrage rate specified in clause 21.

Forty-eight hours' notice to be given by wire by the receiving Railway of its intention to forward empties.

Receiving Railway to supply wagons for back loading.

CLAUSE 10.—I. The Railway on which through traffic originates shall provide wagons for such traffic. But when the through traffic offering is more than the wagon stock of the sending Railway can cope with, it may call on the receiving Railway to place a certain daily average capacity of wagon stock at its disposal at the junction for traffic to, and *via* the receiving line; and in the event of failure to comply within one week, the sending line shall be entitled to charge two pies per ton-mile on all traffic to the extent of the wagon stock short supplied, which it may send through in its own stock, provided that the receiving Railway shall not be required to supply more wagons than sufficient to maintain an equal interchange of stock based on the carrying capacity. Open wagons shall be accepted if supplied with proper sheets and ropes.

II. The sending Railway shall pay mileage at the rate specified in clause 17 on all through traffic with which such wagons are returned to the owning line.

Trans-shipment at junction.

CLAUSE 11.—I. When the contents of any wagon aggregate less than 81 maunds of through traffic, such contents shall be trans-shipped at Mooltan Cantonment and Kotri Junction.

II. The Traffic Management of the two Railways shall be at liberty to make exceptions by mutual agreement as to the amount to be trans-shipped in case of consignments which from their bulk or weight fully occupy a wagon or require exceptional care, such as furniture, glassware, stationery, millinery, pictures, musical instruments, &c, &c.

Division sheets.

CLAUSE 12.—The Audit offices of the two Railways shall exchange weekly division sheets; each Railway to have in division its local rates and fares except in the case of minimum charges common to both lines which shall be divided by mileage, and to account for all inwards through traffic within six weeks from the date the invoices pass Mooltan Cantonment or Kotri Junction. A monthly settlement of accounts based on division sheets, bills and statements *as rendered* shall be made by transfer certificate on the understanding that all errors brought to notice will be adjusted without delay in subsequent accounts by the responsible Railway.

Responsibility regarding rolling stock.

CLAUSE 13.—I. So soon as the rolling stock of either Railway passes into the custody or possession of the other Railway, such other Railway shall be responsible for and all and every contingency that may arise from the use of such stock while it remains in their possession. Except that, when the contingency is clearly traceable to defect of material or workmanship, the actual repair or replacement of the vehicle in which there was such defect, but not of any other vehicle, or any other consequent damage, shall be effected at the expense of the owning Railway.

Liability as regards cost of repairs to stock.

II. The cost of repairs arising from ordinary wear and tear shall be always borne by the owning Railway, but cases of palpable damage (such as dropping heavy weights into wagons and so damaging the bottoms, neglect of greasing or oiling, and other similar neglects, and all cases of accidents or collisions shall be borne by the Railway in whose custody or possession the stock may be at the time the damage occurs.

Sending home damaged stock
Stock unable to run home.

III. When stock is damaged in such a way as to admit of its running to the owning line for repairs this course shall be adopted. If the damage is slight, but still of such a nature as to prevent the wagon from running (*e g*, a broken buffer), the repairs may be effected by the foreign Railway, and for such material as may be sent by the owning Railway for the necessary repairs no freight shall be charged for any line over which it may be carried, but when the damage is very serious, the vehicle shall be loaded up for transport to the owning line.

Free time allowed for damaged stock.

IV. Six additional days shall be allowed in case of damage to the stock of either Railway on the line of another Railway for the repairs of such stock, and no demurrage shall be charged for those six days. But if the damage is such as will require longer than six days to complete the repair, the stock shall be returned to the owning Railway. If not sent within the six additional days, whether repaired or not, demurrage shall be charged after the expiration of the six days unless specially exempted by the Traffic Management of the owning Railway.

Notice of damage to stock.

V. Notice shall be sent within two months to the owning Railway in all cases how and when the damage took place and the nature of it, and if not so sent, any time free of demurrage shall not be claimed.

Forfeiture of cost of repairs.

VI. Unless the claim for the cost of repairs of damaged stock be sent to the Railway which is responsible for the payment of such claim within three months of the time at which the repairs are completed, the claim shall be forfeited.

Interest chargeable on cost of repairs.

VII. If the cost of repairs to, or replacement of damaged stock, be not paid within

three months from the date of submission of claim, interest thereon shall be chargeable at the rate of 5 per cent. per annum from the date of submission of claim.

Damageable goods in open trucks.

CLAUSE 14.—I. No goods damageable by fire or water, or goods sheeted, shall be allowed to leave the line of the owning Railway in open wagons, except under special arrangement, and except as provided in clause 10.

II. But when open trucks laden with damageable goods are accepted, the receiving Railway shall become liable for subsequent damage, provided the goods are handed over under a description implying that they are damageable by fire, water, or atmospheric causes.

Handing over stock at junction.

CLAUSE 15.—I. All stock shall be considered as handed over when entered in the number-taker's book at the junction station, and it shall be so entered directly it is put into the lines or sidings in which such stock is usually placed for that purpose.

Number-takers.

II. The number-taker or takers to be joint servants of both Railways and work under instructions approved by the Traffic Management of both Railways.

Definition of coaching and merchandise stock.

CLAUSE 16.—Passenger carriages, horse boxes, carriage trucks, mail vans, brake-vans, passenger, road or luggage vans, shall be in all cases reckoned as coaching vehicles, whether they run upon passenger or goods trains. All other kinds of vehicles shall be reckoned as goods vehicles.

Mileage charges.

CLAUSE 17.—I. A mileage charge of 7 pies shall be made for coaching vehicles, both on the outwards journey and in returning, double horse boxes when containing more than three horses to be counted as two vehicles, but no mileage shall be charged on vehicles of the following descriptions when returning empty to the owning Company's line :—

Horse boxes.	|	Hospital carriages.
Carriage trucks.	|	Prison vans.
Special carriages not used for ordinary traffic.		

II. Mileage shall be paid to the sending Railway for goods vehicles of all descriptions at the rate of $\frac{2}{3}$ of a pie per ton or fraction of a ton of goods conveyed in either direction in such vehicles, in respect of every mile a goods vehicle of one Railway may carry goods on the line of the other Railway or any Railway connected therewith.

III. Mileage shall be paid on the weight entered in invoice for charges.

CLAUSE 18.—Mileage shall not be charged on merchandise vehicles when running empty.

Time allowed free of demurrage. Coaching vehicles.

CLAUSE 19.—Coaching vehicles sent through from one Railway to the other or any line beyond shall be allowed one hour for every $12\frac{1}{2}$ miles or portion of $12\frac{1}{2}$ miles run in going and returning, and 24 hours extra at destination free of demurrage.

Time allowed free of demurrage. Goods vehicles.

CLAUSE 20.—I. No demurrage shall be charged on the goods vehicles from either Railways sent through to the line of the other Railway or any line beyond, provided they are returned within the time arrived at by allowing one hour for every $6\frac{1}{2}$ miles or portion of $6\frac{1}{2}$ miles run in going and returning; mileage to be reckoned on the total distance run foreign in each direction separately. 24 hours allowed at destination for unloading, and 24 hours for reloading, and 12 hours shall be allowed at intermediate stations for each of these operations.

II. But no allowance shall be made for detention at junctions.

Demurrage charges.

CLAUSE 21.—On vehicles detained beyond the time named at clauses 13, 19 and 20, demurrage shall be charged as follows.—

Coaching vehicles—At the rate of eight annas per hour.

Merchandise vehicles—At the rate of one anna per ton of carrying capacity per hour.

Loading vehicles short of owning line.

CLAUSE 22.—In cases any merchandise vehicles are loaded on the homeward journey to any station short of or not beyond the junction with the owning Railway, the Audit offices of the respective Railways shall duly and correctly account for the same in their mileage returns to each other, and the mileage charges due under clause 17 shall be allowed to the owning Railway for the distance the vehicles are run loaded. When in such cases the distance run loaded is over two or more Railways, each line shall pay its proper share of the mileage charges.

Penalty for mis-sending.

CLAUSE 23.—I. No return vehicle shall be run, whether loaded or empty, unless otherwise mutually arranged, on any other than the exact route to its own line by which it was received, under a penalty of 22 Rupees per diem from the time it was mis-sent, until it return to a station on the route by which it was received.

Calculation of penalty.

II. In calculating penalty the date on which the vehicle is wrongly sent shall be included, and the date on which it returns to a station on the route by which it was received shall be omitted.

III. Vehicles may be loaded on their return journey to any station on the owning line or beyond.

- Diverting vehicles to branches. IV. But either Railway may divert a vehicle of the other Railway to any short branches of its own (to wit, the Hamdi or Sehwan branches on the Indus Valley State Railway), for a load to the line of the owning line, but not beyond.
- Liability of line originating mis-sending. V. Penalty is to be paid in every instance when a vehicle is mis-sent, even if it should reach the owning Railway within the time allowed under clauses 19 and 20.
- Trans-shipment to prevent wrong running. VI. For the wrong running of a vehicle on the Railway which mis-sends it, penalty shall be levied as provided in the first paragraph of this clause, but for the wrong running on a Railway other than the Railway which originates the mis-sending, the time on which to calculate the penalty recoverable from the Railway originating the mis-sending shall be determined in the case of merchandise vehicles at the rate of one hour for every $6\frac{1}{2}$ miles or portion of $6\frac{1}{2}$ miles wrongly run by the vehicle, together with 24 hours for unloading at destination, and in the case of coaching vehicles at the rate of one hour for every $12\frac{1}{2}$ miles or portion of $12\frac{1}{2}$ miles, and 24 hours extra, any detention in excess of this time to be charged against the detaining railway at the demurrage rate provided in clause 21. The penalty of 22 Rupees shall be leviable for 24 hours, or part thereof.
- Owning line to receive mileage and penalty dues. VII. Penalty-paying vehicles shall also be subject to the provisions of clauses 17 and 24.
- Inspection of accounts. VIII. If a vehicle be loaded with goods for a station, the running to which would take the vehicle out of its exact route homewards, and the load be trans-shipped at some point before the vehicle runs out of its proper route, the vehicle then running home by the proper route, then no penalty shall be due on the vehicle, but only mileage for the distance it ran loaded.
- Definition of through traffic. IX. The Auditors of the respective Railways shall specially advise each other whenever a vehicle has been mis-sent.
- Goods claims. CLAUSE 24.—Whatever amount is paid for mileage and penalty for wrong sending by any Railway for the use of vehicles of other Railways shall in all cases belong to and be paid over to the owning Railway
- Statements as to through wagon loads. CLAUSE 25 —The accounts referring to any mileage or demurrage question in which any sending Railway is concerned shall be open to the inspection of such Railway
- Trans-shipped goods and parcels. CLAUSE 26 —Through traffic is to be understood in all cases to mean coaching and merchandise traffic which may be booked or invoiced in accordance with the terms of this Agreement, through from any station on one of the two contracting lines or any line beyond to any station on the other or any line beyond.
- I V S Railway traffic between Mooltan Cantonment and Mozufferabad. CLAUSE 27 —I. Goods claims shall be settled by the Railway in whose custody the loss or damage occurred, when this cannot be ascertained with certainty the claim shall be paid in mileage proportion but in such cases the consent of both Railways shall be obtained before settlement is made.
- Haulage of I V S. Railway trains. II. Each Railway shall accept the statements of the other Railway with respect to the loads of wagons, unless the number-takers at the Junction notice and record that the loads have been interfered with, when the actual contents and their condition must be ascertained and recorded by a responsible officer of the joint station, failing which the sending Railway's statement shall be accepted.
- Control of I V S. Railway trains. CLAUSE 28 —All trans-shipped goods and parcels shall be checked by the receiving Railway, and receipt duly given in the agreed form, the work being arranged for by the Sind, Punjab and Delhi Railway at Mooltan Cantonment and by the Indus Valley Railway at Kotri Junction, the cost being equally borne by the two Railways.
- Rules and regulations. CLAUSE 29.—I All merchandise and coaching traffic between Mooltan Cantonment and stations on the Indus Valley Railway shall be booked by the Indus Valley Railway and carried by its own trains, and traffic of all kinds between Mooltan Cantonment and the Mozufferabad Junction Railway station may be booked by the Indus Valley Railway trains as well as by the Sind, Punjab and Delhi Railway trains.
- Speed, load, &c., of trains. II The Indus Valley Railway engines shall haul their own trains in either direction over that portion of the Sind, Punjab and Delhi Railway situated between Mooltan Cantonment and Mozufferabad Junction stations.
- III. All such trains shall be started under *line clear* messages obtained from the Sind, Punjab and Delhi Railway, and be generally controlled, when so running over the Sind, Punjab and Delhi Railway line by the Staff of the Sind, Punjab and Delhi Railway, to whom, when on this length, the servants of the Indus Valley Railway shall be subordinate.
- IV.—In all respects, the servants of the Indus Valley Railway working these trains, shall be subject to all the Rules and Regulations of the Sind, Punjab and Delhi Railway in force over this portion of the line for the time being.
- V. The speed and load of trains, and times of departures and arrivals, shall be subject to approval of the Sind, Punjab and Delhi Railway from time to time.

- Damage to Indus Valley State Railway trains VI. The Indus Valley Railway shall be responsible for all damage occurring to their engines and vehicles engaged in working between Mooltan Cantonment and Mozufferabad Junction stations, and also to the vehicles belonging to any other Railway attached to their trains from whatsoever cause arising.
- Payment for the concession. VII.—That the terms for this concession shall be a payment by the Indus Valley Railway to the Sind, Punjab and Delhi Railway of interest on capital expenditure, and of actual cost of maintenance of the line, in proportion to the relative vehicle mileage of the two Railways, the interest being calculated at 5 per cent. per annum on a Capital expenditure of Rs.
- Haulage charge. VIII. The Indus Valley Railway shall pay to the Sind, Punjab and Delhi Railway 15 per cent. of the gross receipts from all traffic booked locally by the Indus Valley State Railway trains between Mooltan Cantonment and Mozufferabad Junction Stations.
- Disabled I. V. S. Railway trains. IX. In any case, in which either Railway supplies haulage power for the other railway's trains, a payment shall be made to the hauling Railway of Rs. 5 per hour for each engine.
- Expense of clearing line. X. In the event of the Sind, Punjab and Delhi Railway line being obstructed by a disabled Indus Valley Railway train, from whatever cause arising, it shall be the duty of the Sind, Punjab and Delhi Railway staff to clear the line.
- Term of notice. XI. The expense incurred, so far as it relates to the removal of the Indus Valley Railway train, shall be refunded by that Railway, but all other expenses in connection with the clearance and restoration of the line shall be debited to the maintenance account referred to in para. VII of this clause.
- The week. Returns. XII. The provisions of this clause shall be subject to alteration on one month's notice from either Railway.
- The day. CLAUSE 30.—I. The week shall in all cases end at 24 o'clock on Saturday night. When the 30th June and 31st December do not fall on a Saturday, two returns shall be rendered, one for the period commencing from the first day of the last week to the end of the month, and another from the first day of the next month up to and including the first Saturday of that month.
- Dies non.* II. The day shall in all cases be reckoned as 24 hours, commencing at 24 o'clock at night, of a day being reckoned as a day. Madras time shall be adopted in all cases. Sundays, Christmas day, and Good Friday shall be treated as ordinary working days and no *dies non* shall be allowed.
- Extension of Agreement to connected lines. CLAUSE 31.—The principles of this agreement shall be extended by each Railway to any other Railway working in connection with it, the two Railways, parties to this Agreement, being responsible to each other for all through traffic so forwarded.
- CLAUSE 32.—I. It is further agreed that the Indus Valley Railway shall have the joint use of the Sind, Punjab and Delhi Railway Stations and sidings, &c., at Mooltan Cantonment, and Kotri Junction Stations.
- II. The Indus Valley Railway shall take charge of the Railway from the distant signals on the Sukkur side of the Kotri Junction and Mooltan Cantonment Stations and for the purpose of these arrangements, their liability shall commence at these points in accordance with para V. of this clause.
- III. The staff of the joint Stations of Kotri Junction and Mooltan Cantonment shall deal with all through and local traffic of both Railways.
- IV. Each Railway to have equal right in respect of the occupation of the Stations, and of the use of the Station Staff.
- V. The Railway which appoints the Station Master and staff shall be responsible for accidents or injury to rolling stock or traffic within the station or any limits within which the said staff takes charge of the same arising from any default of that Staff, and for any loss from undue delay or obstruction to traffic caused by any acts, whether of commission or omission, of the Station Staff.
- VI. The Station Staff at Mooltan Cantonment and the Kotri Junction Stations to be appointed by the Sind, Punjab and Delhi Railway.
- VII. For the use of those Stations and Sidings the Indus Valley Railway shall pay 1st, A share of an annual rental calculated at the rate of five (5) per cent. upon expenditure agreed upon between the Chief Engineers of the two Railways as the necessary expenditure on the Station for working the traffic of the two lines; 2nd, A share of the entire cost of the Station Staff, and of maintenance and renewal of such parts of station works as are used in common by both Railways.
- VIII. These charges are to be allocated in proportion to the number of vehicles working in and out of the joint stations.

(N.B.) Both in this clause and in clause 29 (VII) in calculating the number of vehicles, each light, dead, or assisting engine is to be counted as ten vehicles.

CLAUSE 33.—It is further agreed that the Sind, Punjab and Delhi Railway shall undertake all shunting required for the Indus Valley Railway at the Mooltan Cantonment and Kotri Stations, and that the Indus Valley Railway shall pay the Sind, Punjab and Delhi Railway for this service at the following rates :—

	Hours.
For every mail train,	½
„ „ mixed or goods train,	1
General shunting per diem,	2½
With an extra allowance of 1 hour on Sunday.	

The hours being worked out at 5 train miles per hour at the average cost per train mile shown in the Revenue Account of the previous half year.

CLAUSE 34.—I. In all respects the servants of the Indus Valley Railway, whilst on the premises of the Sind, Punjab and Delhi Railway, shall be subject to all the Rules and Regulations of the Sind, Punjab and Delhi Railway in force on such portion of the line for the time being.

II. In case of any breach of Rules and Regulations by servants of the Indus Valley Railway, the same will be dealt with by the heads of the Traffic Departments of the two Railways, and in case of dispute as to the interpretations of the Rules and Regulations of the Sind, Punjab and Delhi Railway, the matter shall be referred to the Agent of the Sind, Punjab and Delhi Railway, whose decision shall be final.

CLAUSE 35.—I. It is further agreed that the Sind, Punjab and Delhi Railway will allot space in their running shed at Mooltan Cantonment Station for four Indus Valley Railway engines.

II. The latter Railway to pay for this accommodation a sum of Rs. * monthly.

Construction of Agreement. Settlement by arbitration.

CLAUSE 36.—All questions which may arise in carrying out these arrangements, upon which the Traffic Management of the two Railways cannot agree, shall be referred to the Management of the respective Railways; and in cases of any difference of opinion between the two Railways as to the construction of any part of this agreement, or as to its application to any particular case, it shall be open to either Railway to call for an arbitration to be conducted in the ordinary way.

* See Appendix Q.

APPENDIX Q.

AGREEMENT BETWEEN THE SIND, PUNJAB AND DELHI AND INDUS VALLEY STATE RAILWAYS FOR WORKING THE JOINT STATIONS AT MOOLTAN AND KOTRI.

1. From and after the 1st April, 1882, the Indus Valley State Railway shall run and haul their own trains over the line between Mooltan Cantonment station and Muzaffarabad Junction, and have the joint use of the Mooltan Cantonment and Kotri Junction stations and sidings, also of the fuelling and watering buildings, machinery, plant and sidings and of the engine shed and sidings at Mooltan Cantonment station, as per detailed Schedules hereto annexed; upon the following conditions:—

2. All traffic to Indus Valley State Railway stations originating at Mooltan Cantonment or Kotri stations, shall be booked by the Sind, Punjab and Delhi Railway Company or the joint staff hereinafter provided for, and carried in Indus Valley State Railway's trains, and all traffic booked in Indus Valley State Railway trains and terminating at those stations, shall be received and dealt with by the Sind, Punjab and Delhi Railway Company, or by the said joint staff.

3. All goods traffic booked to Indus Valley State Railway stations, or stations on the Sind, Punjab and Delhi Railway Company's Sind Section, originating at Mooltan City or Cantonment stations, or trans-shipped at Mooltan Cantonment station, shall be loaded into Indus Valley State Railway vehicles.

4. The Sind, Punjab and Delhi Railway shall appoint a joint staff to deal with all the through and local traffic, coaching and merchandise, of the two lines at Kotri Junction station, also a joint staff to deal with the interchange of through traffic vehicles, and stock, and the cleaning and lighting of vehicles and trains at Mooltan Cantonment station.

5. The said joint staff shall be upon the basis of the various schedules hereto annexed, and no permanent increase shall be made to the numbers or salaries of either the station staff or Police without the concurrence of the Manager of the Indus Valley State Railway, but in the event of stress of traffic necessitating immediate increase to the staff, the Agent of the Sind, Punjab and Delhi Railway may make temporary arrangements subject to the subsequent approval of the Manager of the Indus Valley State Railway.

6. The Indus Valley State Railway shall pay the Sind, Punjab and Delhi Railway for shunting and marshalling trains at Mooltan and Kotri Junction at the following rates:—

Each passenger and mail train,	½ an hour.
Each mixed or goods train,	1 hour.
For work on Sundays, double the above allowance.	

Charge to be made for 5 miles per hour at an average cost per train mile for locomotive expenses, calculated on the actual expense, shown in the Sind, Punjab and Delhi Railway Revenue Account for the previous half-year, plus 5 per cent. thereon to cover interest on the capital cost of the Sind, Punjab and Delhi Railway Company's locomotive stock at work.

7. Each Railway shall supply at Mooltan and Kotri stations the lamps and other running stores necessary for its own trains, also the tickets, waybills and other station forms necessary for its own particular purposes, also at both these stations, menial staff, and premises, for its own running rooms, and oil and staff for lubricating the vehicles attached to its own trains, also the necessary staff for the examination of its own stock. The Indus Valley State Railway shall also supply at Mooltan station all forms necessary for the interchange of traffic and stock.

8. The Indus Valley State Railway shall be entitled to store on the premises of the Sind, Punjab and Delhi Railway at Mooltan Cantonment a sufficient number of spare vehicles to provide for the exigencies of the traffic arising at that station, but shall not use the station as a depôt for surplus stock.

9. Each Railway shall have equal right in respect to the occupation of the portion set apart for joint purposes at Kotri Junction stations, and in respect to the work to be performed by the joint staff, both at Mooltan and Kotri stations, but if required by the other Railway, neither Railway shall occupy with spare vehicles a larger portion of the total siding accommodation than is represented by the average proportion paid during the preceding three months for use for the joint station.

10. Debits laid against the joint station staff by the Indus Valley State Railway for errors in accounts, shall if necessary, be deducted from the salary or guarantee of the station staff, or otherwise recovered upon proper representation by the Examiner of the Railway.

11. All trains shall be started under line clear messages obtained from the Sind, Punjab and Delhi Railway, and be generally controlled, when running over the Sind, Punjab and Delhi Railway line, by the staff of the Sind, Punjab and Delhi Railway, to whom the servants of the Indus Valley State Railway shall be then subordinate.

12. In all respects the servants of the Indus Valley State Railway working these trains, shall be subject to all the Rules and Regulations of the Sind, Punjab and Delhi Railway, in force for the time being.

13. In case of any breach of Rules and Regulations by servants of the Indus Valley State Railway, the same will be dealt with by the Traffic Managers of the two Railways, and in case of dispute, as to the interpretation of the Rules and Regulations of the Sind, Punjab and Delhi Railway, the matter shall be referred to the Agent of the Sind, Punjab and Delhi Railway Company, whose decision shall be final.

14. The times of departures and arrivals of trains, and their speed over the Sind, Punjab and Delhi Railway, shall be determined by the Sind, Punjab and Delhi Railway from time to time.

15. The Indus Valley State Railway shall be responsible for all damage occurring to their engines and vehicles engaged in working between Mooltan Cantonment and Muzaffarabad Junction, or in either of the joint stations, and also to the vehicles belonging to any other Railway attached to their trains, from whatsoever cause arising.

16. In the event of the Sind, Punjab and Delhi Railway line or stations being obstructed by a disabled Indus Valley State Railway's train from whatever cause arising, it shall be the duty of the Sind, Punjab and Delhi Railway staff to clear the line.

The expense incurred so far as it relates to the removal of the Indus Valley State Railway's train, shall be refunded by that Railway, but all other expenses in connection with the clearance and restoration of the line shall be debited to the maintenance account of the Sind, Punjab and Delhi Railway.

LINE FROM MUZAFFARABAD JUNCTION INTO MOOLTAN CANTONMENT STATION,

17. The whole of the traffic passing from and to the Indus Valley State Railway and the Punjab and Delhi Section of the Sind, Punjab and Delhi Railway, shall be made over at Mooltan Cantonment station, and the Indus Valley State Railway shall provide engine power, stock and staff for the haulage of all such traffic between Mooltan Cantonment station and Muzaffarabad Junction.

18. The Sind, Punjab and Delhi Railway shall be entitled to all the traffic earnings attributable to the length of line between Muzaffarabad Junction and Mooltan Cantonment Station, and carried in Indus Valley State Railway trains, such traffic earnings being calculated upon a length of $6\frac{1}{2}$ miles at the rates and fares per mile received for each class of traffic.

But in the event of any considerable reduction in the rates and fares of the Indus Valley State Railway without the previous consent of the Sind, Punjab and Delhi Railway, the amount of rebate to be allowed to Indus Valley State Railway under clause (19) shall be proportionately reduced.

19. The Indus Valley State Railway in consideration of performing the haulage and necessary train service, shall be entitled to a rebate of 30 per cent. upon the traffic earnings referred to in clause 18.

20. For mileage and demurrage purposes, the line between Mooltan Cantonment and Muzaffarabad Junction shall be treated as part of the Indus Valley State Railway system; no mileage and demurrage charges being made to Sind, Punjab and Delhi Railway for vehicles of Indus Valley State Railway and connected lines, unless they are attached to Sind, Punjab and Delhi Railway trains for Sind, Punjab and Delhi Railway service, but the Indus Valley State Railway shall pay the usual mileage and demurrage charges on all vehicles belonging to Sind, Punjab and Delhi Railway and connected lines when used for Indus Valley State Railway service on Indus Valley State Railway trains. All vehicles to be treated as received from or returned to parent line at Mooltan Cantonment station.

21. A charge of 2 annas per vehicle per mile shall be credited to the traffic earnings of the joint line referred to in clause 18 for all vehicles attached to an Indus Valley State Railway train running over the joint line in both directions without load, but no charge shall be made for vehicles running empty in one direction and loaded on the other. Provided always that empties shall not be run in both directions at the same time, in which case one-half shall be treated as running in both directions without load. Passenger, luggage and postal vehicles and brake-vans shall be always considered loaded.

This clause is not to be applicable to wagons forwarded to Sind, Punjab and Delhi Railway for equalization purposes.

22. Either Railway may issue free passes between Muzaffarabad Junction and Mooltan Cantonment, and send free its own officer's reserved carriages by either Railway's trains.

23. Should it at any time be necessary for vehicles of the one Railway engaged upon that Railway's service to be hauled in the trains of the other Railway, a payment shall be made to the hauling Railway of 2 annas per mile per vehicle.

24. In any case, in which either Railway supplies haulage power for the other Railway's trains, a payment shall be made to the hauling Railway of Rs. 5 per hour for each engine.

MOOLTAN CANTONMENT STATION.

25. The Indus Valley State Railway shall pay for the cost of cleaning vehicles, and of oil and staff for lighting trains in the ratio of the number of trains of each Railway using the Mooltan station.

26. The Indus Valley State Railway shall pay a proportion of the cost of vehicle number-takers and of the staff employed in the preparation of the junction Returns, also of the staff employed, or stores consumed in the trans-shipment or taking over of through vehicles, stock and traffic at the Mooltan Cantonment station in the ratio of the number of trains of each Railway using it.

27. A fixed sum of Rs. per mensem shall be paid for the receipt and despatch of Indus Valley State Railway service telegrams at Mooltan Cantonment station which do not refer to matters of joint traffic.

28. The cost of all other services performed, or stores supplied, except those provided for in clauses 6, 25 and 26, in connection with the booking, marshalling, lighting, starting, and reception of Indus Valley State Railway trains at Mooltan Cantonment station, shall be borne by the Sind, Punjab and Delhi Railway; who shall also provide sufficient accommodation to the Indus Valley State Railway staff engaged upon the Mooltan Cantonment station, for the execution of their duty, and the safe custody of their stores.

ENGINE SHED AT MOOLTAN CANTONMENT STATION.

29. The Sind, Punjab and Delhi Railway shall allot space in their Running shed at Mooltan Cantonment station for four Indus Valley Railway engines, for which accommodation the Indus Valley State Railway shall pay a proportion of a charge of 5 per cent. per annum upon a sum of Rs. to cover the interest on capital cost, also of further charges of 5 per cent. per annum upon a sum of Rs. to cover the cost of maintenance and renewal of permanent way, and of $2\frac{1}{2}$ per cent. per annum upon a sum of Rs. to cover the cost of maintenance and renewal of all buildings and works connected with the said Running shed. *

30. The Indus Valley State Railway shall pay a proportion of the cost of the Sind, Punjab and Delhi Railway Company's fuelling shed, and watering establishment and other expenditure appertaining at Mooltan Cantonment, as per detailed schedule hereto annexed (plus a charge of 10 per cent. thereon for supervision); also a like proportion of a charge of 5 per cent. per annum upon a sum of Rs. to cover the interest on capital cost and of further charges of 5 per cent. per annum upon a sum of Rs. to cover the cost of maintenance and renewal of permanent way, and of $2\frac{1}{2}$ per cent. per annum upon a sum of Rs. to cover the cost of maintenance and renewal of all buildings and works in connection with the Company's watering and fuelling plant, premises, appurtenances and sidings at that station.

The proportion payable by Indus Valley State Railway under clauses 29 and 30, shall be

KOTRI JUNCTION STATION.

31. The cost of the joint station working including staff, stores, stationery, police, labor employed in the trans-shipment of goods, or in cleaning, lighting, shunting, and marshalling trains, &c., shall be apportioned between the two lines in the ratio of the number of trains of each Railway working in and out of the joint station.

32. The Indus Valley State Railway shall pay the Sind, Punjab and Delhi Railway a share of the following annual charges to cover the cost of rent, maintenance and renewals of the said station, sidings, &c., apportioned in the same ratio as the station staff referred to in the preceding clause :—

5 per cent. upon a sum of Rs.	to cover interest on capital cost.
5 per cent. upon a sum of Rs. and earthwork.	to cover the cost of maintenance and renewal of permanent way, excluding ballast
$2\frac{1}{2}$ per cent. upon a sum of Rs.	to cover the cost of maintenance of all works and buildings.

MUZAFFARABAD JUNCTION STATION.

33. The Muzaffarabad Junction and signals having been provided by the Sind, Punjab and Delhi Railway shall be maintained by that Company, the working staff and stores shall be supplied by Indus Valley State Railway, who shall also give the necessary line clear to Sind, Punjab and Delhi Railway trains between Mooltan and Ramowalla. No charge to be made to the other Railway for either service by either Railway.

CARRIAGE OF STORES FOR JOINT USE.

34. The Company's rate for carriage of Revenue stores shall be added to the cost of all stores consumed on joint account.

FUEL AND STORES SUPPLY TO ENGINES AND TRAINS FOR OTHER THAN JOINT PURPOSES.

35. For all supplies in addition to those provided for in this agreement, the Indus Valley State Railway shall pay, in addition to that actual cost, the cost of handling and conveyance from the depôts, and loss on exchange incurred upon English stores, plus a charge of 10 per cent. for supervision.

36. This clause shall remain in force for two years certain from the 1st April, 1882, after which date it shall be subject to revision upon six months' notice by either Railway.

37. Any additional Capital outlay on joint account must be approved from time to time by both Railways, and added to the sums particularized in this agreement for the purpose of calculating interest and maintenance.

APPENDIX R.

AGREEMENT FOR WORKING AND MAINTENANCE OF THE PORADAH SECTION, NORTHERN BENGAL STATE RAILWAY, BY THE EASTERN BENGAL RAILWAY COMPANY.

*Minutes of a Special Meeting held at the Agent's Office, Eastern Bengal Railway, on Wednesday, the 23rd
June, 1880.*

Submitted letter No. 1775 W, dated the 18th June, from the Director of State Railways, North-Eastern System, in which he disapproves of the arrangement conditionally resolved upon at a Special Meeting held at Siligori on the 8th instant, whereby the Eastern Bengal Railway was to receive a percentage of the gross receipts of the Branch equal to the percentage which the gross expenses of the Northern Bengal State Railway shall bear to the gross receipts of that line for the same half-year: and states his opinion that the working expenses of the Eastern Bengal Railway should be the basis, the Company being paid an additional percentage on that to cover the cost of Agency and of working a Branch line.

After some discussion the following telegram was agreed to and despatched to the Director of State Railways, North-Eastern System.

"Prestage agrees subject to the approval of his Board to work and maintain Poradaha Branch for 60 per cent. of the gross receipts during continuance of Eastern Bengal Railway Contract with effect from 1st January last. Do you approve? wire reply."

The Meeting was adjourned till the 25th June, 1880.

Read the following telegram from the Director of State Railways, North-Eastern System, to the Manager of Northern Bengal State Railway, Calcutta.

"Yes, will accept the 60 per cent. rate for Poradaha Section."

1. Resolved that, subject to the approval of Government and the Board of Directors, the Eastern Bengal Railway Company continue to work and maintain the Way and Works of the Section with its station buildings and staff quarters in consideration of which they shall receive 60 per cent. of the gross receipts.

2. This arrangement to have effect from the 1st January, 1880, and during the continuance of the Eastern Bengal Railway Company's present Contract.

3. It being a distinct stipulation with regard to the maintenance of the Branch that the Eastern Bengal Railway accepts no risks whatever, and any additional special expenses that may be incurred on account of floods or extraordinary accidents be a special charge to be borne by the Northern Bengal State Railway. All estimates for construction or extraordinary works of repair that may be necessary will be submitted for sanction to the Northern Bengal State Railway authorities.

APPENDIX S.

AGREEMENT BETWEEN THE GREAT INDIAN PENINSULA RAILWAY COMPANY AND THE WARDHA COAL STATE RAILWAY FOR THE INTERCHANGE OF TRAFFIC AND STOCK.

DRAFT MEMORANDUM OF AGREEMENT, dated the _____ of January, 1879, and made between the Chief Commissioner of the Central Provinces, and the Great Indian Peninsula Railway Company, for the interchange of Traffic and Stock between the Wardha Valley State Railway (hereinafter called the State Railway) and the Great Indian Peninsula Railway (hereinafter called the Railway Company), and for the provision, maintenance, and working of the Junction Station at Wardha, to be used in common by both Railways.

- Term of Agreement.** 1. The Agreement for the working, by the Railway Company, of the State Railway to be considered as cancelled and determined on the 31st of December, 1878. And this Agreement to be in force during the whole of the year 1879, and thereafter (except as provided in clause 35) until the expiration of not less than six months' notice, which may be given, either by the Chief Commissioner or by the Railway Company, at any time, but which is to expire only on either the 30th of June, or the 31st of December, in any year.
- Boundaries of each Railway.** 2. A line of division of land between the two Railways, to be agreed upon at Wardha, and all lines and sidings required by each Railway respectively, at that place, are to be laid in, and maintained, by each Railway upon their own land.
- Joint use of Junction Station.** 3. During the continuance of this Agreement the trains of the State Railway are to be entitled to work into, and out of, the Railway Company's Station at Wardha, having the use, for traffic purposes only, under the terms of this Agreement, of the platforms, sidings, and all the traffic premises, of the Railway Company. All other offices, premises, and buildings required by the State Railway are to be provided by themselves, outside of the boundaries of the Railway Company's land, and this Agreement is not to be held as giving the State Railway any authority, or permission, or right to come within the Railway Company's boundaries except as provided herein, and any notice to terminate this Agreement is to be considered and accepted, as also notice of the withdrawal of all the rights given under it to the State Railway, to enter or use the Railway Company's Station at Wardha.
- Payment for joint use of Junction Station.** 4. The cost of laying in and erecting the Wardha Junction sidings, station buildings, and all premises which are used for traffic purposes, and of such alterations and additions as may, hereafter, from time to time, be required to be used in common by both Railways, is to be ascertained, and the plans and estimates are to be agreed upon, from time to time, between the two Railways, before any new work is commenced. The expenditure thus required, and agreed upon, is to be provided by the Railway Company, and an annual rental at the rate of $7\frac{1}{2}$ per cent. upon the total amount spent, from time to time, is to be charged to a "Joint Station Expenses" account.
- The actual cost of maintenance and renewal of such parts of the station premises as are used in common by both Railways for traffic purposes, and as are charged against Revenue is to be also debited to the "Joint Station Expenses" account.
- Compensation to Railway Company of joint use of Junction Station discontinued.** 5. Upon the termination of this Agreement, the State Railway is to compensate the Railway Company, at the time of the expiry of the Agreement, for any expenditure upon station buildings, sheds, or premises which the Railway Company may have incurred in order to accommodate the traffic of the State Railway. The amount of compensation to be paid to the Railway Company to be agreed upon by the Consulting Engineer to the Government of Bombay, and the Chief Engineers of the two Railways, due regard being given to the utilization of the premises by the Railway Company, or to the necessity for their removal.
- Duties of Staff at Junction Station.** 6. The Station Staff at Wardha will deal with all traffic, through as well as local, and the traffic of the two Railways is to be dealt with in the same manner as if it belonged to one only, no undue preference being given to that relating to either Railway. The staff at the Wardha Station to be appointed by the Railway Company, who are to have the exclusive control of the station and sidings, &c, within the station limits.
- Limit of Junction Station defined.** 7. The distant signals on either side of the Wardha Junction Station both on the State Railway, and on the Great Indian Peninsula Railway, are to be considered and accepted as the limit of the station; and the trains and engines and traffic are to be under the control of the Station Staff at Wardha, within the limit of the station as thus defined.
- Control of Staff while within Junction Station.** 8. The staff of the State Railway are, while within the limits of the Wardha Station, to obey, and be bound by all the rules and regulations, and also all instructions which may

be, from time to time, in force, or which may be issued by the authorities of the Railway Company, and the authorities of the Railway Company are to have the same rights and control over the Staff of the State Railway while within the limits of that station as if they were the Staff of the Railway Company itself.

Responsibility for accidents at Junction Station.

9. All damages or accidents which may be caused by the Station Staff at Wardha, to the public, or to the stock of the two Railways; or to the traffic, whether goods or otherwise, and whether through or local, or which may, from time to time, arise or occur, within the limits of that station; and all damages or losses which either of the Railways may sustain, or be put to, in consequence of the act of the Station Staff, whether arising from carelessness or otherwise, within the limits of that station, are to be charged to the "Joint Station Expenses" account.

Each Railway to be individually responsible for damages or accidents caused by its own running staff within station limits.

Through booking of passengers, horses, &c.

10. Passengers and horses, carriages, and dogs are to be booked through between such stations on both Railways, and of other Railways with which the Railway Company may, from time to time, have through booking arrangements, as may be, from time to time, arranged between the Manager of the State Railway, and the General Traffic Manager of the Great Indian Peninsula Railway.

Through booking of goods and parcels.

11. Goods and parcels are to be invoiced and booked through, to and from all goods booking stations on both Railways, and also between all goods booking stations of other Railways with which the Great Indian Peninsula Railway book through from time to time.

Traffic of other Railways to be treated in the same way as G. I. P. traffic.

12. The traffic of Railways, whether Guaranteed or State, other than the Great Indian Peninsula Railway, which may pass on to the State Railway is, in regard to the State Railway, to be treated and dealt with, in all respects, as if it were traffic of the Great Indian Peninsula Railway, except that the rates, fares, charges, &c., of such other Railways, are to be collected and charged upon the State Railway, as the State Railway authorities may be advised, by the Railway Company from time to time.

General arrangements for children; servants, halts during journey; excess luggage, &c., &c.

13. The general arrangements in force, from time to time, upon the Great Indian Peninsula Railway as to charges for children, and for servants accompanying their employers; as to halts during journeys, reserved accommodation; time for which return tickets are available; weight of luggage carried free by the holder of each class of tickets respectively, and the charge for excess luggage, also for troops and their baggage; and for horses, carriages, stores, ammunition, &c., belonging to Government, and all other general arrangements for both passenger and goods traffic, are to apply to traffic booked through between the two Railways, except when, and in such cases, as the General Traffic Manager of the Great Indian Peninsula Railway may be advised by the Manager of the State Railway, from time to time, that different arrangements, which may be specified, are to be adopted.

Through rates and fares.

14. Each Railway is to supply the other from time to time with the rates and fares between Wardha and their respective stations. The through rates and fares are to be, in all cases the sum of the local rates and fares of each Railway to Wardha including terminals, and cartage if, and when, that is performed, of both Railways.

But no terminal is to be charged for the Wardha Junction Station by either Railway upon through traffic.

Notice of alterations of rates, fares, &c.

15. No alteration of rate or classification affecting the through traffic, is to be made by either Railway, without one month's previous notice to the other. And such notices are to be given only by the Manager of the State Railway, and the General Traffic Manager of the Great Indian Peninsula Railway, to each other respectively.

Collection of through charges.

16. Each Railway is to be responsible for collecting the proportion due to the other upon all through traffic and upon goods traffic invoiced through "To pay." The receiving station is to check the invoices, and to be responsible for collecting any amounts that may be undercharged by the forwarding station, but the receiving station is not to reduce below the charge mentioned in the invoice or through way bill without the consent of the forwarding Railway, except only in cases of errors in rate or calculation which may be corrected.

Distances.

17. The mileages to Wardha from stations on each Railway are to be taken in regard to all charges, and all arrangements made in this Agreement, at the distances which may be quoted from time to time, by each Railway.

Limit of goods to be sent through in some wagons, minimum charges, &c.

18. The loads of wagons containing less than three tons of goods are to be transhipped at the Wardha Junction Station.

Wagons containing three tons or more of goods, are to go through to destination in the same wagons as those in which they arrive at the junction

Consignments of goods of not less than 14 seers in weight are to be booked through between the two Railways, but the minimum charge upon goods traffic booked through is to be as for one maund, and no less charge is to be made than one rupee upon goods traffic, or than eight annas upon parcels traffic booked through.

Packages of less than 14 seers in weight are to be booked through as parcels.

The minimum charge is to be divided in mileage proportion between the two Railways.

- Division of receipts upon through traffic. 19. The division of the receipts on through traffic is to be carried out weekly by the Audit offices of the two Railways without reference to the end of a month, except on the 30th of June and the 31st of December in each year, when returns for odd days completing those months respectively, will be required, and the traffic will be divided up to the end of those months accordingly. The weekly accounts are to be made up to Saturdays inclusive, and settlements are to be made monthly on accounts which are to be closed on the last Saturday of each month. And each Railway is to have, in such division, its own local rates and fares, except in the case of minimum charges which are to be divided as provided in clause 18.
- Record of stock exchanged. 20. A number-taker is to be employed as part of the Joint Station Staff at Wardha, and is to enter the number and description of every vehicle, also of every sheet, loose coupling, &c, which arrives at, and leaves that station, and showing the owning Company's name, and the date and time it is so entered, and showing also, in regard to goods wagons, those which are empty, and those which are loaded.
- Definition of, how stock is to be handed over. 21. All vehicles, sheets, and loose couplings are to be considered as handed over, or returned, to the State Railway, or as handed over, or returned, to the Railway Company, when they are entered in the number-taker's book, which is to be done, in the case of vehicles and sheets in use directly they are put into the sidings where such vehicles are usually placed for those purposes, at Wardha, and in the case of sheets not in use and loose couplings directly they are handed to the officer of either Railway who usually receives them.
- Mileage allowance for vehicles. 22. Coaching vehicles belonging to either of the two Railways are to be allowed one day for every 300 miles, and goods vehicles are to be allowed one day for every 150 miles. These mileages to be allowed both on the outward and the return journey upon both coaching and goods vehicles.
- Free allowance upon vehicles, &c. 23. One day is to be allowed free upon all vehicles at destination.
The day vehicles are handed over at the Junction Station is to be reckoned, but the day they are returned to the Junction Station is not to be reckoned.
But inasmuch as the distances upon the State Railway are short, and these free allowances might therefore so work out as to give no payment at all, it is agreed that, for every vehicle, at least one day's full mileage charge is to be paid.
Six additional days to be allowed in case of damage to the stock of either Railway on the line of the other Railway for the repairs of such stock, and no demurrage to be charged for those six days. But if the damage is such as will require longer than six days to complete the repair, the stock must be returned to the owning Railway. If not sent within the six additional days, whether repaired or not, demurrage will be charged after the expiration of the six days unless specially exempted by the Traffic Manager of the owning Railway. Notice to be sent within one month to the owning Railway, in all cases how and when the damage took place, and the nature of it.
- Definition of days, classification of stock, &c. 24. Portions of days are to be, in all cases, reckoned as full days, and the day is to be calculated from midnight to midnight only.
The week is to be reckoned from midnight on Saturday.
Sundays, Good Fridays, and Christmas days are to be reckoned in regard to coaching vehicles, but are not to be reckoned in regard to goods vehicles and sheets and couplings.
Horse boxes, carriage trucks, foot board road vans, and brake-vans are to be reckoned as coaching vehicles, in all cases, whether they run on goods or passenger trains.
- Mileage payment. 25. For coaching vehicles belonging to either of the two Railways, the owning Company is to be paid at the rate of seven pies per mile actually run both in going and returning; and for goods vehicles (except those named below) at the rate of four pies per mile when running under load only. But for the small goods (coal) wagons of the State Railway now in use for carrying coal, &c., the rate is to be only one and three-quarter pies per mile when running under load only.
- Demurrage. 26. For coaching vehicles which are not returned to the owning Company within the time specified in clauses 22 and 23, the owning Company is to be paid demurrage at the rate of 5 Rupees a day; and for goods vehicles (except those named below) at the rate of 3 Rupees a day for every day that they are so detained beyond the agreed periods. But for the small goods vehicles named in clause 25 the demurrage rate is to be only 1 Rupee and 12 annas per day.
- Back loading of goods vehicles, and penalty for wrong sending. 27. Goods vehicles of either Railway may be loaded back in the direction of the owning Company's line, and the mileage charge is to be paid for all vehicles so returning under load.
But when goods vehicles are returned empty, no mileage charge is to be made.

For each vehicle, whether goods or passenger, that is loaded back in any direction other than towards the owning Company's line, the owning Company is to be paid a sum of 20 Rupees a day by way of penalty in addition to the mileage charge.

Back loading of stock of other Railways.

28. Vehicles of all sorts belonging to the East Indian or other Railways beyond Jubbulpore may be loaded back to Wardha or to any station in the direction of Wardha on the State Railway; to any station of the Great Indian Peninsula Railway between Wardha and Jubbulpore; to any station on the owning Company's line; or to any station on any intermediate Railway, between Jubbulpore and the owning Company's line in the direction of the owning Company's line, but not in any other direction.

Vehicles of all sorts belonging to the Madras or other Railways beyond Raichur may be loaded back to Wardha or to any station on the State line in the direction of Wardha; to any station of the Great Indian Peninsula Railway between Wardha and Raichur; to any station on the owning Company's line, or to any station between Raichur and the junction with the owning Company's line in the direction of the owning Company's line, but not in any other direction.

And vehicles of all sorts which belong to the Bombay, Baroda and Central India Railway may be loaded back to any station on the State Railway in the direction of the owning Company's line; to any station between Wardha and Dadur Junction on the Great Indian Peninsula Railway; or to any station on the owning Company's line; but not in any other direction.

Statement of loading short of owner's Railway on return of stock.

29. Should any goods vehicle be loaded on the homeward journey to any station short of the junction with the owning Company's line, the Audit offices of the respective Railways will send in special returns to each other in order that the charges may be paid to the owning Company.

Definition of through and local traffic.

30. Traffic booked between stations of the Railway Company and of the State Railway (except Wardha), or between stations of other Railways reached *via* the Great Indian Peninsula Railway and stations of the State Railway, is to be considered as through traffic.

And traffic booked, by either Railway, to the Wardha station is to be considered as local traffic.

Examination of stock, &c., at Junction.

31. The State Railway and the Railway Company will each appoint carriage examiners at Wardha. All vehicles of all sorts, and all loose couplings must be examined by the carriage examiners of both Railways, and any defects or damages of any kind must be entered in a book to be kept for the purpose, and must be signed by both examiners, and their examination and records in this joint book is to be accepted as conclusive, and the only evidence which is to be recognized, in regard to the condition of such stock, &c.

The Station Master at Wardha will be responsible for the condition of all sheets handed over to, and returned by, the State Railway, and for keeping a record of all sheets that are damaged when they are returned.

The cost of repairs of any damages which have been done to the stock, sheets, &c., of either Railway upon the line of the other, is to be borne by the Railway upon which it occurred. The bills for repair of such stock, sheets, &c., are to be adjusted monthly between the Railway Company and the State Railway.

But neither the Railway Company nor the State Railway are to be responsible to the other for damages arising out of the neglect or default of the examiners.

Railway Company to provide stock, &c., for State Railway.

32. The Railway Company will (subject to the provision of clause 34) provide all such carriages, wagons, brake-vans, and rolling stock of all descriptions (except engines) including loose screw and chain coupling and sheets, as the State Railway may, from time to time, require.

The indents for such stock, &c., are to be sent, by telegram, or otherwise only by the Traffic Superintendent of the State Railway, to the District Traffic Superintendent of the Great Indian Peninsula Railway, from time to time.

Payment by State Railway for hired stock, &c.

33. For the time that such stock, sheets, &c., are in the possession of the State Railway, as provided in clause 32, they are to be considered as hired by the State Railway, and the Railway Company are to be paid for their use upon monthly bills, at the rate, for each day, of 5 Rupees for each first class and each composite carriage; of 4 Rupees for each second class carriage; of 3 Rupees for each vehicle for all other coaching vehicles, of 2 Rupees for each goods vehicle; of 2 annas for each sheet; and 1 anna for each loose screw or chain coupling. Provided that if the Railway Company have to hire stock, &c., at higher rates than the above, the rate charged to the State Railway is to be increased to the rates which the Railway Company may have to pay for the time being.

Limitation in case of insufficiency of Railway Company's stock, &c.

34. But if, at any time, it should be found that the available stock of the Railway Company is insufficient to carry all the traffic of both Railways, the Railway Company reserve to themselves the right to withdraw such stock, sheet, &c., if required for their own purposes, at any time, upon giving one month's notice to the State Railway.

For stock, sheets, &c., so hired, the hiring charge is to be paid for every day, or part of a day, as defined in clause 24, that the stock, sheets, &c., remain upon the State Railway, but no demurrage charge is to be made, and the penalty for wrong sending, under clause 27, is not to be charged.

For stock, sheets, &c., hired by the State Railway, the day of departure from, and the day of return to, the Junction Station are to be respectively charged for, and the days allowed free under clauses 23 and 24 are to be also charged for.

The State Railway to keep all stock hired by them under this clause in running order.

Provisions of clauses 32, 33 and 34, to cease at end of year 1879.

35. The arrangements made in clauses 32, 33 and 34 are to cease absolutely on the 31st of December, 1879.

Payment by State Railway for stock of other Railways.

36. The State Railway are to pay to the Railway Company whatever amount for mileage, or demurrage, penalty for wrong sending or otherwise the Railway Company may have, from time to time, to pay to any other Railway for stock of such other Railway passing on to the State Railway, such stock, &c., being, in all other respects, treated as if it was stock, &c., of the Railway Company.

The stock of State Railways, other than the Wardha Valley State Railway, is to be dealt with, and treated for the purposes of this Agreement, either in the same manner as stock of other Foreign Railways, or as if it were part of the stock of the Great Indian Peninsula Railway, as the case may be. The State Railway to be, from time to time, advised of the payment for mileage, demurrage, &c., which may have to be paid by the Railway Company to other Railways, whether State or Guaranteed.

Greasing of stock.

37. Each Railway to make its own arrangements for greasing or oiling its own vehicles at the Junction Station independently of the joint Staff.

Responsibility for accidents.

38. The State Railway are to be responsible for all accidents, damages, or losses to themselves, to the Railway Company, and to the public, which may arise in consequence of the condition of any of the stock, &c., which may be running upon the State Railway, whoever it may belong to, except that, if any damage should arise from defective materials or workmanship, in any vehicle belonging to the Great Indian Peninsula or other Railway Company, while running upon the State Railway, the owning Company is to be responsible for the actual repair or replacement of such vehicle only, but not of any other vehicle, nor for any other of the consequences of such defective material or workmanship.

But should damage be caused by defective material or workmanship in any vehicle belonging to the Railway Company which may be upon the State line upon the hiring arrangements made in clauses 32, 33, 34, and 35 of this Agreement, the State Railway is also to bear the cost of repair of such vehicle as if it were actually their own.

Settlement of claims.

39. Claims for compensation for goods, parcels, &c., lost or damaged are to be settled and paid by the Railway in whose custody the loss or damage occurred.

When the responsibility for loss or damage cannot be ascertained with certainty, the claim is to be divided in mileage proportion between the Railway Companies concerned. But, in such cases, the previous consent of the Manager of the State Railway, and the General Traffic Manager of the Great Indian Peninsula Railway, is to be obtained before any settlement is made.

Records of Junction Staff to be accepted by both Railways.

40. Each Railway is to accept the statements of the other with respect to loads of wagons unless the number-taker at the Junction notices and records that the loads have been interfered with, in which case their actual contents are to be ascertained and recorded by the Station Master at Wardha.

Accounts at Junction and inspection of goods, &c.

41. The Joint Staff at Wardha are to keep all such books, statements, &c., as may be required by either Railway from time to time. And they are to render such statements, returns, &c., as either Railway may require direct to the authorities of that Railway from time to time.

The traffic books of all sorts at the Junction Station, and all books, statements, &c., and all through goods, are to be, at all times, open to inspection by any authorized officers of either Railway.

Division of Joint Station Expenses.

42. The rent referred to in clause 4, and the cost of the Joint Station working, including Staff, and all expenditure which is in accordance with this Agreement, to be placed to the Wardha "Joint Station Expenses" account, are to be paid by the two Railways, in the proportion of three-eighths of the whole amount by the State Railway, and five-eighths by the Railway Company.

Repairs and maintenance of stock and engines, &c.

43. The Railway Company agree to repair and maintain any and all stock including engines, which may be provided by the State for working the State Railway, from time to time, at the actual cost with 30 per cent. on Indian expenditure added for supervision and shop charges.

The repairs of State Railway stock and engines are to be carried out at whichever of the Locomotive depôts of the Railway Company may, in the discretion of the Locomotive

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Superintendent of the Railway Company, be arranged from time to time, at which the necessary accommodation and appliances may be available.

- Rate for State Railway stores, coal, &c., over G. I. P. Railway. 44. The State Railway are to pay the Railway Company, upon Ledger accounts to be submitted monthly by the Railway Company, at the ordinary State Railway rates as now in force for the carriage over the Great Indian Peninsula Railway of all State Railway stores, material, &c., (except coal,) and for vehicles, including engines, belonging to, or in use by, the State Railway running over the Great Indian Peninsula Railway to any of their Locomotive stations for repair. And for all coal the State Railway are to pay to the Railway Company the same average rate per ton, per mile, as is charged to the Railway Company for coal carried for them over the State Railway, from time to time, such rate being understood to include freight, terminals, royalties, and all other charges which are credited as receipts to that line. The loading and unloading services to be performed by the State Railway.
- Water supply. 45. Each Railway is to make its own arrangements for water supply at Wardha.
- Telegrams free. 46. Telegrams on the joint business of the two Railways to be interchanged free.
- Calcutta Conference rules for interchange of stock, &c. 47. All the arrangements as to interchange of stock, mileage, demurrage, penalty for wrong sending, &c., made in this Agreement (except those made in clauses 32, 33, 34, and 35) are to be subject to modification whenever any of the rules proposed at the recent Conference held in Calcutta are brought into force.
- Payment of Accounts. 48. The accounts for Joint Station Expenses under clause 42, and for repairs of stock under clause 43, to be submitted by the Railway Company to the State Railway within six weeks after the end of each half-year, and to be adjusted by the usual transfer certificate in the accounts pertaining to the month in which they are submitted.
- The accounts for repairs of damages to stock, &c., under clauses 31 and 38, and for the conveyance of stock, stores, coal, &c., under clause 44, are to be paid during the month after that in which they accrue.
- The division of traffic receipts under clause 19, and the accounts for mileage, demurrage, and penalty for wrong sending under clauses 25, 26, and 27, and for hire of stock under clause 33, to be settled by the Railway Company and the State Railway, by the usual transfer certificate, in the accounts pertaining to the same month as that to which they relate.
- Upon all amounts due as above the accounts for which are not settled, as rendered (errors being subsequently adjusted) within the specified time as named above, interest at the rate of 5 per cent. per annum is to be paid until the money is actually paid by the State Railway to the Railway Company or by the Railway Company to the State Railway as the case may be.
- Settlement of disputes. 49. All questions of dispute which may arise in carrying out these arrangements, as to the construction of any part of this Agreement, or its application to any particular case, or as to the cost of the station to be used in common; or as to the amount for which either Railway is liable for damage of stock, or injury, or loss; or with respect to any other questions which may arise, to be settled by arbitration, in some way to be arranged by the Board of Directors of the Great Indian Peninsula Railway, and the Government of India.
- Sanction to Agreement 50. This Agreement to be subject to the sanction of the Directors of the Railway Company; of the Government of Bombay; and of the Government of India.

SUPPLEMENTAL AGREEMENT BETWEEN THE GREAT INDIAN PENINSULA RAILWAY AND THE WARDHA COAL STATE RAILWAY FOR THE INTERCHANGE OF TRAFFIC, &c.

MEMORANDUM OF SUPPLEMENTAL AGREEMENT, made between the Chief Commissioner of the Central Provinces, and the Great Indian Peninsula Railway Company, as to interchange of Traffic and Stock between the Wardha Coal State Railway (hereinafter called the State Railway) and the Great Indian Peninsula Railway (hereinafter called the Railway Company).

The undermentioned arrangements are agreed to between the parties, namely:—

- 1st.—That as to the small coal wagons belonging to the State Railway when booked to Nagpur, the Railway Company are to be allowed, free of demurrage, 24 hours more than the time allowed free under the Conference Minutes for the return of these wagons to the State Railway at Wardha.
- 2nd.—That for wagons belonging to the Railway Company which are handed over at Wardha to the State Railway to be worked to Warora for loading with coal for the Railway Company, the Conference Rules as to time free of demurrage, &c., are not to take effect, until 24 hours after the time at which the Conference Rules would ordinarily take effect.
- 3rd.—That any wagons of the Railway Company which are sent under load to any station on the State Railway, may be worked by the State Railway authorities to the Colliery for back loading, without incurring the penalty for wrong sending.
- 4th.—That mileage, at not less than as for 100 miles, is to be paid to the Railway Company for all their wagons going on to the State Railway, and similarly mileage at not less than as for 100 miles, is to be paid to the State Railway for all their wagons going on to the Great Indian Peninsula Railway.

2. These arrangements apply only to wagons of the State Railway, and the Railway Company respectively, and not to the wagons of any other Railway.
 3. The Conference Rules are to be in force in all respects, except as provided herein.
 4. These arrangements are to be considered as being in force from the 1st of January, 1881, and are to continue until the existing Agreement between the parties, dated 25th April, 1879, is cancelled. Any notice to cancel that Agreement is to be also accepted as notice to cancel these supplementary agreements.
 5. Dated Bombay, the 21st July, 1881.
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APPENDIX T.

AGREEMENT BETWEEN THE GREAT INDIAN PENINSULA RAILWAY AND THE NAGPUR-CHHATTISGARH STATE RAILWAY FOR THE INTERCHANGE OF TRAFFIC.

DRAFT MEMORANDUM OF AGREEMENT, dated the _____ of January 1879, and made between the Chief Commissioner of the Central Provinces and the Great Indian Peninsula Railway Company, for the interchange of Traffic between the Chhattisgarh State Railway (hereinafter called the State Railway) and the Great Indian Peninsula Railway (hereinafter called the Railway Company), and for the provision, maintenance, and working of the Railway Company's Station at Nagpur, to be used in common by both Railways.

Term of Agreement.

1. This Agreement to be in force for one year from the date of the opening of the State Railway, and subsequently until the expiration of not less than six months' notice, which may be given, either by the Chief Commissioner or by the Railway Company, at any time, but which is to expire only on either the 30th of June, or the 31st of December in any year.

Joint use of Nagpur Station.

2. During the continuance of this Agreement the State Railway are to be entitled to work their trains into, and out of, the Railway Company's Station at Nagpur, having the joint and equal use, for traffic purposes only, under the terms of this Agreement, of the booking offices, goods sheds, platforms, and all the traffic premises, of the Railway Company. All other offices, premises, and buildings, except the State Railway local goods premises, required by the State Railway, are to be provided by themselves, outside of the boundaries of the Railway Company's land.

The State Railway local goods premises are to be provided and maintained by the State Railway at their own expense, on the Railway Company's land within the limits of the Nagpur Station, and they are to be removed by the State Railway upon the termination of this Agreement.

Payment for joint use of Nagpur Station.

3. The cost of erecting the Nagpur Station buildings, goods sheds, and all premises which are used for traffic purposes, by both Railways, and of such alterations and additions as may be, from time to time required to be used in common by both Railways, is to be ascertained, and the plans and estimates of future alterations and additions are to be agreed upon, from time to time, between the two Railways before any new work is commenced. The expenditure thus incurred and agreed upon, is to be provided by the Railway Company, and an annual rental, at the rate of $7\frac{1}{2}$ per cent. upon the total amount spent from time to time, is to be charged to a "Joint Station Expenses" account.

The actual cost of maintenance and renewal of such parts of the station premises as are used in common by both Railways for traffic purposes, and as are charged against Revenue, is to be also debited to the "Joint Station Expenses" account.

Provision of Sidings for each Railway at Nagpur Station.

4. The cost of laying in, and maintaining, such of the sidings as are required by the State Railway within the limits of the Nagpur Station from time to time is to be borne by the State Railway, and the cost of laying in, and maintaining, such of the sidings as are required from time to time, within the limits of that station, by the Railway Company, is to be borne by the Railway Company.

Compensation to Railway Company for expenditure upon buildings, &c., and removal of State line sidings upon termination of this Agreement.

5. Upon the termination of this Agreement, the State Railway is to compensate the Railway Company, at the time of the expiry of this Agreement, for any expenditure upon station buildings, sheds, or premises which the Railway Company may have incurred in order to accommodate the traffic of the State Railway. The amount of compensation to be paid to the Railway Company to be agreed upon by the Consulting Engineer to the Government of Bombay and the Chief Engineers of the two Railways, due regard being given to the utilization of the premises by the Railway Company, or to the necessity for their removal.

And inasmuch as, under the provisions of clause 4, the State Railway will lay in sidings upon land belonging to the Railway Company, it is expressly agreed that, at the expiration of this Agreement, the State Railway will, at their own expense, remove all such sidings from the Railway Company's land.

State Railway to pay expense of removal of Railway Company's accommodation to make room for State Railway use of Station.

6. The State Railway are to pay to the Railway Company the whole of the cost, beyond what is chargeable to the joint account of the two Railways, of all works required to provide accommodation for the Railway Company, within the Nagpur Station limits, equivalent to that which it is necessary to remove in order to give the State Railway access to, and the use of, the Railway Company's station there. And any alteration of the

existing bridge, which may be required to give the State Railway access to the station, is also to be carried out at the sole expense of the State Railway.

General control of work, of maintenance, &c.

7. All the work of alterations and additions within the limits of the Railway Company's Station at Nagpur is to be done upon plans and estimates agreed upon, from time to time, before the work is commenced, and under the general control of the Engineer of the Railway Company.

All maintenance within the limits of the station is also to be done under the general control of the Railway Company's Engineers.

Reservation of all rights of the Railway Company.

8. This Agreement is not to be held as giving the State Railway any authority, or permission, or right to erect buildings or sheds or lay in sidings, &c., within the Railway Company's boundaries at Nagpur Station except as provided herein, and any notice to terminate this Agreement is to be considered and accepted, as also notice of the withdrawal from the expiration of such notice, of all the rights and privileges given under it, to the State Railway, to enter or use the Railway Company's Station and land at Nagpur.

Duties of Staff at Nagpur Station.

9. The Station Staff at Nagpur will deal with all traffic, through as well as local, and the traffic of the two Railways is to be dealt with in the same manner as if it belonged to one only, no undue preference being given to that relating to either Railway. The Staff at the Nagpur Station to be appointed by the Railway Company, who are to have the exclusive control of the stations and sidings, &c., within the station limits.

Limit of Station defined.

10. The distant signals on either side of the Nagpur Junction Station both on the State Railway, and on the Great Indian Peninsula Railway, are to be considered and accepted as the limit of the station; and the trains and engines and traffic, as well as the Staff of both Railways, are to be under the control of the Station Staff at Nagpur within the limits of the station as thus defined.

Control of Staff while within Station limits.

11. The Staff of the State Railway are, while within the limits of the Nagpur Station, to obey, and be bound by, all the rules and regulations, and also all instructions which may be, from time to time, in force, or which may be issued by the authorities of the Railway Company, and the authorities of the Railway Company are to have the same rights and control over the Staff of the State Railway, while within the limits of that Station, as if they were the Staff of the Railway Company itself.

Responsibility for accidents at Nagpur Station.

12. All damages or accidents which may be caused by the Station Staff at Nagpur to the public; to the stock of the two Railways; to the traffic, whether goods or otherwise, and whether through or local; or which may, from time to time, arise, or occur, within the limits of that station; and all damages or losses which either of the Railways may sustain or be put to, in consequence of the acts of the Station Staff whether arising from carelessness or otherwise, within the limits of that station, are to be charged to the "Joint Station Expenses" account.

Each Railway to be individually responsible for damages or accidents caused by its own Running Staff within station limits.

Through booking of passengers, horses, &c.

13. Passengers and horses, carriages, and dogs are to be booked through between such stations of both Railways, and of other Railways with which the Railway Company may have through booking arrangements, as may be, from time to time, arranged between the Manager of the State Railway, and the General Traffic Manager of the Great Indian Peninsula Railway.

Through booking of goods and parcels.

14. Goods and parcels are to be invoiced and booked through, to and from all goods booking stations on both Railways, and also between all goods booking stations of other Railways, with which the Great Indian Peninsula Railway book through from time to time.

Minimum charges, &c.

15. Consignments of goods of not less than 14 seers in weight are to be booked through between the two Railways, but the minimum charge upon goods traffic booked through is to be as for one maund, and no less charge is to be made than one rupee upon goods traffic, or than eight annas upon parcels traffic, booked through.

Packages of less than 14 seers in weight are to be booked through as parcels. The minimum charge is to be divided in mileage proportion between the two Railways.

Traffic of other Railways to be treated in the same way as G. I. P. traffic.

16. The traffic of Railways, whether Guaranteed or State, other than the Great Indian Peninsula Railway, which may pass on to the State Railway is, in regard to the State Railway, to be treated and dealt with, in all respects, as if it were traffic of the Great Indian Peninsula Railway, except that the rates, fares, charges, &c., of such other Railways, are to be collected and charged upon the State Railway, as the State Railway authorities may be advised, by the Great Indian Peninsula Railway, from time to time.

General arrangements for children; servants, halts during journey, excess luggage, &c., &c.

17. The general arrangements in force, from time to time, upon the Great Indian Peninsula Railway as to charges for children, and for servants accompanying their employers; as to halts during journeys; reserved accommodation; time for which return tickets are available; weight of luggage carried free by the holder of each class of tickets respectively, and the charge for excess luggage; also for troops and their baggage; and

for horses, carriages, stores, ammunition, &c, belonging to Government, and all other general arrangements for both passenger and goods traffic, are to apply to traffic booked through between the two Railways except when, and in such cases, as the General Traffic Manager of the Railway may be advised by the Manager of the State Railway, from time to time, that different arrangements, which may be specified, are to be adopted.

Through rates and fares.

18. Each Railway is to supply the other from time to time with the rates and fares between Nagpur and their respective stations. The through rates and fares are to be in all cases, the sum of the local rates and fares of each Railway to Nagpur including terminals,* and cartage if, and when, that is performed, of both Railways.

Inasmuch as the gauges of the two Railways are different, all goods, &c., will have to be trans-shipped at Nagpur, either Railway will be at liberty to charge its usual terminal for the Nagpur Station, upon through as well as local traffic.*

Notice of alteration of rates, fares, &c.

19. No alteration of rate or fare, or classification affecting the through traffic, is to be made by either Railway, without one month's previous notice to the other. And such notices are to be given only by the Manager of the State Railway, and the General Traffic Manager of the Great Indian Peninsula Railway, to each other respectively.

Collection of through charges.

20. Each Railway is to be responsible for collecting the proportion due to the other Railway upon all through traffic and upon goods traffic invoiced through "To pay." The receiving station is to check the invoices, and to be responsible for collecting any amounts that may be undercharged by the forwarding station, but the receiving station is not to reduce below the charge mentioned in the invoice or through way bill without the consent of the forwarding Railway, except only in cases of errors in rate or calculation, which may be corrected.

Distances.

21. The mileages to Nagpur from stations on each Railway are to be taken in regard to all charges, and all arrangements made in this Agreement, at the distances which may be quoted, from time to time, by each Railway.

Division of receipts upon through traffic.

22. The division of the receipts on through traffic is to be carried out weekly by the Audit offices of the two Railways, without reference to the end of a month, except on the 30th of June and the 31st of December in each year, when returns for odd days completing those months respectively will be required, and the traffic will be divided up to the end of those months accordingly. The weekly accounts are to be made up to Saturdays inclusive, and settlements are to be made monthly on accounts which are to be closed on the last Saturday of each month. And each Railway is to have, in such division, its own local rates and fares, except in the case of minimum charges which are to be divided as provided in clause 15.

Definition of through and local traffic.

23. Traffic booked between stations of the Railway Company and of the State Railway, except Nagpur, or between stations of Railways reached *via* the Great Indian Peninsula Railway and stations of the State Railway, is to be considered as through traffic.

And traffic booked by either Railway to the Nagpur Station is to be considered as local traffic.

Examination of stock of both Railways.

24. Each Railway will be responsible for greasing and oiling and for the examination and proper condition of stock leaving Nagpur Station for their own lines respectively.

Accounts of Junction and inspection of goods, &c.

25. The Station Staff at Nagpur are to keep all such books, statements, &c., as may be required by either Railway from time to time. And they are to render such statements, returns, &c., as either Railway may require direct to the authorities of that Railway from time to time.

The traffic books of all sorts, at that station, and all books, statements, &c., and all through goods, are to be, at all times, open to inspection by any authorized officers of either Railway.

Division of Nagpur Station expenses.

26. The rent referred to in clause 3 and the cost of the Joint Station working, including staff, and all expenditure which is in accordance with this Agreement, to be charged against the Nagpur "Joint Station Expenses" account, are to be paid by the two Railways, in proportion to the weight of the traffic, through and local, of each Railway, in and out of the station. The weight to be considered as due to the coaching traffic is to be ascertained upon the basis laid down in the Schedule following clause 32.

Rate for State Railway stores, coal, &c., over G. I. P. Railway.

27. The State Railway are to pay the Railway Company, upon Ledger accounts to be submitted monthly by the Railway Company, at the ordinary State Railway rates as now in force for the carriage, over the Great Indian Peninsula Railway, of all State Railway stock, stores, material, &c, except coal. And for all coal the State Railway are to pay the Railway Company the same average rate per ton, per mile, as is charged to the Railway Company for coal, carried for them over the Wardha Valley State Railway, from time to time, such rate being understood to include freight, terminals, royalties, and all other charges which are credited as receipts to that line. The loading and unloading services to be performed by the State Railway.

* Terminals on through traffic have been abolished.

- Water supply and greasing of stock.** 28. Each Railway is to make its own arrangements for water supply at Nagpur. And each Railway is to make its own arrangements for greasing or oiling its own vehicles, independently of the Joint Staff.
- Telegrams free.** 29. Telegrams on the joint business of the two Railways to be interchanged free.
- Payment of Accounts.** 30. The accounts for Joint Station Expenses, under clause 26, to be submitted by the Railway Company to the State Railway, within six weeks after the end of each half year, and to be adjusted by the usual transfer certificate in the accounts pertaining to the month in which they are submitted.
- The division of traffic receipts under clause 22 to be settled by the Railway Company and the State Railway, by the usual transfer certificate, in the accounts pertaining to the same month as that to which they relate.
- And the bills for the conveyance of stock, stores, coal, &c., under clause 27 are to be paid during the month after that in which they accrue.
- Upon all amounts due as above the accounts for which are not settled, as rendered (errors being subsequently adjusted) within the specified time as named above, interest at the rate of 5 per cent. per annum is to be paid until the money is actually paid by the State Railway to the Railway Company, or by the Railway Company to the State Railway as the case may be.
- Settlements of disputes.** 31. All questions of dispute which may arise in carrying out these arrangements; as to the construction of any part of this Agreement; or its application to any particular case; or as to the cost of the station to be used in common; or as to the amount for which either Railway is liable for damage of stock, or injury, or loss, at the Junction Station; or with respect to any other questions which may arise, to be settled by arbitration, in some way to be arranged by the Board of Directors of the Great Indian Peninsula Railway, and the Government of India.
- Sanction to Agreement.** 32. This Agreement to be subject to the sanction of the Board of Directors of the Railway Company; of the Government of Bombay; and of the Government of India.

The following are the weights to be allowed under the provisions of clause 26 of this Agreement for each description of coaching traffic, namely:—

SCHEDULE.

1. For each passenger of whatever class	...	...	...	...	1 cwt.
For each child's ticket	...	...	...	...	56 lbs.
2. For each horse or each head of horned cattle	...	...	...	...	1 ton.
3. For each sheep, calf, goat, or pig	...	...	...	...	56 lbs.
4. For each dog or other small animal	...	...	...	...	1 cwt.
5. Parcels at actual weight.					
6. Carriages, each	...	...	...	...	3 tons.

APPENDIX U.

WORKING AGREEMENT BETWEEN THE GREAT INDIAN PENINSULA RAILWAY COMPANY AND THE NIZAM'S STATE RAILWAY.

MEMORANDUM OF AGREEMENT, dated the 29th day of September, 1880, and made between the British Resident at Hyderabad and the Great Indian Peninsula Railway Company, for the interchange of traffic and stock between the *Nizam's State Railway* (hereinafter called the State Railway) and the Great Indian Peninsula Railway (hereinafter called the Railway Company), and for the maintenance and working of the Junction Station at Wadi, which belongs jointly to the two Railways.

Term for continuance of this Agreement and closing of other arrangements.

1. All previous Agreements between the Resident and the Railway Company for the working and maintenance of the State Railway, are to be considered as closed from this date, and this Agreement is to be in force until the expiration of not less than six months' notice, which may be given, either by the Resident or by the Railway Company, at any time, but which is to expire only on either the 30th of June or the 31st of December in any year.

Laying in and maintenance of sidings.

2. A line of division of land between the two Railways having been agreed upon at Wadi, all lines and sidings required by each Railway respectively are to be laid in, and maintained, by each Railway upon their own land.

Joint use of Wadi station.

3. During the continuance of this Agreement the trains of the State Railway are to be entitled to work into, and out of the Railway Company's station at Wadi, having the joint and equal use, for traffic purposes only under the terms of this Agreement, of the booking offices, goods sheds, platforms, and all the traffic premises of the Railway Company. All other offices, premises, and buildings required by the State Railway are to be provided by themselves, outside of the boundaries of the Railway Company's land, and this Agreement is not to be held as giving the State Railway any authority, or permission, or right to come within the Railway Company's boundaries except as provided herein, and any notice to terminate this Agreement is to be considered and accepted, as also notice of the withdrawal of all the rights given under it to the State Railway, to enter or use the station at Wadi of the Railway Company.

Expenditure on junction station buildings and rent.

4. The cost of erecting the junction station buildings, goods sheds, residences for the station staff, and all premises which are used for traffic purposes, and of such alterations and additions as may, hereafter, from time to time, be required to be used in common by both Railways, is to be ascertained, and the plans and estimates are to be agreed upon, from time to time, between the two Railways, before any new work is commenced. The expenditure thus required, and agreed upon, is to be provided by the Railway Company, and an annual rental, at the rate of $7\frac{1}{2}$ per cent. upon the total amount spent, from time to time, is to be paid in equal proportions by the State Railway and the Railway Company.

The actual cost of maintenance and renewal of such parts of the station premises as are used in common by both Railways for traffic purposes, and as are charged against revenue is to be debited to a "Joint Station Expenses" account.

Compensation to Railway Company for expenditure on station buildings on expiry of Agreement.

5. Upon the termination of joint working arrangements at Wadi, the State Railway is to compensate the Railway Company at the time of the expiry of the Agreement, for any expenditure upon station buildings, sheds, or premises which the Railway Company may have incurred in order to accommodate the traffic of the State Railway. The amount of compensation to be paid to the Railway Company to be agreed upon by the Consulting Engineer to Government and the Chief Engineers of the two Railways, due regard being given to the utilization of the premises by the Railway Company or to the necessity for their removal. But so long as the State Railway are willing to continue joint working arrangements with the Railway Company upon terms which they may arrange by mutual consent, or which, in the event of their being unable to agree, may be declared by an arbitrator to be fair and equitable, the foregoing clause shall not come into operation, provided that nothing herein shall prevent either Railway having the power to refuse to continue joint station working, in which case an arbitrator shall decide the amount of compensation, if any, due for expenditure on station buildings, to be paid by either Railway.

Appointment of station staff at Wadi.

6. The Station Staff at Wadi junction station is to be appointed and controlled by the Railway Company.

Station limits.

7. The distant signals on either side of the junction station at Wadi, on the State Railway and on the Great Indian Peninsula Railway, are to be considered as the limits of that station.

- Control of engines and trains and staff at Wadi. 8. The staff, and the trains and engines, and traffic, both through and local, of the State Railway are, while they are within the limits of the Wadi junction station, to be under the entire and absolute control of the Railway Company, and the staff are to obey all signals and to be bound by all rules and regulations, and by all instructions which may be, from time to time, in force upon those parts of the Great Indian Peninsula Railway, or which may be issued by the authorities of the Railway Company. And the authorities of the Railway Company are to have the same rights and control over the trains and staff of the State Railway, within the limits as above defined, as if they were the trains and staff of the Railway Company itself.
- Equal rights as to trains and traffic of both Railways. 9. The traffic and trains of both Railways are to be dealt with at the Wadi junction station, in the same manner as if they were the traffic and trains of one Railway only, no undue preference being given to that relating to either of the two Railways.
- Through booking of passengers, horses, &c. 10. Passengers and horses, carriages, and dogs to be booked through between such stations of both Railways, and of other Railways with which the Great Indian Peninsula Railway Company may, from time to time, have through booking arrangements, as may be, from time to time, arranged between the Manager of the State Railway, and the General Traffic Manager of the Great Indian Peninsula Railway.
- Through booking of goods and parcels. 11. Goods and parcels are to be invoiced and booked through, to and from all goods booking stations on both Railways, and also between all goods booking stations of other Railways, with which the Great Indian Peninsula Railway book through from time to time.
- Traffic of other railways to be treated in the same way as G. I. P. traffic. 12. The traffic of Railways, whether Guaranteed or State, other than the Great Indian Peninsula Railway, which may pass on to the State Railway is, in regard to the State Railway, to be treated and dealt with, in all respects, as if it were traffic of the Great Indian Peninsula Railway, except that the rates, fares, charges, &c., of such other Railways are to be collected and charged upon the State Railway, as the State Railway authorities may be advised by the Railway Company from time to time.
- General arrangements for children; servants; halts during journey; excess luggage, &c., &c. 13. The general arrangements in force, from time to time, upon the Great Indian Peninsula Railway, as to charges for children, and for servants accompanying their employers; as to halts during journeys; reserved accommodation; time for which return tickets are available; weight of luggage carried free by the holder of each class of tickets respectively, and the charge for excess luggage; also for troops and their baggage; and for horses, carriages, stores, ammunition, &c., belonging to Government, and all other general arrangements for both passenger and goods traffic, are to apply to traffic booked through between the two Railways, except when, and in such cases, as the General Traffic Manager of the Railway Company may be advised by the Manager of the State Railway, from time to time, that different arrangements, which may be specified, are to be adopted.
- Through rates and fares. 14. Each Railway is to supply the other from time to time with the rates and fares between Wadi and their respective stations. The through rates and fares are to be, in all cases, the sum of the local rates and fares of each Railway to Wadi, including terminals, and cartage if, and when, that is performed, of both Railways.
- But no terminal is to be charged for the Wadi junction station by either Railway upon through traffic.
- Notice of alterations of rates, fares, &c. 15. No alteration of rate or classification affecting the through traffic, is to be made by either Railway, without one month's previous notice to the other. And such notices are to be given only by the Manager of the State Railway, and the General Traffic Manager of the Great Indian Peninsula Railway Company, to each other respectively.
- Collection of through charges. 16. Each Railway is to be responsible for collecting the proportion due to the other Railway upon all through traffic and upon goods traffic invoiced through "to pay." The receiving station is to check the invoices and to be responsible for collecting any amount that may be undercharged by the forwarding station, but the receiving station is not to reduce below the charge mentioned in the invoice or through way bill without the consent of the forwarding Railway, except only in cases of error in rate or calculation which may be corrected.
- Distances. 17. The mileages to Wadi from stations on each Railway are to be taken in regard to all charges, and all arrangements made in this Agreement, at the distances which may be quoted, from time to time, by each Railway.
- Division of receipts upon through traffic. 18. The division of the receipts on through traffic is to be carried out weekly by the Audit offices of the two Railways without reference to the end of a month except on the 30th June and the 31st December, when returns for odd days completing those months respectively will be required, and the traffic will be divided up to the end of those months accordingly. The weekly accounts are to be made up to Saturdays inclusive, and settlements are to be made monthly on accounts which are to be closed on the last Saturday of each month. And each Railway is to have, in such division, its own local rates and fares, except in the case of minimum charges which are to be divided as provided in clause 18.
- Records of stock exchanged. 19. A number-taker is to be employed as part of the joint Station Staff at Wadi, and is to enter the number and description of every vehicle, also of every sheet, loose coupling, &c., which arrives at, and leaves that station, and showing the owning Company's name, the date and time it is so entered; the train by which it arrives at, or leaves that station, and

showing also, in regard to goods wagons, those which are empty, and those which are loaded.

Definition of through and local traffic.

20. Traffic booked between stations of the Railway Company and of the State Railway (except Wadi), or between stations of other Railways reached *via* the Great Indian Peninsula Railway, and stations of the State Railway, is to be considered as through traffic.

And traffic booked by either Railway to the Wadi station is to be considered as local traffic.

Examination of stock, &c., at Wadi.

21. The State Railway and the Railway Company will each appoint carriage examiners at Wadi. All vehicles of all sorts, and loose couplings must be examined by the carriage examiners of both Railways, and any defects or damages of any kind must be entered in a book to be kept for the purpose, and must be signed by both examiners, and their examination and record in this joint book is to be accepted as conclusive, and the only evidence which is to be recognized in regard to the condition of such stock, &c.

The Station Master at the Wadi junction station will be responsible for the condition of all sheets handed over to, and returned by, the State Railway, and for keeping a record of all sheets that are damaged when they are returned.

The cost of repairs of any damages which have been done to the stock, sheets, &c, of either Railway upon the line of the other, is to be borne by the Railway upon which it occurred. The bills for repair of such stock, sheets, &c., are to be adjusted monthly between the Railway Company and the State Railway.

Rules for the interchange of rolling stock as agreed to at Railway Conference, February 1879.

22. *Rule I.*—The day is to be reckoned as 24 hours, commencing at midnight, Madras time being adopted in all cases. The week to end at midnight on Saturday.

No *dies non* to be allowed under these rules.

Rule II—All stock to be considered as handed over when entered in the number-taker's book at the junction station, and it is to be so entered directly it is put into the lines or sidings in which such stock is usually placed for that purpose.

Rule III.—Passenger carriages, horse boxes, carriage trucks, brake-vans, and passenger road or luggage vans, are to be, in all cases, reckoned as coaching vehicles, whether they run upon passenger or goods trains. All other kinds of vehicles are to be reckoned as goods vehicles.

Rule IV—No return vehicle shall be run, whether loaded or empty, unless otherwise mutually arranged, on any other than the exact route to its own line by which it was received, under a penalty of 22 Rupees per diem from the time it was mis-sent, until it returns to a station on the route by which it was received.

Vehicles may be loaded on their return journey to any station on the owning line.

Rule V.—So soon as the rolling stock of any Railway passes into the custody or possession of any other Railway, such other Railway is to be responsible for all and every contingency that may arise from the use of such stock while it remains in their possession. Except that if the contingency is clearly traceable to defect of material or workmanship, the actual repair or replacement of the vehicle in which there was such defect, but not of any other vehicle or any other consequent damage, is to be at the expense of the owning Railway.

The cost of repairs arising from ordinary wear and tear to be always borne by the owning Railway, but cases of palpable damage (such as dropping heavy weights into wagons and so damaging the bottoms, neglect of greasing or oiling and other similar neglects), and all cases of accidents or collision to be borne by the Railway in whose custody or possession the stock may be at the time the damage occurs.

No claim shall be admitted for the cost of repairs of stock unless sent to the Railway which is responsible for the payment of it, within three months of the time at which the repairs are completed.

Rule VI.—Six additional days to be allowed in case of damage to the stock of either Railway on the line of another Railway for the repairs of such stock, and no demurrage shall be charged for those six days. But if the damage is such as will require longer than six days to complete the repair, the stock must be returned to the owning Railway. If not sent within the six additional days, whether repaired or not, demurrage will be charged after the expiration of the six days unless specially exempted by the Traffic Manager of the owning Railway. Notice to be sent within one month to the owning Railway in all cases how and when the damage took place and the nature of it.

Rule VII.—The exchange of passenger stock to be subject in extent to mutual arrangement between the respective Railways.

Rule VIII.—The mileage charge on coaching vehicles to be 7 pies per mile

APPENDIX U—*continued.*

both on the outwards journey and in returning, except that no mileage is to be charged on the return journey for horse boxes, carriage trucks, hospital carriages, prison vans, and special saloon carriages not used for ordinary traffic, unless returning under load.

Double horse boxes while carrying four or more horses to be counted and charged mileage as two vehicles.

Rule IX.—Coaching vehicles to be allowed one hour for every twelve-and-a-half ($12\frac{1}{2}$) miles run on foreign lines, and 24 hours extra at destination, free of demurrage.

Rule X.—Demurrage to be charged on all coaching vehicles detained beyond the time named in rules VI and IX at the rate of 8 annas per hour.

Rule XI.—The interchange of goods stock to extend to all connected lines and branches. A fair proportion of through traffic being accepted at junctions in time of pressure.

Rule XII.—All consignments of less than three tons to be trans-shipped at junction. In all other respects the interchange of goods traffic and stock shall be unrestricted.

Traffic Managers are at liberty to make exceptions by mutual agreement as to the amount to be trans-shipped in cases of consignments which, from their bulk or weight, fully occupy a wagon, or require exceptional care, such as furniture, glass-ware, stationery, millinery, pictures, musical instruments, &c., &c.

Rule XIII.—No mileage charge to be made on goods vehicles when running empty.

Rule XIV.—That subject to the proviso in rules XIII and XVIII mileage be paid to the sending Railway for goods vehicles of all descriptions at the rate of two-thirds ($\frac{2}{3}$ rds) of a pie per ton, or fraction of a ton of goods conveyed in either direction in such vehicles, in respect of every mile a goods vehicle of one Railway may carry goods on the line of another Railway.

Rule XV.—Goods vehicles to be allowed one hour for every $6\frac{1}{2}$ miles run on a foreign line, and 24 hours for unloading and 24 hours for re-loading at destination, and 12 hours at intermediate stations for each of these operations, free of demurrage.

Rule XVI.—Demurrage to be charged on all goods vehicles detained beyond the time named in rules VI and XV at the rate of one anna per ton of carrying capacity per hour.

Rule XVII.—That the receiving Railway may call upon the forwarding Railway to accept empty wagons with a view to equalize the ton-mileage.

Rule XVIII.—The Railway on which through traffic originates shall provide wagons for such traffic. But when the through traffic offering is more than the wagon stock of the sending Railway can cope with, it may call on the receiving Railway to place a certain daily average capacity of wagon stock at its disposal at the junction for traffic to, and *vid* the receiving line; and in the event of failure to comply wholly or in part within one week, the sending line shall be entitled to charge two pies per ton-mile on all traffic to the extent of the wagon stock short supplied, which it may send through in its own stock: provided that the receiving Railway shall not be required to supply more wagons than sufficient to maintain an equal interchange of stock based on the carrying capacity. Open wagons to be accepted if supplied with proper sheets and ropes.

Rule XIX.—In case any goods vehicles are loaded on the homeward journey to any station short of the junction with the owning Railway, the Audit offices of the respective Railways shall make a special return of the same to each other, and the mileage charge under rule XIV shall be charged to the Railway so loading such wagons.

Rule XX.—Whatever amount is paid for mileage, and penalty for wrong sending by any Railway for the use of vehicles of other Railways is in all cases to belong to and be paid over to the owning Railway.

Rule XXI.—Each Railway to accept the statements of other Railways with respect to the loads and wagons, unless the number-takers at the junction notice and record that the loads have been interfered with, when the actual contents and their condition must be ascertained and recorded by a responsible officer of the receiving Railway.

Rule XXII.—The accounts referring to any mileage or demurrage question in which any sending Railway is concerned shall be open to the inspection of such Railway.

Railway Conference, January 1880.
Meeting No 6, January 12th, 1880, with regard to rule XVII.

23. *Minute 36* —Mr. Saunders stated that since the introduction of the rules for interchange of rolling stock passed at the last Conference, questions have arisen respecting the working of rule XVII. And the East Indian and Great Indian Peninsula Railway Companies join with the Madras Railway Company requesting that this rule may be discussed by the Conference before it separates. It was agreed to discuss the question.

Minute 37.—Proposed by Mr. Leslie and seconded by Mr. Saunders, that —Rule XVII should only be brought into force when the daily average excess of wagons passing the junction in one direction exceeds for one week 30 per diem, and in that case the forwarding Company should not be called upon to take more than one-third of such excess number in empties. The demurrage on these empties to be paid at the rate of two pies per ton of carrying capacity per hour instead of at the usual rate. This ruling to have force from the 1st January, 1880. Carried without dissent.

Railway Conference, 1880.
Meeting No 7, January 13th, 1880.

Minute 40.—Proposed by Mr. Ross that to ruling in Minute 37 be added— That 48 hours' notice be given by wire by the receiving Company of its intention to forward empties

This was agreed to

Railway Conference, 1880.
Special Meeting, January 28th, 1880. Through and local goods traffic arrangements with regard to minimum charges, &c

24. That the minimum weight to be despatched by goods train be 14 seers.
The minimum charge be 8 annas.
The minimum distance charged, 10 miles.
That subject to the minimum charge, fractions of a quarter of a maund (82½ lbs.) be charged as a quarter of a maund, thus —
121 seers would be reckoned 3¼ maunds.
26 " " " ¾ "
14 " " " ½ "

That these rules for fractions and minimum charges apply to each class of goods in each consignment.

That in calculating the charge, if the total for each consignment give a fraction of an anna, of six pies, or more, such fraction be charged as one anna, if the fraction be less than six pies, such fraction be not considered.

That minimum charges on through goods be divided according to mileage

That fractions of a mile be charged as one mile

Payment by State Railway for stock of other than engines.

25 The State Railway are to pay to the Railway Company whatever amount for mileage, or demurrage, penalty for wrong sending, or otherwise the Railway Company may have, from time to time, to pay to any other Railway for stock of such other Railway passing over the State line, such stock, &c., being, in all other respects, treated as if it was stock, &c., of the Railway Company.

The stock of State Railways, other than the Nizam's State Railway, is to be dealt with and treated, for the purpose of this Agreement, either in the same manner as stock of other foreign Railways, or as if it were part of the stock of the Railway Company, as the case may be. The State Railway are to be, from time to time, advised of the payment for mileage, demurrage, &c., which may have to be paid by the Railway Company, to other Railways, whether State or Guaranteed.

Greasing of stock.

26. Each Railway to make its own arrangements for greasing and oiling its own vehicles at the junction station, independently of the joint staff.

Responsibility for accidents at Wadi junction station.

27. All damages or accidents which may be caused by the Wadi junction station staff to the public, or to the stock, of either of the two Railways, or to the traffic, whether goods or otherwise, and whether through, or local, or which may, from time to time, arise or occur, within the limits of the Wadi junction station, and all damages or losses which either of the Railways may sustain, or be put to in consequence of the acts of the junction Station Staff, whether arising from carelessness or otherwise, within the limits of that station, are to be paid in equal proportions by the two Railways.

Each Railway to be individually responsible for damages or accidents caused by its own running staff within station limits.

Repair of engines and stock of the State Railway by the Railway Company

28. The Railway Company agree to repair and maintain any and all stock, including engines, which may be provided by the Resident for working the State Railway from time to time, at the actual cost, with the addition of 30 per cent. on Indian expenditure, for shop charges and supervision.

The repairs of State Railway stock and engines are to be carried out at Parel, or, in the discretion of the Locomotive Superintendent of the Railway Company, at any locomotive depôt nearer to Wadi at which the necessary accommodation and appliances may be available.

Settlement of claims

29. Claims for compensation for goods, parcels, &c, lost or damaged are to be settled and paid by the Railway in whose custody the loss or damage occurred

When the responsibility for loss or damage cannot be ascertained with certainty, the claim is to be divided in mileage proportion between the Railway Companies concerned; but in such cases, the previous consent of the Manager of the State Railway, and the General Traffic Manager of the Great Indian Peninsula Railway is to be obtained before any settlement is made.

- Accounts at Wadi, and inspection, of goods, &c. 30. The Joint Staff at Wadi are to keep all such books, statements, &c., as may be required by either Railway from time to time. And they are to render such statements, returns, &c., as either Railway may require direct to the authorities of that Railway from time to time.
- The traffic books of all sorts at the junction station at Wadi, and all books, statements, &c., and all through goods, are to be at all times open to inspection by any authorized officers of either Railway.
- Rate for State Railway stores, coal, &c., carried over G. I. P. Railway. 31. The State Railway are to pay the Railway Company, upon ledger accounts to be submitted monthly by the Railway Company, at the ordinary State Railway rates as now in force for the carriage over the Great Indian Peninsula Railway of all State Railway stores, material, &c., except coal, and for vehicles, including engines, belonging to, or in use by, Government running over the Great Indian Peninsula Railway to any of their locomotive stations for repair. And for coal they are to pay at the rate of six-and-a-half pies per ton per mile without any terminal charge, the loading and unloading services being performed by the State Railway.
- Water supply. 32. Each Railway to make its own arrangements for water supply at Wadi.
- Free telegrams. 33. Telegrams on the joint business of the two Railways to be interchanged free.
- British currency only to be recognized for the purposes of this Agreement. 34. Payments and accounts of all sorts between the two Railways are to be made only in British currency. And the rates and fares and traffic charges of all sorts are also to be, at all times, made and collected in British currency only at Wadi. The rate and fare lists to be supplied by the State Railway to the Railway Company in accordance with clause 14 of this Agreement to be in British currency only.
- Payment of accounts. 35. The accounts for joint station expenses, under clause 4, to be submitted by the Railway Company to the State Railway within six weeks after the end of each half-year, and to be paid in cash within 60 days from date of receipt of the account.
- The division of traffic receipts under clause 18; and the accounts for mileage, demurrage, and penalty for wrong sending, &c., and for hire of vehicles under clause 22 are to be settled by the Railway Company and the State Railway monthly as above.
- The accounts for repair of stock, &c., under clauses 21, 22 and 27; and for conveyance of stores, coal, &c., under clause 31 to be paid within 60 days of receipt.
- Upon all amounts due, the accounts for which are not settled, within the specified time as named above, interest at the rate of 10 per cent per annum is to be paid until the money is actually paid by the Resident to the credit of the Railway Company at the Bank of Bombay, or by the Railway Company to the Resident, as the case may be.
- Settlement of disputes. 36. All questions of dispute which may arise in carrying out these arrangements; as to the construction of any part of this Agreement; or its application to any particular case; or as to the cost of the Wadi joint station; or as to the amount for which either Railway is liable for damage of stock, or injury, or loss; or with respect to any other questions which may arise, to be settled by arbitration, in some way to be arranged by the Government of India and the Board of Directors of the Great Indian Peninsula Railway.
- Agreement subject to confirmation. 37. This Agreement to be subject to the sanction of the Directors of the Railway Company; of the Government of Bombay; and of the Government of India.

APPENDIX V.

AGREEMENT FOR WORKING BERAR RAILWAYS BY THE GREAT INDIAN PENINSULA RAILWAY.

Extract from Minutes of Meeting, No. 19 of 1880, held on 15th September, 1880, at the offices of the Great Indian Peninsula Railway Company, Bombay.

91. *Working of Berar Railways.*—Read the following extract from Bombay Government Resolution No. 1498 of 7th June, 1880 :—

I.—The Great Indian Peninsula Railway Company to take over the Berar* Branches from a date to be named (the 1st July, 1880, to be fixed if hereafter found practicable), and to work and maintain them as Branches of their own line, providing all necessary stock and staff. Provided that, before the State Railways are taken over by the Company, they will be placed in a sound and satisfactory condition, so that no undue expenditure for renewal of permanent way material or for completing the banks, ballast, &c., according to standard dimensions, will be thrown upon the Company.

A joint inspection on the part of Government and the Railway Company to be made, to determine the expenditure necessary to effect this, and the sum agreed upon by the Consulting Engineer to Government and the Railway Company's Chief Engineer to be accepted.

II.—The same tariff of rates and fares to be in force on the Berar Branches as on the Great Indian Peninsula Railway. But the extra tolls heretofore levied over the Amraoti line as per margin to be retained unless altered by mutual agreement.

Goods, 3 pies per maund.
Cattle, 2 annas per head.
Horse box, 8 annas
Carriage trucks, 8 annas.
Return horses, 12 annas per horse box.
Return carriages, 12 annas per carriage.
Dogs, 1 anna each.

III.—The Company to be paid for working the lines with their own stock, the same rate per traffic train mile as may have been incurred by them in the working of the Great Indian Peninsula line in the half year.

IV.—Provided that, when the receipts from the traffic on either of the Branch lines are not sufficient to pay the Company's charges for that line calculated on the above basis, plus a charge for interest on Capital cost of stock in use, calculated at the rate of 3 annas per traffic train mile, the State Railway shall make good the difference.

V.—The net profits at the end of each half-year to be divided between the State Railways and the Railway Company in the proportion of three-fifths to the former and two-fifths to the latter.

The accounts of each line to be dealt with separately, and the settlements to be made half-yearly.

VI.—The agreements to be for five years, and terminable upon six months' subsequent notice on either side.

Read Government Resolution No. 2077, dated 12th August, 1880.

Read Board's letter No. 31 of 16th July, 1880.

It was agreed to take the lines over from the 1st November, 1880.

The Khamgaon line to be opened from the 15th November.

Departmental officers to arrange with the Manager of the State lines to take over such of the subordinate staff as they may require who are willing to be transferred.

Should any of the permanent works, such as bridges, station buildings, or other works upon either of the State Railways fail from causes beyond the control of the Railway Company, the cost of replacing and renewing such works is to be borne by the State Railway.

All additional works, such as station buildings, sidings, &c., which may be required for either of the State Railways are to be paid for by the State Railway.

All rolling stock on the State lines to be removed at the expense of the State Railways.

All furniture, fittings, platelayer's tools, lamps, and such like on the State lines to be transferred with the Railways.

The Manager of the State lines to be requested to arrange with the heads of departments for the transfer of serviceable stores.

It is suggested that petty stores under the value of Rs. 50 be not charged for.

In cases where the officers of the Great Indian Peninsula Railway and State lines are unable to agree as to value of stores or material, the same not to be taken over.

APPENDIX W.

WORKING OF THE DHOND AND MANMAD STATE RAILWAY BY THE GREAT INDIAN PENINSULA RAILWAY COMPANY.

MEMORANDUM OF AGREEMENT, made the 17th day of May, 1882, between the Government of Bombay and the Great Indian Peninsula Railway Company, for the working and maintenance of the Dhond and Manmad State Railway (hereinafter called the State Railway) by the Great Indian Peninsula Railway Company (hereinafter called the Railway Company).

Interpretation Clause.	1. Throughout this Agreement, unless otherwise stated, or unless there is something repugnant in the context, the following terms are to have the meanings set opposite to each of them respectively, namely :—
Traffic.	(a). Traffic includes everything that is carried over the State Railway.
Coaching traffic.	(b). Coaching traffic includes passengers, horses, carriages, dogs, parcels, luggage, and all that is booked at what are commonly known as coaching rates.
Goods traffic	(c). Goods traffic includes coal, material, and merchandise of all kinds, also cattle, sheep, &c., and all that is booked at what are commonly known as goods rates.
Telegraph.	(d). Telegraph includes posts, wires, batteries, instruments (of the patterns in use, from time to time, on the Great Indian Peninsula Railway), and all that is necessary for working the telegraph.
Capital	(e). Capital expenditure includes all expenditure of all kinds over Rs. 1,000, which would, under the rules in force, from time to time, on the Great Indian Peninsula Railway, be charged to the Capital account.
Revenue.	(f). Revenue expenditure includes all expenditure of all kinds under Rs. 1,000, which would, under the rules in force, from time to time, on the Great Indian Peninsula Railway, be charged to the Revenue account. <i>Extract para 2 from the letter from the London Board of the Great Indian Peninsula Railway Company, No 37, dated 10th March, 1882.</i> "In reply to para. 2 of your No. 7 B, I have to inform you that the words 'under Rs 1,000, were to be introduced in para f, of Clause 1 of the Memorandum of Agreement, Dhond and Manmad Railway, in order that the interpretation in relation to Capital and Revenue expenditure might be confined to expenditure upon works over and within the limit of Rs 1,000, and this does not conflict with clause 2 (para a), which binds the Company to work and maintain the State line as part of its own undertaking, the charges in connection therewith pertaining alone to Revenue, excepting as is met by the proviso of that clause."
Stations.	(g). Stations include sidings, platforms (where necessary), points, sheds, tank houses, wells, water cranes, signals, approaches, roads, buildings for traffic purposes, dwellings for the traffic station staff, furniture, fittings, lamps, and all other appliances that are required for working traffic, &c., at stations.
Locomotive premises.	(h). Locomotive premises include running sheds, repairing shops, and all other appliances necessary for maintaining and keeping rolling stock in working order.
Rolling stock	(i). Rolling stock includes engines, travelling cranes, brake-vans, water tanks (on their own wheels), pilot trucks, and all other goods and coaching vehicles which are necessary for working the traffic of the Railway.
State Railway.	(k). The term "State Railway" includes all stations, locomotive premises, dwellings for the staff, telegraph and appliances, &c., which form part of the complete undertaking.
Local traffic and telegraph receipts.	(l). Local traffic and telegraph receipts are those which relate to traffic and telegrams which do not pass off the State Railway, and include the receipts for traffic and telegrams, over the State Railway, between Dhond

Provided as regards definitions (e) and (f), that the total expenditure on minor works which may be charged against Revenue in any one half year shall not exceed in the aggregate Rs. 25,000 over the entire system of the Great Indian Peninsula Railway, including the Dhond and Manmad Railway.

- and Manmad; between Dhond and any station on the State Railway; and between Manmad and any station on the State Railway.
- Through traffic and telegraph receipts. (m). Through traffic and telegraph receipts are the share of the receipts due to the State Railway for traffic and telegrams which pass from, or over the State Railway to, or from, stations of the Great Indian Peninsula or other Railways beyond Dhond and beyond Manmad respectively.
- Gross receipts. (n). The gross receipts include the State Railway share of all local and through traffic and telegraph receipts; all amounts received for rent (which are to be collected under the rules in force from time to time on the Great Indian Peninsula Railway), and all other sums received by the Railway Company on account of the State Railway.
- Railway Company to work and maintain State Railway. 2. (a). The State Railway, as hereinbefore defined, was, on the 1st of January, 1881, taken charge of, and from that date it has been, and it is, during the term of this Agreement, to continue to be worked and maintained by the Railway Company as part of its own undertaking in all respects as if it actually belonged to the Railway Company, subject only to the same control of Government through the Consulting Engineer to the Government of Bombay, as is in force upon the Great Indian Peninsula Railway itself, under their contract with Government, the intention being that the State Railway is to be considered and dealt with exactly as if it were the property of the Railway Company, except only as to the provision of Capital for Capital expenditure past, present, and future, which has been and is to be made by Government.
- Term of Agreement. (b). This Agreement is to remain in force until the time when Government have again the option of purchasing the Great Indian Peninsula Railway.
- Previous Agreements cancelled. (c). All previous Agreements between the State Railway and the Railway Company are to be considered as having been cancelled after the end of the year 1880.
- Construction and completion. 3. The State Railway is to be completed at the expense of Government, as funds can be made available in accordance with the sanctioned estimates, temporary works being replaced by permanent works in all cases provided for in those estimates or considered necessary by Government.
- Government to find Capital. 4. Additional works shall be sanctioned as and when considered necessary by Government.
- Rates, fares, tolls, &c. 5. (a). The same rates, fares, tolls, conditions, arrangements, &c., both for public traffic and for troops, &c., are to be in force upon the State Railway as are in force, from time to time, upon the Great Indian Peninsula Railway.
- Traffic to be usually sent by shortest route. (b). The Railway Company undertake to send all traffic over the State Railway when that is the shortest route, except only that passengers are to be allowed to travel (with their luggage) by whichever route they prefer, and that troops are to be carried by whichever route the military authorities may select.
- Charge for carriage of material for Capital works on State Railway. (c). The Railway Company agree to carry, over the Great Indian Peninsula Railway and over the State Railway, material, &c., required for Capital works upon the State Railway, at the same rate as is charged and under the same arrangement as is in force from time to time, for material, &c., required for Capital works upon their own Railway.
- Responsibility for accidents, &c. 6. The Railway Company are to be responsible for all accidents or damages of all kinds upon the State Railway, to the public, to the traffic, to the Railway Company, and otherwise, except in the case of any accident or damage caused by the failure of way or works due to defective construction or extraordinary casualty. Government shall be responsible for any accident or damage that the Company could not have prevented, which may result from any such failure.
- Railway Company to provide rolling stock. 7. The Railway Company are to provide and maintain all rolling stock that may be necessary for working the State Railway.
- Dhond and Manmad Junction Stations. 8. (a). The stations, for traffic purposes, at Dhond and at Manmad, including dwellings for the Traffic Station Staff at those places, are to be provided by the Railway Company.
- (b). All locomotive premises and dwellings for the staff of all Departments (exclusive of the Traffic Station Staff, for which see paragraph (a) of this clause) required at Dhond and Manmad, are to be provided by and at the cost of the Railway Company, a payment being made to the Company by Government proportionate to the requirements of the State Railway at those junctions, to cover interest on the additional capital outlay of the Company due to those requirements.

Manner of maintenance of State Railway.

9. (a). The Railway Company are to maintain the State Railway in the same manner as they do their own Railway, but any expenditure that would not be chargeable to Revenue under the rules in force on the Great Indian Peninsula Railway, or that may arise from extraordinary casualty (clause 6), is to be borne by Government.

Standard width for works and depth for ballast.

(b). The standard width for banks and cuttings at formation level, which has been adopted on the State Railway is 18 feet, and the depth of ballast is 20 inches. The Railway Company are not to be required to do more than maintain these respective standards.

Division of receipts.

10. The gross receipts of the State Railway, as hereinbefore defined, are to be collected and treated as receipts of the Railway Company.

But the Railway Company are to pay to Government for each year, ending on the 31st of December, a proportion, calculated in the following manner, of the gross receipts of the State Railway, namely :—

(a). Whenever the gross receipts for any year amount to five lakhs of rupees, or less, the Railway Company are to pay to Government a sum equal to 20 per cent. of such gross receipts.

(b). Whenever the gross receipts for any year exceed five lakhs of rupees, the 20 per cent. to be paid to Government by the Railway Company is (subject to the provisions of para. (c) of this clause) to be increased by one per cent. for each lakh, or portion of a lakh of rupees, in excess of five lakhs: the total percentage, thus ascertained, being paid upon the gross receipts.

For instance, if the gross receipts should amount, in any year, to, say, Rs. 5,62,500, the Railway Company are to pay to Government 21 per cent. on that amount, or if the gross receipts should amount to say, Rs. 8,20,641, the payment to Government is to be at the rate of 24 per cent. upon that sum.

(c). Provided that the Railway Company are never to be required to pay to Government, in any year, such a sum as will leave the Railway Company less, for working and maintenance of the State Railway, than 10 per cent. in excess of the mean rate of percentage cost (reckoned upon the gross receipts) of working their own and other Railways worked by them for that year.

For instance, if the total working expenses of the Great Indian Peninsula Railway (including the expenses of working the Dhond and Manmad and other Railways which may be worked by the Railway Company) should, in any year, be equal to, say, 54 per cent. of the gross receipts, then the Railway Company are to retain not less than 64 per cent., and to pay to Government not more than 36 per cent. of the gross receipts of the Dhond and Manmad State Railway.

(d). Whenever the gross receipts of the first half of any year amount to Rs. 2,50,000, or less, the Railway Company are to pay Government a sum equal to 20 per cent. of such gross receipts.

(e). Whenever the gross receipts of the first half of any year exceed Rs. 2,50,000, the 20 per cent. to be paid to Government by the Railway Company is (subject to the provision of paragraph (f) of this clause) to be increased by one per cent. for each half lakh or portion of half lakh of rupees, the total percentage thus ascertained being paid upon the gross receipts.

(f). Provided that the Railway Company are never to be required to pay to Government in any half year such a sum as will leave the Railway Company less for working and maintenance of the State Railway than 10 per cent. in excess of the mean rate of percentage cost (reckoned upon gross receipts) of working their own and other Railways worked by them for that half year.

(g). A final adjustment for each twelve months should be made at the expiration of the second half of the year, that is, up to 31st December in each year, in accordance with paragraphs (a), (b) and (c) of this clause.

Arbitration in case of dispute,

11. All questions in dispute which may arise under this Agreement are to be settled by arbitration in some way to be agreed between the Railway Company and Government, but failing such agreement, either Government or the Railway Company may, within not less than three months, nor more than six months, after notice given by either party to the other, appoint an Arbitrator, whose decision shall be final.

Sanction to Agreement.

12. This Agreement is to be subject to the sanction of the Government of India, and of the Board of Directors of the Railway Company.

APPENDIX X.

AGREEMENT BETWEEN THE BOMBAY, BARODA AND CENTRAL INDIA RAILWAY AND THE RAJPUTANA-MALWA RAILWAY FOR INTERCHANGE OF TRAFFIC AT AHMEDABAD AND SABARMATI.

1. This agreement will come in force on the 1st January, 1882, and will supersede previous agreements.
 2. This agreement will be subject to revision or cancellation from time to time, but three months' notice will be required from either Railway desiring to revise or cancel it.
 3. Coaching and goods traffic will be freely interchanged between the two Railways with such special restrictions as may, from time to time, be agreed to by the Traffic Managers of the two Railways, and subject to the conditions laid down below.
 4. Live stock shall not be booked through except by special agreement.
 5. Packages, weighing more than 5 tons, or exceeding 12 feet in length by 5 feet 6 inches in breadth by 6 feet high, outside measurement, shall not be booked on to the Rajputana-Malwa Railway except by special arrangement, but this restriction shall not include girders, long timber, &c., which can be carried on timber trucks, and which do not exceed 30 feet in length.
 6. If at any time either line should find itself unable, either from want of vehicle stock or engine power, or from any other cause, to receive and forward all the traffic tendered, or likely to be tendered, to it by the other line, it shall be competent for the receiving line to give notice of not less than 14 days to the said other line, of the maximum quantity it will be prepared to receive and forward, and of the period during which the restriction will be necessary; and during such period the said Railway shall not be bound to receive more than the quantity so specified. No undue preference shall in any case be given to the traffic of one Railway over that of the other.
 7. The interchange of traffic in accordance with this agreement will include traffic to or from other Railways with which either contracting Railway has established, or may hereafter establish, through booking.
 8. Each Railway shall be responsible for collecting all charges due to the other on all received traffic, with the exceptions noted below, for which the forwarding Railway shall be responsible.—
 - (1). Charges on live stock of every description.
 - (2). Charges on all articles printed in italics in the classifications of the two Railways, booked either as goods or parcels.
 - (3). Charges on Commissariat and Ordnance stores booked as prepaid.
 - (4). Errors under 1 rupee in the case of transactions with the Military Department, and under 20 rupees in other accounts on freight paid by credit note.
 - (5). Under charges in fares of passengers' tickets, freight on passengers' luggage, and in charges for insurance.
 - (6). Charges on all articles booked and carried with the owner.
 - (7). Under charges on specie, palanquins and carriages.
- The receiving Railway shall not reduce below the charge mentioned in the invoice or through way bill without the consent of the forwarding Railway, except in the case of overcharges, the evident result of error in classification or computation of freight.
9. Each Railway shall furnish the other with tables of the rates to be charged for from the junction of interchange to all its stations. These rates in the case of goods shall, unless special reduction is agreed to, be the same as the local rates, and shall include terminals, cartage charges, &c.
 10. The through rates will be the sum of the rates to the junction of interchange as furnished in accordance with the preceding clause.
 11. The minimum weight of goods for charge will be half a maund, and the minimum charge on through booked goods will be 8 annas, divisible in mileage proportion between the two Railways.
 12. Each Railway shall keep the other informed of its rates and classifications, and no alteration of rules or conditions relating to through traffic shall be made by either Railway without one month's previous notice to the other.
 13. The Audit officers of the two Railways shall exchange weekly division sheets; each Railway to have in division its own rates and charges as quoted for through traffic in accordance with clause 9, except in the case of the minimum charge as provided for in clause 11. All inwards through traffic shall be accounted for within six weeks from the date the invoices pass the junction. A monthly settlement of accounts, based on

the division sheets and statements and bills as rendered, shall be made by transfer certificate, on the understanding that all errors brought to notice will be adjusted without delay in subsequent accounts by the responsible Railway.

14. The week shall in all cases end at 12 o'clock on Saturday night. When the 30th June or 31st December do not fall on a Saturday, two returns shall be rendered, one for the period commencing the first day of the last week to the end of the month,—and another from the first day of the next month up to and including the second Saturday of that month.

15. Sundays, Christmas day, and Good Friday, shall be treated as ordinary working days.

16. The day shall in all cases be reckoned as 24 hours commencing at 12 o'clock at night, part of a day being reckoned as a day. Madras time will be adhered to.

17. All goods exchanged between the two Railways, * except such as are fully addressed in English or are otherwise clearly distinguishable, shall be marked with letters of a code published in traffic orders, which will indicate stations of despatch and destination and a number by which the consignment can be identified.

18. A record shall be kept at junction stations of all through traffic, in a form approved of by the Traffic Managers of the two Railways.

19. Telegrams on the joint business of the two Railways shall be exchanged free.

20. In case any damage to, or loss of through booked traffic arises otherwise than at a junction station, or through the act or negligence of the junction staff, the Railway in whose custody the through booked traffic was at the time of such loss or damage, will be responsible.

21. † So as to afford the earliest opportunity of check, all such damage or deficiency must be at once brought to the notice of the officials of the Railway concerned in such manner as may be agreed upon by the Traffic Managers.

22. Ahmedabad will be the junction for coaching traffic, and Sabarmati the junction for goods traffic.

23. In the calculation of fares for coaching traffic between Rajputana-Malwa Railway stations and Bombay, Baroda and Central India Railway stations, north of Ahmedabad and *vice versa*, the distance from Sabarmati to Ahmedabad and back will be omitted.

24. The working of the Sabarmati goods transfer station will be paid for and controlled by the Rajputana-Malwa Railway.

25. An official, appointed by the Bombay, Baroda and Central India Railway, will hand over invoices for down traffic as soon after the arrival of the Bombay, Baroda and Central India Railway wagons as possible, and will receive invoices for up traffic as soon after the loading Bombay, Baroda and Central India Railway wagons as possible. This official will also be communicated with in cases coming under the operation of clauses 20 and 21.

26. The Rajputana-Malwa Railway shall have control over all movements of vehicles within the Sabarmati transfer yard.

The transfer yard will be taken to include—

(1). All narrow gauge lines in the transfer yard, and up to the Bombay, Baroda and Central India Railway signal protecting the junction of the broad and narrow gauge lines north of the Sabarmati bridge.

(2). The broad gauge lines leading to the transfer yard outside the junction points of the Bombay, Baroda and Central India Railway, and such lines unconnected with the main line as may from time to time be agreed upon as necessary.

27. Wagons taken to Sabarmati by Bombay, Baroda and Central India Railway engines will be considered as made over to the junction staff, when they are delivered in such siding as may be ordered by the Station Master of the transfer yard. Delivery will be made in the transfer yard if possible. If not possible, delivery will be reckoned from the time the wagons are delivered in the Bombay, Baroda and Central India Railway siding at Sabarmati.

28. Broad gauge shunting engines will be furnished as required by the joint Station Master in charge of the transfer station, within 12 hours of notice being given to the Locomotive Foreman at Ahmedabad.

29. No inwards loaded Bombay, Baroda and Central India Railway wagon, or wagon belonging to any railway exchanging rolling stock with the Bombay, Baroda and Central India Railway, shall be detained under load beyond 24 hours after its delivery, as provided for in clause 27; and should any wagon be so detained, the Rajputana-Malwa Railway shall be liable to a charge for demurrage payable to the Bombay, Baroda and Central India Railway of one anna per ton of carrying capacity per hour.

30. The Bombay, Baroda and Central India Railway shall, on the requisition of the Station Master provide sufficient wagons for traffic booked through from the Rajputana-Malwa Railway; and should the

* NOTE 17. In the case of large consignments of packages or bags of the same description, size, and weight, the marking of one package in 20 will be considered sufficient.

† NOTE 21. It will be the duty of the junction staff to advise sending stations the same day that goods are unloaded of any articles that may be short received, received in excess, or in bad condition, and enter full particulars in a book or books to be kept for the purpose. In the case of goods short received from the Bombay, Baroda and Central India Railway, the Police Department of that line will be advised in the usual printed form, and should the missing articles be of a valuable character, the Bombay, Baroda and Central India Railway representative at Sabarmati must be communicated with at once.

Bombay, Baroda and Central India Railway fail to provide wagons as required after 24 hours' notice, the Bombay, Baroda and Central India Railway shall be liable to a penalty of one anna per hour per ton of such goods as are detained for want of Bombay, Baroda and Central India Railway wagons. Any failure to make wagons available through want of shunting power, will be treated as failure to supply wagons. Inwards loaded Bombay, Baroda and Central India Railway wagons are to be considered as available for outward loading.

31. Should wagons in excess of the ordinary requirements of the traffic be at any time obtained on requisition from the Bombay, Baroda and Central India Railway, and should such wagons not be used, the Rajputana-Malwa Railway shall be liable to a penalty of one anna per ton of carrying capacity from time of receipt to time of return. But this penalty shall not apply to such stock as may be stood in the Sabarmati yard for mutual convenience.

32. The penalties laid down in the preceding three clauses shall not apply to girders, timber, and such heavy and bulky articles as may from time to time be exempted by special agreement between the Traffic Managers.

33. Should down traffic, *i. e.*, traffic from the Bombay, Baroda and Central India Railway, be at any time detained at Sabarmati for want of invoices, and should the weight of such detained traffic exceed 100 tons, a penalty of one anna per hour per ton will be paid by the Bombay, Baroda and Central India Railway to the Rajputana-Malwa Railway for any time, in excess of 24 hours, such traffic is detained for want of invoices.

34. Traffic for which invoices are not to hand will not be loaded up unless sufficiently marked for complete identification.

35. The Rajputana-Malwa Railway will be responsible for all through booked goods while in the transfer station yard, with the two following exceptions, *viz.* :—

- (1). Goods which the Rajputana-Malwa Railway may not receive under terms of clause 6 will be at the risk of the Bombay, Baroda and Central India Railway.
- (2). The Bombay, Baroda and Central India Railway shall become responsible for contents of all wagons of upwards goods from 24 hours after loading up in broad gauge wagons.

36. The working of the passenger station at Ahmedabad will be paid for and controlled by the Bombay, Baroda and Central India Railway. This working will include both the through and local coaching work of the two lines at Ahmedabad, and the formation and receipt and despatch of both broad and narrow gauge trains.

37. At Sabarmati each Railway will arrange for the disposal of its own local traffic, both goods and coaching, and at Ahmedabad each Railway will arrange for its own local goods shed work.

38. The Station Master in charge of the trans-ship station at Sabarmati and the Station Master at Ahmedabad shall carry out the orders of the Traffic Managers of the two Railways regarding the special work of each line as affecting the junction station, and he shall render all working and audit returns required by each Railway from its own Station Masters. Timely notice must be given by each Railway of its procedure and requirements.

39. The working of, and books connected with, the through traffic arrangements at Sabarmati and Ahmedabad shall be open to the inspection of the officers of either line.

40. The Rajputana-Malwa Railway shall have running powers over the Sabarmati bridge of the Bombay, Baroda and Central India Railway, and over the narrow gauge line laid on the Bombay, Baroda and Central India Railway ground between Sabarmati and Ahmedabad. But the control over the running of engines and trains on the line between Ahmedabad and Sabarmati will remain with the Bombay, Baroda and Central India Railway, and no engine or train must leave Sabarmati for Ahmedabad, or *vice versa*, without a line clear message obtained from the Bombay, Baroda and Central India Railway Station Master.

41. Each Railway will accept all risks connected with its own local traffic in or out of Ahmedabad and Sabarmati. It will also accept all risks connected with the movement of engines or vehicles of its own gauge within junction stations.

Any repairs necessary to render broad gauge stock fit for running will be effected by the Bombay, Baroda and Central India Railway.

Notice of damage to broad gauge stock occurring in the transfer yard will be given to the local representatives of the Bombay, Baroda and Central India Railway.

42. Each Railway will make its own arrangements for greasing and cleaning its own vehicles at junction stations.

43. Each Railway will provide the junction stations with all tickets and working and audit forms required for its own work.

44. At the Sabarmati and Ahmedabad stations both Railways shall have joint and equal use of the offices and platforms devoted to the use of the two lines. The Rajputana-Malwa Railway shall have the separate use of buildings provided at Ahmedabad for the local goods traffic of the State line.

45. The narrow gauge line between Ahmedabad and Sabarmati will run alongside the broad gauge on the Bombay, Baroda and Central India Railway land, except over the Sabarmati bridge, where for the present the narrow gauge metals will be laid between the broad gauge metals.

46. Each Railway will supply all materials of its own gauge required for construction and maintenance of the line between Sabarmati and Ahmedabad and the two junction stations. Excepting the cost of permanent way material of the other Railway, each Railway shall pay for all lines within its own boundaries.

47. At Sabarmati all platforms, offices, and quarters, required for the transfer yard work and for establishment appointed by the Rajputana-Malwa Railway, will be provided and maintained by the Rajputana-Malwa Railway. At Ahmedabad the Bombay, Baroda and Central India Railway will provide and maintain all platforms, offices, and other buildings, required for the passenger traffic of both lines,—except that a shed, of design to be approved of by the authorities of both Railways, may be put up on the narrow gauge extension of the Ahmedabad platform at the expense of the Rajputana-Malwa Railway.

48. No rent shall be paid by the Bombay, Baroda and Central India Railway to the Rajputana-Malwa Railway for the use of the goods transfer yard at Sabarmati; nor shall rent be paid by the Rajputana-Malwa Railway for the use of the Bombay, Baroda and Central India Railway station buildings and platform at Ahmedabad.

49. The Rajputana-Malwa Railway shall pay the Bombay, Baroda and Central India Railway Company $7\frac{1}{2}$ per cent. on one-third of the capital expenditure on the Sabarmati bridge, and this rent will include all charges for maintenance of the bridge.

50. The Rajputana-Malwa Railway shall also pay the Bombay, Baroda and Central India Railway $7\frac{1}{2}$ per cent. on all additional capital outlay in the Ahmedabad yard, and between Ahmedabad and Sabarmati excluding the Sabarmati yard, incurred up to the present time in bringing the narrow gauge line into Ahmedabad, and $7\frac{1}{2}$ per cent. on one-third the capital outlay on fencing and level crossings between the Sabarmati bridge and Ahmedabad station. This rent will include maintenance.

51. Half the cost of the capital outlay jointly agreed to on the old transfer station at Sabarmati (omitting the cost of such buildings as may be retained for the purposes of either Railway) shall be refunded to the Railway which incurred the outlay, and the charge for interest on this account shall cease.

52. Should the State Railway at any time determine to cease running trains from and to Ahmedabad and Sabarmati, it will refund to the Bombay, Baroda and Central India Railway such additional outlay as has been incurred on taking the narrow gauge line from Sabarmati to Ahmedabad, and the charge for interest will then cease, but the amount refunded will be reduced by the then value of any buildings abandoned by the Rajputana-Malwa Railway, and the narrow gauge material may be removed by the Rajputana-Malwa Railway.

53. All questions which may arise in carrying out these arrangements upon which the Traffic Managers of the two Railways cannot agree, shall be referred to the Manager, Rajputana-Malwa Railway, and the Agent, Bombay, Baroda and Central India Railway, and in case of any difference of opinion between the two Railways as to the construction of any part of this agreement, or as to its application to any particular case, it shall be open to either Railway to call for an arbitration to be conducted in the usual way.

APPENDIX Y.

AGREEMENT BETWEEN THE GREAT INDIAN PENINSULA RAILWAY COMPANY AND THE HOLKAR STATE RAILWAY FOR WORKING THE THROUGH TRAFFIC AT KHANDWA STATION.

The following Memorandum of Agreement between the Holkar State Railway and the Great Indian Peninsula Railway Company, for the interchange of traffic, and for the provision, maintenance, and working of the station at Khandwa, to be used in common by both Railways, was agreed to.

1. This agreement to be in force for one year from the date when the trains of the Holkar State Railway commence to run into and out of the Khandwa station, and until the expiration of six months' notice to be given at any time after the first twelve months by either of the Railways.

2. During the continuance of this agreement the train of the Holkar State Railway are to be entitled to work into and out of the Great Indian Peninsula Railway Company's station at Khandwa, having the joint and equal use, for traffic purposes only, under the terms of this agreement, of the booking offices, goods sheds, platforms, and all the traffic premises of the Great Indian Peninsula Railway Company. All other offices, premises and buildings required by the Holkar State Railway are to be provided by them outside of the boundaries of the Great Indian Peninsula Company, and this agreement is not to be held as giving the Holkar State Railway any authority or permission or right to come within the Great Indian Peninsula Railway Company's boundaries except as provided herein, and any notice to terminate this agreement is to be considered and accepted, as also notice of the withdrawal, of all the rights given to the Holkar State Railway under it.

3. The cost of laying in and maintaining such of the sidings as are used by the Great Indian Peninsula Railway Company within the limits of the Khandwa station is to be borne by the Great Indian Peninsula Railway Company. The cost of laying in and maintaining such of the sidings as are used by the Holkar State Railway is to be borne by the State Railway, and at the expiration of this agreement such sidings are to be removed by the Holkar State Railway without any expense to the Great Indian Peninsula Railway Company. All work connected with the construction of the Holkar State Railway within the limits of the Khandwa station is to be done under the general direction and control of the Engineer of the Great Indian Peninsula Railway Company, and in accordance with the certified plan, and all maintenance work within the said limits is to be done under the general control of the Engineer of the Great Indian Peninsula Railway Company. The cost of erecting the station buildings, goods sheds, and all the premises which are used for traffic purposes, and of such alterations and additions as may from time to time be required to be used in common by both railways, and which are, or may be hereafter, a charge against Capital, is to be ascertained, and the plans and estimates are to be agreed upon, from time to time between the authorities of the two Railways before the work is commenced. The Capital thus required and agreed upon is to be provided by the Great Indian Peninsula Railway Company, and an annual rental at the rate of $7\frac{1}{2}$ per cent. upon the total amount spent from time to time is to be charged to the "joint station expenses" and paid to the Great Indian Peninsula Railway. The actual cost of maintenance and renewal of such parts of the station premises as are used in common by both Railways for traffic purposes, and as are charged against Revenue, is also to be debited to the "joint station expenses." On the termination of the agreement, the Holkar State Railway is to compensate the Great Indian Peninsula Railway Company for the value at the time of the expiry of the agreement, of any expenditure on station buildings, sheds or premises which the Great Indian Peninsula Company may have incurred in order to accommodate the traffic of the Holkar State Railway, such value to be agreed upon by the Consulting Engineer to Government, and the Chief Engineers of the two Railways, due regard being given to the possible utilization of the premises by the Great Indian Peninsula Railway Company, or to the necessity for their removal.

4. The Station Staff at Khandwa will deal with all traffic through as well as local, and the traffic of the two Railways is to be dealt with in the same manner as if it belonged to one only, no undue preference being given to that relating to either Railway. The staff at the Khandwa station is to be appointed by the Great Indian Peninsula Railway Company, who are to have the exclusive control of the station and lines within the station limits.

5. The distant signal on either side of the station on the Holkar State line and on the Great Indian Peninsula Railway, are to be considered and accepted as the limit of the station in each direction respectively, and the trains and engines and traffic as well as the staff of both Railways, are to be under the control of the Khandwa Station Staff within the limits of the station as provided in this clause.

6. The staff of the Holkar State Railway are, while in the limits of the Khandwa station, to obey and be bound by all the rules and regulations, and also all instructions which may be from time to time in force, and which may be issued by the authorities of the Great Indian Peninsula Railway, and authorities of the Great Indian Peninsula Railway are to have the same rights and control over the staff of the Holkar State line, while within the limits of the Khandwa station, as if they were the staff of the Great Indian Peninsula Railway Company itself.

7. All damages or accidents which may be caused by the Khandwa Station Staff to the public, or to the stock of the two Railways, or to the traffic, whether goods or otherwise, and whether through or local, or, which may from time to time arise or occur within the limits of the Khandwa station, and all the damages or losses which either of the Railways may sustain, or be put to, in consequence of the acts of the station staff,

whether arising from carelessness or otherwise, within the limits of the Khandwa station, are to be charged to the "joint station expenses" account.

8. The 1st, 2nd and 3rd class passengers and horses, carriages, and dogs are to be booked through between stations within 100 miles of Khandwa on both Railways, and also between such other stations on both lines as may from time to time be agreed upon between the two Railways, it being understood that all the principal stations on both Railways should be entitled to book through.

9. That the holders of through tickets for distances of over 200 miles are to be allowed one day extra for every additional 200 miles, on the through distance, to enable them to break their journey if they wish to do so at any place or places along the route at which the mail train stops.

10. That no charge be made for children under 3 years, and half fares for children over 3 and under 12 years of age. That dhais and ayahs travelling with their mistresses, or with young children, may travel 1st class at 2nd class fare, and 2nd class at 3rd class fare, and that a native man servant in attendance on an invalid may do the same where circumstances are proved to the satisfaction of the Station Master at the starting station, who will issue a certificate to that effect.

11. That no through return tickets be issued except such as may be specially arranged from time to time between the two Railways.

12. That troops and their baggage, Government horses, &c., be booked through between all stations on either Railways under the rules which may be from time to time in force on each Railway respectively.

13. That goods and parcels be invoiced and booked through to and from all goods booking stations on both Railways.

14. Each Railway is to supply the other from time to time with the rates and fares between Khandwa and their respective stations. The rates and fares to be in all cases the sum of the local rates and fares of each Railway to Khandwa, including terminals and cartage when performed of both Railways.

15. That each Railway is to be responsible for collecting the proportion due to the other Railway on all through traffic, and that on goods traffic invoiced through "to pay," the receiving station is to check the invoices and be responsible for collecting any amount that may be undercharged by the forwarding station, but the receiving station is not to reduce below the charge mentioned in the invoice or through way bill without the consent of the forwarding station.

16. That the mileages to Khandwa from station on each line be taken at the distances which may be from time to time advised by each Company.

17. That telegrams on the joint business of the two Railways be interchanged free.

18. Consignment of goods traffic, if not less than 14 seers in weight, can be booked through between the two Railways, but the minimum charge on goods traffic booked through is to be as for one maund, and no less charge is to be made than one rupee on goods traffic booked through. Those minimum charges to be divided on mileage between the two Railways.

19. The division of the receipts on the through traffic is to be carried out monthly by the Audit offices of the two Railways, and each Railway is to have on division its own local rates and fares except in the case of minimum charges as provided in clause 18.

20. All vehicles, except engines, are to be greased or oiled before they start from Khandwa by the staff of that station. The expense of so doing is to be paid by the two Railways in the proportion of the number of vehicles of each leaving Khandwa station, each Railway to make its own arrangements for oiling, &c., of engines, the expense of so doing not being included as part of the expense to be divided as provided in this clause.

21. The rent referred to in clause 3, the cost of the joint station working, including staff and all expenditure, which is in accordance with this agreement, to be charged against the Khandwa "joint station expense," is to be paid by the two Railways, and the apportionment after the deduction of one-fourth as shown below, is to be based on the proportionate weight of the traffic, through and local (as defined in paras. 1, 2, 4,

Meeting held in Poona on 15th September 1877.

and 5 of clause 22) using the station. The weight to be considered as due to the coaching traffic is to be ascertained upon the basis laid down in the scale appended to this agreement. But inasmuch as the Holkar State line is not interested in the through traffic of the Great Indian Peninsula Railway, as defined in para. 3 of clause 22, one-fourth is to be deducted from the total expenses of working the station (including the amount to be charged to the "joint station expenses" under clause 7) and borne exclusively by the Great Indian Peninsula Railway Company at their proportion of the expense of working their own through traffic, and the remainder is to be divided in accordance with arrangement specified.

22. Throughout this agreement the following terms are to be understood to bear the meaning and interpretation named below, viz. :—

- 1st. Great Indian Peninsula local traffic is to include all traffic booked between Khandwa station itself and any station of the Great Indian Peninsula or any other Railway, which may, from time to time, have through traffic arrangements with the Great Indian Peninsula Railway Company.
- 2nd. Great Indian Peninsula "State Railway through" traffic is to include all traffic booked or invoiced through between any station other than Khandwa of the Great Indian Peninsula or other Railway with which the Great Indian Peninsula Railway Company may, from time to time, have through booking arrangements and any station other than Khandwa, of the Holkar State Railway.

- 3rd. Great Indian Peninsula "through" traffic is to include all traffic of the Great Indian Peninsula Railway between places of either side of Khandwa, and which therefore only passes through that place.
- 4th. Holkar State Railway "local" traffic is to include all the traffic booked or invoiced between Khandwa station itself and any station of the Holkar State Railway, or of any other Railway with which the Holkar State Railway may have through booking arrangements.
- 5th. Holkar State Railway "through" traffic is to include all traffic booked or invoiced through between any station other than Khandwa of the Holkar State Railway, or of any other Railway with which the Holkar State Railway may have through booking arrangements, and any station other than Khandwa of the Great Indian Peninsula, or any Railway with which the Great Indian Peninsula Railway Company may, from time to time, have through arrangements.
23. The Khandwa station books are to be kept by the "joint staff," but all such books, and all through goods are to be at all times open to inspection by any authorized officer of either Railway.
24. No alteration of rate or fare or classification affecting the through traffic is to be made by either Railway without one month's previous notice to the other.
25. The principle of this agreement may be extended by each Railway to any other Railway which may be from time to time working in connection with it, the two Railways, parties to this agreement, being responsible to each other for all through traffic so forwarded, as if it were traffic from their own lines respectively.
26. All questions which may arise in carrying out these arrangements, as to the construction of any part of this agreement, or its application to any particular case, or as to the cost of the station works used in common, or as to the amount for which either Railway is liable for damage of stock, or injury or loss or delay to traffic, or with respect to any other question which may arise, and upon which the two Railways cannot agree, to be settled by arbitration in some way to be arranged by the Board of Directors of the Great Indian Peninsula Railway and the Government.

Schedule referred to in clause 21.

The following are the weights to be allowed for the purposes of this agreement for each description of coaching traffic, viz. :—

1. For each passenger of whatever class,	..	..	..	1 cwt.
For each child's ticket,	..	..	..	56 lbs.
2. For each horse, or each head of horned cattle,	..	..	..	1 ton.
3. For each sheep, calf, goat or pig,	..	..	..	56 lbs.
4. For each dog or other small animal,	..	..	..	1 cwt.
5. Parcels at actual weight.				
6. Carriages, each,	..	..	..	3 tons.

Great Indian Peninsula Railway Company, General Traffic Manager's office. Bombay, 21st April, 1881.

The arrangement existing between the Railways which have junctions with us, except with the Madras Railway, is that if there are charges to pay upon through goods which are left on hand, the Railways in whose hands they are pays all charges of other Railways, disposes of the goods and keeps the balance that there may be, or if they should not realize enough to pay the charges, they bear the loss.

2. The Madras Company decline to abide by this rule. I have, therefore, to ask you to note that in any traffic booked to and from stations beyond Raichur, if goods cannot be delivered and have to be sold, the amount realized will have to be set against the amount due for carriage, and the balance, if there should be any, will have to be divided upon mileage, each Company taking its own share; in like manner if there should be any profit, the amount of profit should be divided on mileage and credited to each Railway respectively.

3. I am sorry to have to give you this notice, but my efforts to induce the Madras Railway to accept the general rule have failed, and I can do no other.

4. Please acknowledge receipt of this letter.

APPENDIX Z.

AGREEMENT BETWEEN SIND, PUNJAB AND DELHI AND PUNJAB NORTHERN STATE RAILWAYS.

1. From and after the 1st July, 1882, the Punjab Northern State Railway shall run and haul their own trains into, and have the joint use of the Lahore Junction station and sidings, also of the fuelling and watering buildings, machinery, plant and sidings, and of the engine shed and sidings, at that station, also the exclusive use of the drivers and menial staff quarters and running rooms specially constructed for their use by the Sind, Punjab and Delhi Railway at that station, as per the detailed Schedules hereto annexed; upon the following conditions:—

2. The Sind, Punjab and Delhi Railway shall appoint a joint staff to deal with all the through and local traffic, coaching and merchandise, of the two lines at Lahore Junction station, also with the interchange of through traffic, vehicles, and stock, the cleaning and lighting of vehicles and trains, the signalling and marshalling of trains, and any other service necessary for the working of that station.

3. The said joint staff shall be upon the basis of the various Schedules hereto annexed, and no permanent increase shall be made to the numbers or salaries of either the station staff or police without the concurrence of the Manager of the Punjab Northern State Railway, but in the event of stress of traffic necessitating immediate increase to the staff, the Agent of the Sind, Punjab and Delhi Railway may make temporary arrangements, subject to the subsequent approval of the Manager of the Punjab Northern State Railway.

4. It shall not be competent for any order to be issued by the Punjab Northern State Railway officers to any of the staff of the Lahore station, except through the Station Master, and then only in respect to matters affecting the working of the Punjab Northern State Railway traffic, or in regard to the safe custody of its rolling stock, on which points all orders issued by such officers must be strictly attended to. In the event of any variance existing between any such orders issued, and any rule or regulation in force on the Sind, Punjab and Delhi Railway having reference to the Lahore station and yard, it shall be within the discretion of the Station Master to defer executing such order, or orders, until the same have received the approval of the Company's Traffic Manager. The Examiner of Accounts, Punjab Northern State Railway, may, however, communicate directly with the Station Master upon matters of account.

5. The Punjab Northern State Railway shall accept the same responsibility for all losses caused by errors, defalcations, &c, of the joint staff (so far as their own traffic is concerned) from whatever cause arising as would accrue to them if the station and staff were under their sole control.

6. Debits laid against the joint station staff by the Punjab Northern State Railway for errors in accounts, shall, if necessary, be deducted from the salary or guarantee of the station staff, or otherwise recovered upon proper representation by the Examiner of that Railway.

7. All traffic to Punjab Northern State Railway stations originating at Lahore, shall be booked by the joint staff, and carried in Punjab Northern State Railway's trains, and all traffic booked in Punjab Northern State Railway trains, and terminating at that station, shall be received and dealt with by the said joint staff.

8. The Sind, Punjab and Delhi Railway shall provide the engine power for shunting and marshalling the Punjab Northern State Railway's trains at Lahore Junction at rates hereinafter prescribed.

9. Each Railway shall supply at Lahore station the lamps and other running stores necessary for its own trains, also the tickets, way-bills and other station forms necessary for its own particular purposes, also at both these stations, menial staff, for its own running rooms, and oil and staff for lubricating the vehicles attached to its own trains, also the necessary staff for the examination of its own stock. The Sind, Punjab and Delhi Railway shall supply all other working stores and stationery, and maintain the station and premises subject to the proportion payable by the Punjab Northern State Railway as hereinafter provided.

10. Each Railway shall have equal right in respect to the occupation of the portion set apart for joint purposes at Lahore Junction station, and in respect to the work to be performed by the joint staff, but if required by the other Railway, neither Railway shall occupy with spare vehicles a larger portion of the total siding accommodation than is represented by the average proportion paid during the preceding 3 months for use of the joint station.

11. The times of departure and arrival of all trains shall be mutually arranged by the traffic departments of the two Railways.

12. All trains shall be started under *line clear* messages obtained from the Sind, Punjab and Delhi Railway, and be generally controlled, when running over the Sind, Punjab and Delhi Railway line, by the staff of the Sind, Punjab and Delhi Railway, to whom the servants of the Punjab Northern State Railway shall be then subordinate.

13. In all respects the servants of the Punjab Northern State Railway, while within the limits of the Sind, Punjab and Delhi Railway premises, shall be subject to all the rules and regulations of the Sind, Punjab and Delhi Railway in force for the time being, and applicable specially and generally to such portion of the line or premises.

WORKING AGREEMENTS.

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14. In case of any breach of rules and regulations by servants of the Punjab Northern State Railway, the same will be dealt with by the Traffic Managers or Locomotive Superintendents of the two Railways, and in case of dispute, as to the interpretation of the rules and regulations of the Sind, Punjab and Delhi Railway, the matter shall be referred to the Agent of the Sind, Punjab and Delhi Railway Company, whose decision shall be final.

15. The Punjab Northern State Railway shall be responsible for all damage occurring to their engines and vehicles in Lahore station, and also to the vehicles belonging to any other Railway attached to their trains, from whatsoever cause arising.

16. All damages in Lahore station to foreign stock, which has either come off the Punjab Northern State Railway, or is booked to that Railway, although at the time of damage not actually attached to one of its trains, shall be apportioned between the two Railways.

17. In the event of the Sind, Punjab and Delhi Railway line or stations being obstructed by a disabled Punjab Northern State Railway's train, from whatever cause arising, it shall be the duty of the Sind, Punjab and Delhi Railway staff to clear the line.

The expense incurred, so far as it relates to the removal of the Punjab Northern State Railway's train, shall be refunded by that Railway, but all other expenses in connection with the clearance and restoration of the line shall be debited to the maintenance account of the Sind, Punjab and Delhi Railway.

18. In consideration of the services hereinbefore prescribed, the Punjab Northern State Railway shall pay the following amounts :—

Lahore Junction Station.

19. A share of the cost of the joint station working including staff, stores, stationery, police, labor employed in the trans-shipment of goods, or in cleaning, lighting, shunting, and marshalling trains, &c., in the ratio of the number of trains of each Railway working in and out of the joint station.

The cost of stores of a heavy nature for renewal of plant and furniture to be covered by a fixed percentage of 5 per cent. on capital cost, and included in the joint stores expenses for apportionment.

Fines for negligent working, &c., shall be credited to the Sind, Punjab and Delhi Railway Fine Fund, but in all cases where a specific recovery is made to cover a specific loss, such amounts shall be rateably credited to the joint expenses, or to the Railway having to bear the loss.

20. A share of the following annual charges to cover the cost of rent, maintenance and renewals of the said station (including damages by fire) sidings, &c., apportioned in the same ratio as the station staff referred to in the preceding clause :—

5 per cent. upon a sum of Rs.	to cover interest on capital cost.
5 per cent. upon a sum of Rs. excluding ballast and earthwork.	to cover the cost of maintenance and renewal of permanent way,
2½ per cent. upon a sum of Rs. ings.	to cover the cost of maintenance of all other works and build-
Rents from sweetmeat-sellers, &c., shall be credited rateably in reduction of interest on capital cost.	

21. For shunting in the Lahore station at the following rates :—

Each passenger and mail train,	¼ an hour.
Each mixed or goods train,	1 hour.
General shunting per diem,	2½ hours.

Charge to be made for 5 miles per hour at an average cost per train mile for locomotive expenses, calculated on the actual expense, shown in the Sind, Punjab and Delhi Railway Revenue Account for the previous half-year, plus 5 per cent. thereon to cover interest on the capital cost of the Sind, Punjab and Delhi Railway Company's locomotive stock at work. In the event of carriage of revenue stores being abolished, a percentage shall be also added to cover the cost of carriage of fuel.

22. Claims arising on, or traced to, the staff on the Punjab Northern State Railway, shall be charged to that Railway or *vice versa*.

23. Claims arising at Lahore station on local bookings to and from Punjab Northern State Railway, shall be charged to that Railway or *vice versa*.

24. Through claims on traffic from and to Punjab Northern State Railway and Sind, Punjab and Delhi Railway arising at Lahore station, shall be apportioned in the same ratio as the staff.

25. Through claims on traffic from and to Punjab Northern State Railway and Sind, Punjab and Delhi Railway, which cannot clearly be traced to either Railway, or to the staff at Lahore station, shall be apportioned in the ratio of the mileage of the consignment.

Engine Shed, &c., at Lahore Station.

26. A share of the following charges in proportion to the number of running engines of each Railway (including shunting engines) using the shed :—

5 per cent. upon a sum of Rs.	to cover Interest on Capital cost.
5 per cent. upon a sum of Rs. excluding ballast and earthwork.	to cover the cost of maintenance and renewal of permanent way,
2½ per cent. upon a sum of Rs.	to cover the cost of maintenance of all other works and buildings

27. A similar proportion of the cost of the Sind, Punjab and Delhi Railway Company's fuelling shed,.

watering establishment and other expenditure appertaining thereto, as per detailed Schedule* hereto annexed, (plus a charge of 15 per cent. thereon for supervision.)

Running Room Drivers, &c., Menial Staff Quarters.

28. For use of the quarters specially constructed for their use at Lahore, the following sums :—

5	per cent. per annum upon a sum of Rs.	to cover interest on capital cost.
2½	per cent. per annum	to cover maintenance and renewal.
½	per cent.	to cover ground-rent, water rates, &c.
8	Total	

Carriage of Stores for joint-use.

29. The Company's rate for carriage of revenue stores shall be added to the cost of all stores consumed on joint account.

Fuel and Stores supply to Engines and Trains for other than joint purposes, Repairs, &c.

30. For all supplies in addition to those provided for in this agreement, the Punjab Northern State Railway shall pay, in addition to the actual purchase rate, the cost of handling and conveyance from the Depôts and loss on exchange incurred upon English stores, plus a charge of 10 per cent. for supervision and incidental expenses.

31. For all petty repairs executed to Punjab Northern State Railway engines, the Punjab Northern State Railway shall pay the actual cost of material and labour, plus 20 per cent. to cover supervision, use of machinery, rent of shops, &c.

32. The Punjab Northern State Railway shall pay Rs. 50 per mensem for the combined use of the Sind, Punjab and Delhi Railway Company's hospital, medicines and medical attendance.

33. Any additional capital outlay on joint account, must be approved from time to time by both Railways, and added to the sums particularized in this agreement for the purpose of calculating interest and maintenance.

Duration.

34. This clause shall remain in force for two years certain from 1st July, 1932, after which date it shall be subject to revision upon six months' notice by either Railway.

APPENDIX AA.

CIRCULAR No. XIX RAILWAY.

OFFICERS OF THE LOCOMOTIVE, TRAFFIC, AND STORES DEPARTMENTS WILL NOT BE RETAINED IN THOSE DEPARTMENTS UNLESS EFFICIENT FROM THE POINT OF VIEW OF A RAILWAY COMPANY WORKING WITH A VIEW TO PROFIT.

Fort William, March 4th, 1881.

SIR,—I am directed to request that you will intimate to all officers of the superior branch of the Locomotive, Traffic, and Stores Departments, not under special covenant; and serving under your orders, that the retention of their services in Railway employment under Government is dependent on the efficiency with which they conduct their several duties. Service on State Railways must from its nature differ from service in other Government Departments, and the efficiency of officers will, in consequence have to be measured by tests similar to those that govern service under Railway Companies working with a view to profit.

2. Officers in the superior branches of the Locomotive, Traffic, and Stores Departments of State Railway administration who fail to give satisfaction, will, if transferred for service in these branches from other Departments of Government; be remitted back to their former Department in the grade and position they held at the time they left, other officers who have entered or who will hereafter enter Government service for exclusive employment on State Railways in these branches will, if they fail to give satisfaction, be discharged on the terms laid down in the Civil Pension Code, Section 59, for reduction of Establishment.

APPENDIX BB.

CIRCULAR No. 18, RAILWAY.

NO EMPLOYE Brought INTO THE STATE RAILWAY DEPARTMENT AFTER 1st SEPTEMBER, 1881, WILL BE ELIGIBLE FOR PENSION.

Simla, September 3, 1881.

SIR,—I am directed to intimate that the Government of India has been pleased to extend to all employes on State Railways, not under special covenant, the general principles regarding fitness for service in the Railway Department laid down in Circular XIX Railway of 4th March, 1881.

2. Railway service must from its nature differ from service in other Government departments. Each Railway has to be worked on a commercial basis, so the efficiency of its staff must be measured by tests similar to those that govern service under Railway Companies working with a view to profit.

3. The Railway Provident Institution is now fully established, and provides a fund for the employe which is ever increasing. It also gives every inducement to practice thrift, as it places a "Government Savings Bank" at the door of the employe wheresoever he may be employed. The Provident Institution which is liberally assisted by grants from State revenues is in many respects more valuable than a prospective pension, as realisation is not dependent on specified terms of service, nor is it at any time dependent on the life of the employe. Moreover, the amount at the employe's credit is at all times available for himself, his family, or heirs.

4. I am therefore to request that instructions may be issued to the Managers of all State Railways that no employe, superior or subordinate, clerical or otherwise, brought into the State Railway Department after 1st September, 1881, will be eligible for pension. If after that date it is considered advisable to employ on a State Railway any permanent servant of the State the case must be specially referred.

APPENDIX CC.

Nos. 0101—0112 R.E.

EMPLOYMENT OF NATIVES AS ENGINE DRIVERS AND SHUNTERS.

Fort William, 12th February, 1880.

OBSERVATIONS.—The first proposal for the employment of natives as Engine Drivers on Indian Railways was made in 1859, but little resulted for some years beyond correspondence containing many conflicting opinions.

2. The Government of India have from time to time indicated the policy to be kept in view, and have urged that in the general interests of railway enterprise, it was most desirable, not only with a view to reduction of expenditure, but also with the object of saving Europeans from exposure to heat to which they are not inured, that the staff of drivers imported from Europe should be supplemented by carefully selected and trained men born and descended from persons permanently resident in this country.

3. From the reports which have been received it appears that drivers of Asiatic descent or natives are now employed as follows :—

South Indian Railway.—One driver on a ballast train, and six shunters.

Madras Railway.—Several are employed as drivers of the local trains between Potanor and Coimbatore, and with shunting engines.

Great Indian Peninsula Railway.—There are some Parsee and Portuguese drivers, but the information received is incomplete.

Bombay, Baroda and Central India Railway.—There are eight drivers, viz., three Parsees, four Portuguese, and one Mahomedan (these can all read and write English). There are also six Mahomedan and Hindu shunters, besides one Hindu and six Mahomedan turners employed on shunting work. The Dabhoi Branch is worked by two Mahomedan drivers, who are well reported on.

Sind, Punjab and Delhi Railway.—None.

Oudh and Rohilkhand Railway.—Employed as shunters and with pilot engines, and occasionally with goods trains.

Eastern Bengal Railway.—None.

East Indian Railway.—Employed in driving goods and passenger trains on six branches, and on the section between Gazeabad and Delhi. They also drive goods and coal trains on various sections on the line aggregating 1,045 miles in length, and do most of the shunting and pilot work. With the exception of some short branches with light traffic, the trains driven are in charge of European guards, and as a general rule no train on the main line is entirely in the charge of natives. The saving effected on this line by the employment of native drivers during the year 1877 was estimated at £18,000, and amounted to fully £30,000 in the year 1879.

State Railways.—Up to the present time native drivers have only been employed with ballast trains and shunting engines, but it is intended, as fit men can be found, to employ them in certain instances on goods trains.

4. This question has received most attention on the East Indian Railway, where there are now 208 natives employed as drivers and shunters. The method adopted on this Railway is to engage lads of 15 or 16 years of age and employ them in the running sheds as cleaners. During this time those who desire to advance themselves take advantage of the native school attached to the station and learn to read and write at least one language. They then serve on an engine under a good driver for a number of years, and in that way get their mechanical training, and pick up a smattering of English. No man is put in charge of an engine until he has passed a searching examination conducted either by the Locomotive Superintendent or his Deputy.

5. The scales of pay adopted on the East Indian Railway for native firemen and native enginemen and shunters are as follow :—

Native Firemen, ... First year Rs. 8 with a yearly increment of Re. 1. up to Rs. 14.

Assistant Shunters, ... { 1st year 8 annas a day.
2nd " 8½ " "

Yard Shunters, ... { 1st year 9 annas a day.
2nd " 9½ " "

Branch Enginemen, ...	11 annas a day.
Goods Enginemen, ...	{ 1st year 12 annas a day.
	{ 2nd " 14 " "
	{ 3rd and subsequent Re. 1 a day.

Overtime is also allowed to each class.

6. The objections which have been raised in various quarters to the employment of native drivers are as follows:—

Deficiency in intelligence, want of judgment, want of promptitude in action on emergencies, inability to read and write, want of sufficient technical knowledge to adjust the mechanism of an engine, low physical power, deficiency in stamina and presence of mind.

7. That these objections can, in a great measure, be overcome by careful selection and proper training, appears to be indisputable from the results obtained on the East Indian Railway. On this Railway the Foremen are induced to interest themselves in the training of native drivers, and the most promising cleaners are promoted successively to assistant firemen, firemen, shunters, and drivers; great care being taken in the selection of the shunters and drivers. All main line drivers read and write in one of the native languages, they understand English figures sufficiently to read the numbers of the indicator and the pressure gauge, the clock, the numbers of their engines, and the numbers of their trains, on the line clear and other messages. The want of a thorough knowledge of English is supplemented as far as possible by mechanical aids, such as varying the color of the clear line messages to distinguish between "all right" and "caution," making a marked distinction between clear line messages for up trains from those for down trains, &c. By these means the men are found to do thoroughly efficient work, although doubtless procedure would be simplified if they could all read and write English.

RESOLUTION.—The Government of India desires to impress upon all Railway authorities how important it is that there should be a large infusion of natives into the ranks of engine drivers, both for the sake of economy and for the diminution of risk to life during the hot season.

2. The Government views with pleasure the success that has attended the efforts made on the East Indian Railway for the training of native drivers, and would urge on all Railway Companies the expediency of adopting some recognized system for training lads of native extraction for similar capacities. The scheme pursued on the East Indian Railway is working well, and seems well adapted to the class of native to be trained; but if lads of a higher social standing could be induced to enter the Locomotive Department, it would be as well to give them one or two years of mechanical training in a workshop and also inducements to learn English. Having served long apprenticeship as cleaners and firemen under good enginemen, those physically well constituted, after test by a technical examination, would be promoted to the charge of an engine on suitable rates of pay, a knowledge of English commanding a higher rate of salary.

3. The Government is of opinion that the importance of the question warrants the trial of some schemes of this or a similar nature, and Agents of the Guaranteed Railway Companies and Managers of State Railways should be called upon to report on these proposals, and to urge on their respective Locomotive Superintendents the desirability of introducing on their lines some system under which selected natives can rise to the charge of an engine. The Government is aware that such attempts are often attended at first with considerable trouble and annoyance, and such was experienced on the East Indian Railway, but after the initial stages are passed the trouble decreases, the native begins to see the advantages gained by him, and the Railway gains the services of an additional number of trained men.

No. 625 R.E.

Simla, September 11th, 1882.

OBSERVATIONS.—Under Public Works Department Circular No. XI Railway, dated 28th January, 1881, it was stated—"The Government of India trusts that all railway administrations will direct their attention towards the training of the natives of the country to serve as drivers; and requests that an annual report may be furnished of the progress made during each calendar year."

2. The reports for the year 1881 show that the number of natives employed as drivers and shunters respectively were 199 and 348, against 156 and 282 during 1880. The Eastern Bengal Railway Locomotive Superintendent is averse to entrust the heavy trains on that line to native drivers, so he has taken no steps towards their training. The Native States Railways,—Mysore and Bhavnagar-Gondal—which have only recently been opened for traffic, have not as yet had facilities for training natives for locomotive work.

3. The numbers employed and the general system adopted on each line will be seen from the following extracts:—

The following is extracted from the Locomotive Superintendent's letter No. 324, dated 13th February, 1882, addressed to the Agent of the Company:—"I beg to report that on 31st December last we had a staff of 235 native drivers and shunters on this line employed in working goods trains between Nawadhi and Delhi, Sutna and Jubbulpore, as well as throughout the loop line and on all the branch line trains.

"In addition to the above, we have at present a reserve of 10 native shunters, who have each been tested with a train on the main line in charge of a foreman, and passed by me as qualified to work trains at any moment that the exigencies of the service may demand.

"These men have each served over eight years in the running sheds in the capacity of cleaners, firemen,

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and shunters, and have of course during that period gained considerable experience in the details and working of an engine.

"The practice of engaging suitable young men as coolies and cleaners in the various running sheds still continues, and we had on 31st December last a staff of 549 so employed, against 539 on 31st December of the previous year.

"The whole of these with the rest of the running shed employes are required to attend the vernacular adult schools open daily at the various outstations from 6 to 8 A. M. and 6 to 8 P.M. (Sundays excepted); also from 2 to 4 P.M. in the case of men booked for shed duty.

"Coolies and cleaners drawing from Rs. 4 to Rs 5 per month are admitted free into these schools, while men employed in the higher grades are required to pay a small monthly fee on the following scale to cover the cost of stationery and books supplied :—

From Rs. 20 to Rs. 30	receive annas 3-0	each per month.
" " 15 " 19	" " 1-6	" "
" " 10 " 14	" " 1-0	" "
" " 6 " 9	" " 0-6	" "

"Promotion from one grade to another is made contingent on the men being qualified to read and write in one of the vernaculars; and as a further inducement to the men to exert themselves, I have decided on awarding prizes at the end of each half-year to the most punctual and generally efficient scholars on the rolls on the recommendation of the Locomotive Foremen.

"These prizes will be paid for out of the fees collected during the half-year.

"The Foremen are required to visit the schools in their charge at least once a day to watch the progress made, and to submit (in addition to a monthly report) a quarterly one giving details of the number of scholars, the amount of their attendance, and the progress made by each of them in acquiring a proper knowledge of the vernaculars.

"In a few cases we have found it necessary either to reduce the pay or dispense with the services of men who failed to attend school regularly in spite of frequent cautioning, and I am glad to say the effect has been a wholesome one on the rest of the staff.

"I append hereto a statement of the number of natives employed in the various grades in the several running sheds, with their rates of pay on 31st December, 1881, as compared with the number in the same grades on 31st December, 1880, from which it will be seen that the matter of training natives so as to qualify them in time for taking charge of an engine continues to receive every attention on this line.

"The arrangement of substituting native drivers and shunters for Europeans in the same grades has now been at work in this department for over six years, viz., from April 1875, and I have pleasure in attaching hereto an abstract statement of the saving which has resulted therefrom up to 31st December last, from which you will notice that the aggregate saving up to the latter date amounted to over 20 lakhs of rupees."

Statement of Natives employed in the several running sheds on 31st December, 1880 and 1881, with their rates of pay.

DECEMBER 1880.	DECEMBER 1881.
Particulars of Native staff employed on running engines.	Particulars of Native staff employed on running engines.
19 Branch drivers at annas 11 per day.	15 Branch drivers at annas 11 per day.
87 Main line drivers at annas 12, 14 and Rs. 1 per day.	102 Main line drivers at annas 12, 14 and Rs. 1 per day.
106	117
46 Shunters at annas 9 and 9-6 per day.	52 Shunters at annas 9 and 9-6 per day.
69 Assistant shunters at annas 8 and 8-6 per day.	66 Assistant shunters at annas 8 and 8-6 per day.
115	118
259 Leading firemen from Rs. 10 to Rs 12 per month.	282 Leading firemen from Rs. 10 to Rs. 12 per month
416 2nd leading firemen at Rs. 8 and 9 per month.	421 2nd leading firemen at Rs. 8 and 9 per month.
62 Assistant leading firemen from Rs. 5 to Rs. 7.	60 Assistant leading firemen at Rs. 6 and 7 per month.
737	763
93 Coalmen from Rs. 4 to Rs. 6-8 per month.	119 Coalmen from Rs. 4 to Rs. 8 per month.
175 Cleaners from Rs. 4 to Rs. 7 per month.	196 Cleaners from Rs. 4 to Rs. 7 per month.
364 Coolies from Rs. 3 to Rs. 6 per month.	353 Coolies from Rs. 3-8 to Rs 6 per month.
43 Steammen from Rs. 7 to Rs 10 per month.	46 Steammen from Rs. 7 to Rs. 10 per month.
5 Assistant steammen at Rs. 5 and 6 per month.	7 Assistant steammen from Rs. 4-8 to Rs. 6 per month.
48	53

Statement showing saving in the cost of drivers, shunters, and firemen's wages effected through the introduction of Native drivers and shunters, &c., from April 1875 to 31st December, 1881.

Periods.	Saving in salary, overtime, and allowance of drivers and shunters.			Saving in sick leave pay for short periods to drivers and shunters.			Saving in salary, overtime, and allowance of European firemen, including sick leave pay.			Total amount.		
	Rs.	A.	P.	Rs.	A.	P.	Rs.	A.	P.	Rs.	A.	P.
From April 1875 to June 1881, ...	15,54,931	3	2	46,308	6	11	2,23,584	13	0	18,24,824	7	1
Less on account of good conduct money paid to native drivers and yard shunters, ...	3,780	0	0									
Less premium to foremen for testing native drivers, ...	1,082	0	0							4,862	0	0
										(a) 18,19,962	7	1
July 1881, ...	31,978	2	3	1,451	12	6	3,318	3	10	36,748	2	7
August " ...	32,142	1	4	1,411	9	11	3,297	6	4	36,851	1	7
September " ...	38,789	10	8	1,499	15	7	3,447	3	8	43,736	13	11
October " ...	37,231	14	7	1,539	2	1	3,379	6	5	42,150	7	1
November " ...	38,050	6	10	1,544	10	5	3,517	9	6	43,112	10	9
December " ...	38,219	10	6	1,545	2	5	3,629	10	5	43,394	7	4
										20,65,956	2	4
Less on account of good conduct money payable to native drivers and yard shunters for last half-year (approximate amount) ...	600	0	0									
Less premium paid to foremen for testing native drivers from July to December, 1881, ...	110	0	0							710	0	0
Total, ...	17,71,343	1	4	55,300	11	10	2,44,174	5	2	(b) 20,65,246	2	4

(a) or @ 1s. 8d. per rupee = £151,663-10s. 0d.

(b) or @ 1s. 8d. per rupee = £172,103 16s. 8d.

Comparative Table showing numbers employed.

	1880.	1881.
Drivers, ...	106	117
Shunters, ...	115	118
Total, ...	221	235

The Locomotive Superintendent in his No. 436, dated 22nd May, 1882, to the address of the Agent, reports as follows:—"I beg to inform you that native lads are first employed as cleaners, those who are intelligent and willing are promoted to khallasies, and from that to firemen, shunters, and drivers. Quicker promotion is given to men who can read and write English or Vernacular as an inducement to others to learn. The times specified to serve in each of the grades are as follows:—

"Cleaners to serve for 12 months before promotion to the grade of khallasies, and as khallasie at least 12 months before promoted to fireman, and as fireman two years before promoted to shunter.

"If competent after two years' service as shunter to pass his examination as driver, he is promoted.

"Exceptions to the above rules are rarely made, only in cases of men having had previous experience elsewhere in a similar capacity, or who are more intelligent than their fellow workmen."

"There has been a decided improvement in the education of shunters and drivers. Many of them can read and write the English alphabets, and most of them who could not, when first started, read or write any language have learnt the Vernacular. Their working has given satisfaction in every respect."

Comparative Table showing numbers employed.

	1880.	1881.
Drivers, ...	26	28
Shunters, ...	31	38
Total, ...	57	66

The Agent, in his No. 2170, dated 9th March, 1882, to the Consulting Engineer at Lahore, remarks as follows.—“In reference to Government of India Circular No. 1R. of 1882, received under cover of your No. 177E., dated 19th January last, I have the honor to forward for information a copy of the Locomotive Superintendent’s No. 249A., dated 1st instant, and its accompaniments (in original), and to state that on this line, where economy in fuel has such an important bearing in the working expenses, and where many premiums are offered for saving in fuel, the system of native drivers lately initiated cannot fairly enter into comparison with the results obtained on the East Indian Railway, where a few pounds of coal consumed more or less per mile does not so much signify. It is by no means an easy task to economise in fuel, as it requires constant care and watchfulness on the part of the driver; and unless this can be attained in the native element, it will be false economy to save in wages and expend more than the savings in fuel.”

The following is the letter from the Locomotive Superintendent alluded to above —

“In reply to your No. 383 of 13th January last and subsequent No. 1843R, I beg to submit the information in the form called for by the latest Government Circular, No. 1R. of 1882, this report dating up to 31st December last.

“The system adopted for training labor on this line is that universally followed. Lads and young men are employed in the different branches of the business, and by performing work with their own hands learn to do it properly, rising from the simplest and most menial to the highest and most important posts. As in all mechanical art men are mostly self-taught, every opportunity is also afforded to the best natives among the firemen, cleaners, fuel coolies, and others to rise in their several grades, and finally become shunters and drivers. On the 1st of November last a school was started at Lahore for the purpose of teaching these men to read and write the Vernacular and English languages. The enclosed notice offering heavy inducements for the latter being issued also, it was made known that engagements were open to men able to read and write qualified to become shunters and drivers. Hitherto none of the present staff have cared to try and qualify themselves, and applicants desiring engagements are astonished to find that they are not at once sent out with an engine, and abandon the idea on finding it is requisite to start in a subordinate position to gain the experience absolutely necessary to ensure success.

“The only additional remark I have to make is, that four native drivers have had to be withdrawn on account of the cost of the additional fuel they consumed, being more than the amount required to pay the same number of European drivers, but I see no reason for depression, the measure has only just been started, and must be allowed time to grow and develop itself. Undue haste will only stop its progress and prevent the full benefit being reaped in future years.”

Comparative Table showing numbers employed.

	1880	1881.
Drivers,	2	3
Shunters,	34	37
Total,	36	40

The Locomotive Superintendent reports as follows.—“Natives of good physique and possessing a fair knowledge of English are sent out as second firemen on the Madras Railway. engines to pick up their trade, as all other trades are picked up, by constantly practising it; and as soon as they are fit, they are promoted respectively to first firemen, shunters, and drivers.

“Up to the end of 1881 two native shunters stood on the books, who drew respectively Rs. 1-2 and Rs. 1-4 per day. There were several other native firemen who shunted occasionally, but whose qualifications were not considered sufficient to entitle them to be promoted to the pukka rank of shunter.

“As stated in my previous report, recruiting European and East Indian firemen has been stopped. Encouragement has been given to the best native firemen to qualify for drivers by acquiring some knowledge of English; and the standard of qualification for native recruits has been raised to include a knowledge of English.

“Five English-speaking native firemen have been engaged with a special view to their promotion to drivers as soon as they have fired a sufficiently long time; this ought not to be less than four years. Unless therefore some of the competent firemen who are getting up their English should qualify in that respect, I do not expect to be able to report the promotion of any more natives to drivers for about three years; but no native firemen will in future be employed who cannot speak, read, and write English. Last year’s experience has, I think, shown that a sufficient number of men possessing these qualifications can be had, and a fair foundation has been laid for the attainment of the wish of the Government of India that there should be an infusion of natives in the ranks of drivers.”

Comparative Table showing numbers employed.

	1880.	1881.
Drivers,	0	0
Shunters,	1	2
Total,	1	2

The Agent, in his No. 178, dated 7th March, 1882, to the Consulting Engineer for Railways, remarks as follows:—"Referring to your letter of the 27th January, 1882, No. 67, I have the honor to subjoin a report from the South Indian Railway. Locomotive Superintendent.

"As requested by the Government of India in their Circular dated 3rd January, 1882, I give below the information regarding native drivers and shunters called for—

- '(a). Native lads are employed first as cleaners and promoted through subsequent grades according to ability.
- '(b). During the year 1881 there were 9 drivers on salaries ranging from Rs. 15 to 30 per mensem, 17 shunters from Rs. 10 to 20, 125 firemen from Rs. 6 to 20, and 116 cleaners from Rs. 3 to 10.
- '(c). During the year 1880 there were 10 drivers on salaries ranging from Rs. 12 to 45 per mensem, 10 shunters from Rs. 12 to 20, 108 firemen from Rs. 7 to 18, and 93 cleaners from Rs. 3 to 10.'

"All the native drivers (26 in number) employed by the Locomotive Superintendent are giving him satisfaction, and are progressing in a practical acquaintance with the machinery of locomotive engines. Owing to greater proficiency in their duties some of these men have received an increase to their pay."

Comparative Table showing numbers employed.

						1880.	1881.
Drivers, ...	...	...	...	...	...	10	9
Shunters, ...	...	...	...	...	...	10	17
Total,						20	26

Extract from Locomotive Superintendent's letter No. $\frac{1171}{4305}$, dated 26th June, 1882, addressed to the Great Indian Peninsula Railway. Agent.—"3. In reporting with regard to the year 1881, I have to make the following observations, and I would mention that up to the present time the engine drivers employed on this Railway are men who can read and write English, and who are well acquainted with the work of Railways; our standard of efficiency for natives of the country has been the same as that for Europeans. There is nothing in the correspondence pointing conclusively as to what is intended by the term 'Natives of the country;' it is possible that for the purpose of this report it may be intended to exclude all who are not of pure, or of partial, Asiatic descent; hitherto the term 'Native driver' as used on this Railway has meant pure Asiatics, and I have written this report upon that understanding, but I may mention there are a large number of Europeans and Eurasians (born in India) employed as drivers on this Railway.

"In explanation of the system adopted for training native lads (Asiatics), there has been no change in the system carried on during the last few years. Strong and healthy looking natives (generally Parsees) have been selected from the mechanics and apprentices employed in the Company's workshops, and also from somewhat similar employments not connected with the Railway. In the first instance, they are employed as *augwallas* (ordinary native firemen), and if after three or four months they have shown any aptitude for their work, and have been regular in their attendance to duty they are graded as 'ordinary firemen' and registered accordingly. All graded firemen of good conduct may hope in time to become engine drivers; the length of time they may be required to serve as firemen varies considerably, and depends in a great measure upon the ability of the candidate and also the demand for drivers."

Comparative Table showing numbers employed.

						1880.	1881.
Drivers, } ...	...	...	...	...	...	35	53
Shunters, }							

The Locomotive Superintendent reports:—"We engage native lads who can speak and write English fairly well as cleaners in the running sheds at from 5 to 6 annas a day, and their promotion is in accordance with the following scale:—

2nd firemen,	...	...	...	...	8 to 10 annas per day.
1st "	...	...	...	...	1½ to 2½ Rupees "
Shed turner,	...	...	...	...	2½ " "
Shunting engine driver,	...	...	...	...	3½ " "
Driver, 1st year,	...	...	...	...	4 " "
" 2nd year,	4½ " "
" 3rd year,	5 " "
" maximum pay,	5½ " "

EMPLOYMENT OF NATIVES AS ENGINE DRIVERS.

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" Selection is made at every step in promotion, and young men who are not likely to make drivers are weeded out.

" Although there is no increase in the number of qualified drivers since last year, good progress has been made in the selection and employment of lads as firemen, chiefly Portuguese and Parsees."

Comparative Table showing numbers employed.

						1880.	1881.
Drivers,	}	...	...	...	...	20.	23
Shunters,		...	...	...	...

The Government of Bengal issued the following Resolution, No. 243T.-R.E, dated 29th June, 1882, on the subject:—"OBSERVATIONS.—In 1880 and 1881 the Government of India, Public Works Department, invited the attention of the several Railway authorities to the importance of employing natives as engine drivers and shunters to a greater extent than had previously been done. From the reports which have been received, it appears that the following progress has been made on the Railways under the orders of the Government of Bengal.

" Northern Bengal State Railway.—Comparing the years 1880 to 1882, the following are the numbers of native drivers, shunters, and assistant shunters employed:—

	1880.	1881.	1882.
Drivers, ...	0	3	5
Shunters, ...	3	1	7
Assistant shunters, ...	4	7	1

" Thus the number of men so employed has increased from 7 in 1880 to 13 in 1882, the rates paid being—for shunters Rs. 17 to Rs 22; for drivers Rs. 22 to Rs 35. Natives are engaged as firemen, and inducements are held out to them to attend the night school: and when they have had sufficient experience in firing they are promoted to assistant shunters and drivers, provided they pass an examination in reading and writing, in the rules of the service, and in the technical management of an engine. A night school has been opened at Sandpur, the head-quarters of the Locomotive Superintendent of the Railway, but the attendance is not so satisfactory as it should be, and efforts are being made to improve it.

" Tirhoot and Patna-Gya State Railways.—There are four native shunters on these Railways—the same number as in 1881. Their pay averages from Rs. 20 to Rs. 22, no proper system has been adopted for training them, but they are selected from the oldest and best firemen, and after they have proved themselves fit, they are employed as shunters. There are no native drivers on these lines.

" Calcutta and South-Eastern and Nalhati State Railways.—All the drivers on these lines are natives, and there are now eight so employed. They are at first tried as firemen, and when they have had sufficient experience in firing are promoted to shunters, and afterwards to drivers, provided they can pass an examination in reading and writing, and in the technical management of an engine.

" RESOLUTION.—Although the scheme for the employment of natives as drivers and shunters has not yet fully attained the usefulness and economy to which it is capable of being extended, it is satisfactory to note that good progress has been made on the Northern Bengal, Calcutta and South-Eastern and Nalhati State Railways—a result due to the personal exertions of the Locomotive Superintendent, Mr. Rendell.

" On the Tirhoot and Patna-Gya State Railways, notwithstanding the importance of the question and the recommendations which have more than once been made to the Assistant Locomotive Superintendent, there has been no progress whatever, nor has any system for the training of natives yet been introduced.

" Experience has shown that while native drivers and shunters can be employed at far less pay than Europeans, they have been proved to be regular in their attendance, to give little trouble, and provided they are efficiently supervised, to be as careful in the performance of their duties as most Europeans with similar length of service on the foot-plate. It is therefore desirable, except on mail or fast passenger trains, where special intelligence, judgment, physical power, stamina, and presence of mind are required, that, for the sake of economy, they should be employed to the fullest extent.

" Every effort should therefore be made to induce natives of a fairly good social standing to join the Locomotive Department of the State Railways in this Province, with a view to their eventually becoming drivers; and as none should be chosen who cannot read and write, an incentive should be given by granting higher pay to those who are proficient in that respect. Night schools should also be started wherever practicable, and they will receive the cordial support of Government."

Comparative Table showing numbers employed.

						1880.	1881.
Drivers, ...	...	...	...	...	...	7	11
Shunters, ...	...	...	...	...	...	9	12
Total,						16	23

North-Western Provinces Provincial Railways. The lines are short with small traffic and afford no scope for training native shunters and engine drivers: the men employed acquired their experience on other Railways.

Comparative Table showing numbers employed.

						1880.	1881.
Drivers, ...	...	...	...	...	...	3	11
Shunters, ...	...	...	...	...	...	0	0
Total,						3	11

State Railways in Central Provinces. These Railways are at present short and incomplete, and natives as shunters or drivers. up to the present have offered no opportunities for training.

Comparative Table showing numbers employed.

						1880.	1881.
Drivers, ...	...	...	...	...	...	0	0
Shunters, ...	...	...	...	...	...	2	3
Total,						2	3

Extract from letter No. 3883, dated 18th May, 1882, from the Secretary to the Chief Commissioner, British Burma, Public Works Department:—"The Chief Commissioner regrets that the Railway Department in Burma has not made greater efforts in this direction, and he hopes that they will do better this year. In the meantime he has established an apprentice class of 12 Karen lads in the Insein Workshops to be trained as fitters and drivers. The Department of Public Instruction bears the charge of this class, and Mr. Bernard is hopeful that it may prove a beginning of the employment of Burman and Karen skilled labor on our Railway."

Rangoon and Irrawaddy Valley Railway.

Comparative Table showing numbers employed.

						1880.	1881.
Drivers, ...	...	...	...	...	...	0	0
Shunters, ...	...	...	...	...	...	4	4
Total,						4	4

Nizam's Railway. Owing to the small number of drivers employed on this line, the demands are too limited to admit of any system of training beyond that gained by experience in the shops.

Comparative Table showing numbers employed.

						1880.	1881.
Drivers, } ...	...	...	...	...	...	2	3
Shunters, }	...	...	...	...	...

The Locomotive Superintendent reports as follows:—"During 1881 I have engaged every native driver or shunter who offered his services, and any qualified native who was in employment on this line has been promoted to shunter or driver whenever a vacancy occurred. The practical work in the running shed and on the foot-plate is the only training the men have got. This line has had so frequently large extensions that all time has been taken up with organising the additional sections.

"There is great difficulty in getting up schools for this kind of men, partly for want of proper teachers, and partly for the regular work of the staff, for the greater part of the year prevents the men from attending any school.

EMPLOYMENT OF NATIVES AS ENGINE DRIVERS.

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Comparative Table showing numbers employed.

						1880.	1881.
Drivers,	2	6
Shunters,...	7	27
Total,					...	9	33

The Locomotive Superintendent reports as follows:—"Steps are being taken to establish a school for the education of native adults with a view to making them better fitted for the duties of engine drivers and shunters.

Punjab Northern Railway.

"The same school will be available for teaching English to native lads now employed in the service.

"Native drivers were first appointed on this line on 21st November, 1881. Previous to that date natives had been employed as shunters and firemen only.

"The portions of the line selected for the employment of native drivers were the Salt and the Khushálgarh branches. The Salt Branch (metre gauge) has been entirely worked by native drivers since the above date. They have done their duty satisfactorily, and have kept their engines in fair working order.

"On the Khushálgarh branch (5 feet 6 inch gauge) they did not do so well, causing numerous failures, and frequently running short of water and burning more coal than was necessary. The employment of natives on this branch was discontinued on the 8th of February last.

"Two native drivers were employed working ballast trains on the Rathial ravines—one for 3½ and the other for 1½ months—and did the work in a satisfactory manner.

"Two native drivers are now employed on the main line, working a local ferry train between Wazirabad and Kathala with satisfactory results.

"On the whole I consider the results satisfactory, the only drawback being their want of understanding English. This, however, will be overcome in time.

"No European shunters are now employed on this line; the work is entirely done by natives.

"All the European firemen have been discharged, with the exception of four, who are kept on to act as shedmen (or engine turners), as they are sometimes termed, when the shedmen are absent owing to sickness or on leave.

Comparative Table showing numbers employed.

						1880.	1881.
Drivers, ...	...	...	...	...	...	0	7
Shunters,...	...	...	...	...	...	1	2
Total,					...	1	9

Extract from Locomotive Superintendent's letter No. 5609, dated 8th June, 1882—"I have tried to train the young English-speaking native, but this has proved a complete failure. His notions are too high, and, as a rule, he is physically unfit for the hard work required of him. It is after a careful trial of some years that I have had to give this class of man up.

Indus Valley and Kandahar Railway.

"All my native drivers are chosen from the shunters, who all have served on the line as firemen. Before they are promoted to drivers, they are required to pass a satisfactory test on the working of an engine and train on the main line under the Foreman of the shed, the Assistant Locomotive Superintendent of the section, and an examination at head-quarters held by me.

"I greatly need help in teaching these men to read and write English, and I trust when our arrangements are completed, for them to attend night-schools at Sukkur and Jacobabad, this difficulty will be overcome. At present the men read with the clerks and the munshis of shed, and are making good progress.

"I have seven native drivers and nine native shunters. Two of the drivers get Rs. 40 per month, and the remainder Rs. 30. I allow them all 2 annas per night out from their home stations. The above consolidated pay is what the men received as shunters. The only increase given as yet on their promotion to drivers is the nightly allowance of 2 annas per night. I am aware that the consolidated salary is too high, and intend making out a scale for the pay of native drivers on the trip system shortly, which will be laid before you for approval before issue. The use of native drivers is but in its infancy as yet on this line, the first having been introduced by me on 9th August, 1881.

"Four of these native drivers have been substituted for Europeans on the Kandahar line, two on the fast

local service between Sukkur and Shikarpur, and one on the yard engine at Adamwahan, and I have much pleasure in stating that the Traffic Department have in no way expressed their dissatisfaction in the working of these men. They are carefully watched by my own Department, in which they have proved themselves good and trustworthy enginemen. The nine shunters are promising men, and I hope during the present half-year to have the whole of the Kandahar section worked by native drivers. The good and experienced firemen are being watched to take the place of the shunters as they are promoted to drivers. The number has increased this year from five to seven.

Comparative Table showing numbers employed.

						1880.	1881.
Drivers, ...	...	...	...	...	...	0	7
Shunters,...	...	...	...	...	...	11	9
Total,						11	16

RESOLUTION.—From the foregoing observations the numbers of native drivers and shunters may be summarised as follows:—

Railways.	Drivers.		Shunters.		
	1880.	1881.	1880.	1881.	
East Indian, ...	108	117	115	118	
Oudh and Rohilkhand, ...	26	28	31	38	
Sind, Punjab and Delhi, ...	2	3	34	37	
Madras, ...	...	...	1	2	
South Indian, ...	10	9	10	17	
Great Indian Peninsula, ...	...	...	*35	*53	
Bombay, Baroda and Central India, ...	...	...	*20	*23	
Bengal Provincial Railways, ...	7	11	9	12	
North-Western Provinces Provincial Railways, ...	3	11	...	...
Central Provinces Railways, ...	...	...	2	3	
Rangoon and Irrawaddy Valley, ...	...	...	4	4	
Nizam's, ...	...	...	*2	*3	
Rajputana-Malwa, ...	2	6	7	27	* Drivers and shunters.
Punjab Northern, ...	...	7	1	2	
Indus Valley and Kandahar,...	...	7	11	9	
Total,	156	199	282	348	

These figures show an increase for 1881 of 109 in the aggregate.

2. With the exception of the Madras and Eastern Bengal Railways, fair progress in the training and employment of natives as drivers and shunters appears to have been generally made. The views and wishes of the Government of India were fully explained in Public Works Department Resolution Nos. 0101—12 R.E., dated the 12th February, 1880, and the manner in which these have been met is recognised with satisfaction. It is trusted that those Railway administrations which have only recently placed natives of the country in charge of locomotive engines will not relax their endeavours to increase the numbers so employed until they number a fair proportion of the whole staff.

APPENDIX DD.

MUNICIPAL WAREHOUSES NEAR RAILWAY STATIONS.

Home, Revenue and Agriculture Department, No. 58-67, dated 30th April, 1881.

On various occasions the attention of the Government of India has been drawn to the want of storage for agricultural produce near Railway stations. This want cannot always conveniently be supplied by Railway Companies, and there are undoubtedly some objections to any admixture of their legitimate functions as carriers with the duties which would fall upon them as warehousemen. Further, works of this description, which require no extensive outlay, and whose first purpose is to serve local interests, do not appear to the Government of India to be ordinarily legitimate objects for State expenditure.

2. On the other hand, it seems both advantageous and proper that Municipalities and other local bodies should interest themselves in these undertakings, and should further them by every means in their power. In making this suggestion, the Governor-General in Council does not overlook the numerous calls upon the resources of Municipalities; and admits that they cannot properly be required to take measures for the facilitation of local trade, except when they have spare funds, after providing for the more necessary calls upon them. But warehouses of the kind in question, if economically constructed and judiciously located, can hardly ever be a source of loss, as has been proved by past experience in various instances. Thus at Nagpur in 1877, owing to large consignments of grain having accumulated at the Railway station for transport to the famine-stricken districts of Madras and Bombay, the Municipality constructed ranges of warehouses, which not only protected from destruction during the monsoon large quantities of grain at a time when food was scarce, and were a great convenience to the trade, but fully repaid the outlay incurred on them. A similar experiment was successfully undertaken by the Public Works Department at Ludhiana in 1878; and the advantages of the system may now be considered to be established.

3. I am therefore to request that the subject may be taken into consideration, and that effect may, as far as possible, be given to the suggestions above conveyed.

Note on Warehouses near Railway Stations.

The Government of India having desired that the subject of warehouses in the vicinity of Railway stations (see Home Department Circular of April 1881) should be taken up on the Sind, Punjab and Delhi Railway, I took the opportunity of my late inspection tour, with the Agent and Traffic Manager, to discuss the subject with the District Officers and the Municipal Committees at the following stations, viz, Amritsar, Jullundur, Ludhiana, Umballa, Saharanpur, Muzaffarnagar and Meerut.

2. The Government Circular was read and explained to the Native gentlemen and merchants present, and the subject discussed in connection with proposals for bonded warehouses that have been made in several quarters. It was explained to the Municipalities that, if the necessity of such warehouses was felt either for the convenience of storing goods, in cases where (as in 1877) the Railways were overwhelmed with traffic and could not take it away fast enough, or, as in the case of ordinary goods in transit, where octroi is first levied and then subsequently remitted owing to the goods having first to enter the town, instead of proceeding direct to the Railway station, it was left to the Municipalities to build such warehouses, and to make their own arrangements for the care and custody of the goods and for the levying of such warehouse rent as might be charged. The Railway would on its part undertake, provided such warehouses were built conveniently near to the station, to run a siding into them from the main line and construct a platform at its own expense, and to make no extra charge for haulage or handling which would be covered by the usual terminal charge.

3. At Amritsar, the Municipality did not seem very keen about the proposal. They said there was no difficulty at present in getting goods carried rapidly away by the Railway, and most, if not all, of the Natives present appeared to be merchants interested in the local trade rather than in transit trade, and therefore not interested in the question of facilitating through traffic.

4. At Jullundur, the same remark may be made, but further consideration of the subject was promised, both here and at Amritsar.

5. At Ludhiana the case was altogether different. In 1877, I found that private warehouses were in use here for storing grain in the vicinity of the station when during the famine in Southern India the Railway could not take away the grain fast enough, and two large sarais are at present used, one of which is recognised by the Municipality as a bonded warehouse. We examined this place and found it large enough for some 500 carts, and surrounded on three sides by 150 pukka *kothis*, with verandahs, each large enough to contain 1,200 pukka maunds of grain in bulk. For the hire of these we were told that Re 1-4 to Re 1-8 per month was charged, or 2 pice per bag (2½ maunds) for grain stored in bags. The place was well filled, and a large quantity of grain in bulk was being sifted and bagged. The whole belonged to a Native merchant, a leading member of the Municipality, whose house and compound were at the back of the sarai. The other sarai was similar, but the buildings were kucha. We were told that these two sarais were sufficient to meet the wants of the trade under ordinary circumstances, but not in times of pressure, and the proposal to run a siding into the place from the station, with a loading platform, appeared generally to meet with approval.

6. At Umballa, the meeting at first was lukewarm on the idea, as at Amritsar and Jullundur; but after the formal meeting was over, several merchants (not on the Municipality) said they would be very glad of a bonded warehouse, as the foreign trade (from the hills) had now to go into the city instead of going direct to the Railway station.
 7. At Saháranpur, Mr. Sladen, the Collector, had some time ago taken action on the Circular, and expressed the readiness of the Native merchants to build a bonded warehouse, if a site could be given them on the Railway ground. It appeared to me on inspection that a site could very well be spared on the Lahore side of the present goods-shed, and I trust the Agent will intimate his concurrence in this view. It will otherwise be very difficult to find a proper site, and there can be no doubt that the proposed arrangement will do much to facilitate and therefore to stimulate traffic.
 8. At Muzaffarnagar, it was explained to us that this place is a great depôt of trade for the surrounding district, which concentrates here, and is exported by rail all over the country, while very little goes *through*. The want of a bonded warehouse was not therefore felt; but, as the station is more than a mile from the town, it was pressed upon us that it would greatly facilitate traffic, if a branch or siding could be run from the station into the Sultán Ganj, a principal trade centre of the place, the Municipality offering the use of half the present roadway for the purpose. An estimate for this scheme is now being prepared.
 9. At Meerut, the necessity of a warehouse was fully admitted; but it was here also urged that a branch line (1½ miles long) into the town to run as near as possible to the two large *mandis* near the Baghpat Gate would be more useful than any warehouse at the station. My own idea is that both would be desirable at this important station, as there must be a good deal of trade that does not want to enter the city at all.
 10. As to Lahore and Mooltan, a further report will be made.
 11. At Rawalpindi, the Manager, Punjab Northern State Railway, informed me that the question of a bonded warehouse had already been taken up by the Deputy Commissioner and the Municipality, but that at present the state of the Municipal funds did not admit of any expenditure in this direction, as all the funds were required for water-supply. At Wazirabad, we were met by the Municipal Committees both of that town and of Gujranwála. Both appeared to favor the idea and promised to consider the subject later on.
 12. At Jhelum, the small amount of trade does not appear to make it probable that any action in the matter is at present desirable.
 13. At Shikárpur, the question had already been taken up by the Collector, with whom the subject was discussed on my late inspection tour, and who intimated the intention of the Municipality to take action in the matter without delay.
 14. A copy of this note will now be sent to the Presidents of the Municipalities concerned, together with copy of the Government Circular, as the readiest mode of enabling them to consider the question at further length if desired, and to take action in the matter if thought necessary.
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APPENDIX EE.

RATES FOR CARRIAGE OF REVENUE STORES.

East Indian Railway.

(Minutes of Meetings Nos. 12 and 18 of 1880. Resolutions Nos. 316 and 456, also Resolution No. 1,030 of 1880 and Resolution No. 1100 of 1881.)

- (1). Coal for the locomotive department, ... 20 pies per wagon per mile.
- (2). Oil and grease, &c., from the Company's factory in special oil wagons to one consignment, 10 pies per 100 maunds per mile.
- (3). Stores of all kinds, whether for construction, maintenance, stock or sale, " " "
- (4). Engineering stores and materials carried by ballast train, Rs. 6 per train per hour.
- (5). Small consignments of stores by passenger trains, Half parcel rates.

Eastern Bengal Railway.

(Minutes of Meeting No. 15 of 1880, Resolution No. 340.)

Four pies per ton per mile in the case of all articles carried by ordinary goods trains, and Rs. 50 per day of 8 hours for the engine for the use of ballast trains, and Rs. 1-8-0 per day for the use of each wagon.

Madras Railway.

(Madras Government letter No. 3 R., dated 6th January, 1881; General No. 795 R.T. of 1881.)

- (1). Stores.—When conveyed by goods or mixed trains, 4 pies per ton per mile, with a minimum charge of 1 anna per wagon per mile, and a minimum charge of 4 annas for a consignment.
- (2). Parcels.—Materials and stores conveyed by passenger train are not to exceed 80 lbs. per package in weight, except springs and axle-boxes, and will be charged at the rate of 4 annas per parcel of any weight up to 80 lbs., or each spring or axle-box, irrespective of distance.
- (3). Fuel and ballast.—When conveyed in special fuel and ballast trains, 2 annas per mile per wagon when under load only.
- (4). Stores sent by locomotive and general stores vans to be charged at the same rates as stores when conveyed by goods or mixed trains.
- (5). Tappal boxes and cash bags and chests to be conveyed "free."

South Indian Railway.

(Minutes of Meeting No. 1 of 1881, clause 9)

- (1). For the carriage of revenue stores and materials, the conveyance of which necessitates the running of special vehicles, 4 pies per ton per mile, with a minimum charge of one anna per truck per mile.
- Revenue stores and materials, when conveyed in trucks with other goods, are conveyed free, if weighing less than 1,000 lbs.; but all consignments in excess of this weight are charged for at the rate of 4 pies per ton mile.

Great Indian Peninsula Railway.

(Minutes of Meetings Nos. 25 of 1880, clause No. 123, and 6 of 1881, clause No. 11)

(Bombay Government Resolution No. 1179 of 1881)

- (1). Five pies per ton per mile for traffic towards Bombay.
- (2). Four pies per ton per mile for traffic in the opposite direction. No charge for consignments under half a maund.
- (3). For engineering stores and materials carried by ballast trains, a charge of Rs. 1-8-0 per train mile, with mileage allowance of 5 miles per hour, and a minimum of 5 hours per day.

Note.—All items amounting to less than Rs. 5 to be discarded.

Bombay, Baroda and Central India Railway.

(Bombay Government Resolution No. 1179 of 1881.)

- (1). Coal for the locomotive or any other department, 24½ pies per wagon of 7 tons per mile.
- (2). Oil, grease, &c., in charge of Traffic department, 3½ pies per ton per mile.

- (3). Materials and stores of all kinds, whether for construction or maintenance, ... $3\frac{1}{2}$ pies per ton per mile.
- (4). Oil and stores of all kinds in oil and stores delivery vans, ... " " "
- (5). Engineering stores and materials carried by ballast trains, ... A charge of Rs. 1-8-0 per train mile with mileage allowance of 5 miles per hour and a minimum of 5 hours per day.

Sind, Punjab & Delhi, Punjab Northern, and Indus Valley Railways.

(Punjab Northern State Railway Minutes of Meeting No. 27 of 1880, clause No. IV; and Sind, Punjab and Delhi Railway Minutes of Meeting No. 4 of 1881, Appendix A.)

- (1). All revenue stores, including permanent way and coal, ... $\frac{1}{8}$ th pie per maund per mile without terminals.
- (2). Firewood, ... $\frac{1}{8}$ th " " "
- (3). Small stores, &c., ... $\frac{1}{8}$ th pie per maund per mile, with minimum of one anna. Fractions of a maund are charged for as to the general public. Above a maund actual rates for full maunds, plus the charge for fractions of maund as above.
- (4). When a separate wagon is used and weight can be readily ascertained, $\frac{1}{8}$ pie per maund per mile, with a minimum of one anna per mile. When weight cannot be readily ascertained, 4 pies per ton of carrying capacity per mile. No terminals in either case.
- (5). Rates per maund are struck to the nearest pie. In calculating the total charge, sums under six pies are excluded, and six pies and over taken as one anna.
- (6). Actual demurrage paid on foreign vehicles to be charged to departments concerned when vehicles are detained beyond 24 hours after arrival at destination.
- (7). An additional charge of one anna per maund is made on all stores crossing the Indus River at Sukkur.

Northern Bengal and Tirhoot Railways.

(Minutes of Meetings Nos. 2 and 5 of 1881, Resolutions Nos. 30 and 95.)

- (1). Coal for the locomotive or any other department, ... 28 pies per wagon per mile.
- (2). Materials and stores of all kinds, whether for "construction," "maintenance" or "stock," $\frac{1}{4}$ pie per maund per mile.
- (3). Stores carried in store delivery vans, ... 28 pies per vehicle per mile.
- (4). Engineering stores and materials carried by ballast trains, Rs. 25 per day of 8 hours for engine power, plus 1 rupee per day of 24 hours for each truck or wagon lent by the Traffic department, in addition to the cost of any extra-establishment specially employed in connection with the work, and subject to a minimum charge as for 5 hours, or $\frac{5}{8}$ ths the above rate for engine power and 8 annas per truck lent.
- (5). The ferry rate for all stores, including locomotive coal, will be 4 pies per maund for the whole distance. The handling to be done by the ferry department, and the cost included in its working expenses.
- (6). The minimum charge on all consignments will be 8 annas.
- (7). No charge will be made for consignments under half a maund each.
- (8). Consignments of and above half a maund each should be charged for at $\frac{1}{4}$ pie per maund per mile, fractions of a maund being dealt with as in ordinary traffic.

Patna-Gya Railway.

(Minutes of Meeting Nos. 11 of 1880 and 5 of 1881, Resolutions Nos. 82 and 95.)

- (1). Coal for locomotive or any other department, 28 pies per wagon per mile.
- (2). Materials and stores of all kinds, ... 20 pies per 100 maunds per mile.
- (3). Engineering stores and materials carried by ballast train, ... Rs. 6 per train per hour.
- (4). Small consignments of stores by passenger trains, ... Half parcel rates.

RATES FOR CARRIAGE OF REVENUE STORES.

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- Muttra-Hatharas and Cawnpore-Farukhabad Railways.**
(Minutes of Meeting No. 3 of 1881, Manuscript.)
- (1). For coal in full wagons, 24 pies per mile.
 - (2). For materials and stores for all departments 27 pies per mile per 100 maunds for full or half loads. Half parcel rates for small parcels and packages.
 - (3). For ballast train—for engine Rs. 25 per day, and for ballast train vehicles 8 annas per day each.
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- Nagpur-Chhattisgarh Railway.**
(Minutes of Meeting No. 1 of 1881, Resolution No. 7, and No. 12 of 1882, Resolution No. 34.)
- (1). On and after the 1st January, 1881, the carriage of revenue stores will be charged to the department concerned at a fixed rate of 5 pies per ton per mile.
 - (2). Consignments of less than 14 seers in weight will not be booked by goods trains, but will be sent at the reduced parcel's rates by passenger trains.
 - (3). Parcels if weighing 7 seers and under "free"

From 7 to 10 seers, ...	2 annas	}	For the first 50 miles.
For each seer above 10 seers	in addition to the rate for		
10 seers,	1 pie per seer		
 - For each additional 50 miles, 1 pie per seer in addition to the above.
-
- Bhavnagar-Gondal Railway.**
(Minutes of Meeting No. 5 of 1881, Resolution No. 55.)
- (1). Coal in full wagon loads, 0.15 pie per maund per mile.
 - (2). All other revenue stores, ' 0.20 " "
 - (3). Construction stores and materials, 0.25 " "
 - (4). Ballast and other engineering trains for revenue, A mileage charge of Rs. 1-4-0 per train mile, with a mileage allowance of 4 miles per hour, and a minimum of 5 hours per day.
 - (5). Trains for conveyance of stone for construction of bridges (capital), Rs. 6 per hour, with minimum charge of Rs. 50 per diem.
-
- Rajputana-Malwa Railway.**
(Minutes of Meetings Nos. 4 and 17 of 1881, Resolutions Nos. 87 and 566.)
- (1). Coal in full wagon loads, 0.15 pies per maund per mile.
 - (2). All other revenue stores, 0.20 " "
 - (3). Construction stores and materials, 0.25 " "
 - (4). Ballast and other engineering trains, A mileage charge of 10 annas per train mile, with a mileage allowance of 8 miles per hour, and a minimum of 5 hours per day.
-
- Rangoon and Irrawaddy Valley Railway.**
(Minutes of Meeting No. 11 of 1880, clause XLVIII, and No. 5 of 1881, clause XXVI.)
- (1). Coal and other materials in full wagons charged at Re. 1 per truck per station distance.
 - (2). For revenue stores in small quantities or less than a wagon load, a charge is made of one anna per 100 viss per station distance, and the minimum charge is 6 pies.
 - (3). For ballast and fuel trains the charge is Rs. 2 per truck, including the brake-van, the charge to cover all expenses attending the working of the trains, including charge for engine, and to be exacted only when the engines are under steam or running.
-
- Nizam's Railway.**
(Minutes of Meeting No. XXXII of 1880, clause III.)
- (1). For parcels 1 pie a mile for 2 seers.
 - (2). Fuel in full wagon loads 21 pie a mile.
 - (3). Materials and stores for all departments, 6 pies a ton mile.
 - (4). Ballast trains 15 pies a vehicle mile, with a mileage allowance of 8 miles an hour.

APPENDIX FF.

INDIAN RAILWAYS.

STATISTICS OF THEIR WORKING

FOR THE

HALF-YEAR ENDED 30TH JUNE, 1881.

PART I.

SUMMARY OF THE REVENUE ACCOUNTS.

(Pages cxxv to cxxxix).

SUMMARY OF THE REVENUE ACCOUNTS OF INDIAN RAILWAYS FOR THE HALF-YEAR ENDED 30TH JUNE, 1881.

No. I.—GENERAL RESULTS.

RAILWAYS.		Gauge.	Capital expended. (f)	Mean Mileage open.	Total Train Mileage.	Earnings.	Expenses.	Net Earnings.
<i>Broad Gauge.</i>		Ft. In.	Rs.	Miles.	Rs.	Rs.	Rs.	Rs.
1	East Indian	5 6	33,13,30,925	1,563 ^a	40,91,494	2,28,07,254	67,48,105	1,60,59,149
2	Great Indian Peninsula	5 6	25,04,21,707	1,434 ^b	42,09,829	1,79,91,643	80,32,373	99,59,270
3	Sind, Punjab and Delhi	5 6	11,58,24,070	676 ^c	14,41,034	55,31,461	36,20,978	19,10,483
4	Madras	5 6	11,11,01,431	858	9,57,296	32,27,807	21,12,815	11,14,992
5	Bombay, Baroda and Central India	5 6	8,28,44,474	444	9,14,988	60,02,972	20,40,198	39,62,774
6	Eastern Bengal	5 6	3,31,85,253 ^g	171 ^d	3,15,121	19,13,346	10,21,599	8,91,747
7	Oudh and Rohilkhand	5 6	5,86,09,175	547	6,96,944	25,65,234	14,19,601	11,45,633
8	Indus Valley and Kandahar	5 6	7,29,61,562	659 ^e	9,12,586	28,62,050	23,72,311	4,89,739
9	Punjab, Northern	5 6	5,23,03,637	322	6,48,598	19,29,663	16,88,379	2,41,284
10	Dhond and Manmad	5 6	..	145	..	74,326*	11,369	62,957
11	Patna and Gya	5 6	34,20,556	57	57,262	2,46,467	1,65,945	80,522
12	Nizam's	5 6	1,21,64,524	117	1,28,057	3,98,286	2,30,213	1,68,073
13	Calcutta and South-Eastern	5 6	67,36,171	28	21,246	89,726	50,705	39,021
14	Khamgaon	5 6	..	7 ¹ / ₂	..	14,426*	14,426*	..
15	Amraoti	5 6	..	5 ¹ / ₂	..	25,114	25,114	..
16	Wardha Coal	5 6	49,50,644	45	36,509	1,13,480	71,655	41,825
17	Sindia	5 6	..	12	..	..	..	..
18	Ghazipur and Dildarnagar	5 6	5,87,697	12	..	22,340	21,452	888
Total		..	1,13,64,41,826	7,092 ¹ / ₂	1,44,30,964	6,58,09,595	2,96,47,238	3,61,62,357
<i>Narrow Gauge.</i>		Metre	Rs.	Miles.	Rs.	Rs.	Rs.	Rs.
19	South Indian	..	4,23,75,687	663 ^h	6,35,295	19,11,830	12,89,546	6,22,284
20	Rajputana	..	5,09,57,787	726 ¹ / ₂	14,21,382	37,19,156	20,81,505	16,37,651
21	Holkar and Sindia-Neemuch	..	2,70,72,388	275	3,26,802	9,92,633	7,09,726	2,82,907
22	Nagpur and Jhattsigarh	..	36,04,848	62	51,025	1,54,517	1,01,101	53,416
23	Rangoon and Irrawaddy Valley	..	1,23,73,848	161	2,71,494	9,69,510	4,88,264	4,81,246
24	Northern Bengal	..	2,04,41,995	230 ¹ / ₂	2,36,798	8,18,343	4,68,294	3,50,049
25	Purhoot	..	54,48,649	82	82,215	3,12,527	1,66,989	1,45,538
26	Cawnpore and Farukhabad	..	30,41,693	74	64,670	1,14,265	74,532	39,733
27	Bhavnagar-Gondal	..	52,98,272	192 ¹ / ₂	1,72,172	4,14,337	2,60,043	1,54,294
28	Muttra and Hathras	..	10,49,382	29	21,518	67,703	47,603	20,100
29	Mysore	..	..	..	..	..	..	..
30	Nalhati	4 0	3,07,780	27 ¹ / ₂	18,006	24,317	26,817	8,000
31	His Highness the Gaekwar's	2 6	35,342	58 ¹ / ₂	39,690	89,323	50,408	38,915
Total		..	17,20,07,671	2,581 ¹ / ₂	33,41,067	95,98,961	57,64,828	38,34,133
GRAND TOTAL		..	1,30,84,49,497	9,673 ¹ / ₂	1,77,72,031	7,54,08,556	3,54,12,066	3,99,96,490

- (a) Includes 3 miles, the length of the Barrh Branch, 44 miles of the Sindia and 12 miles of the Dildarnagar and Ghazipur Railways.
- (b) Exclusive of 7¹/₂ miles (Dadur Junction to Colaba, B, B and C. I. Railway), but inclusive of the length of the State lines worked over by the Company.
- (c) Excludes 13 miles of the E. I. Railway from Ghazipur to Delhi worked over by the Company.
- (d) Includes 13 miles, the length of the Damukdia Branch.
- (e) Excludes 7 miles of the S, P. and D. Railway from Mooltan to Mozuffarabad worked over by this Railway.
- (f) Capital expended on open mileage charged to final heads, inclusive of rolling stock.
- (g) Exclusive of (Rs. 14,77,668) capital expenditure on Docks and Steam Boats.
- (h) Includes 8 miles of Foreign line worked over by the Company.

N.B.—In cases where short lengths of Railway are worked over by Foreign Railways, the mileage so worked over should be included in the length used for calculating earnings and expenses per mile of railway worked.

* Represents amount received from the Great Indian Peninsula Railway.

STATISTICS OF INDIAN RAILWAYS.

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No. II.—SUMMARY OF EARNINGS.

[From No. VIII of Revenue Account].

	RAILWAYS.	Coaching.	Goods.	Electric Telegraph	Steam-boat	SUNDRIES.		TOTAL.
						Receipts from other lines for hire, mileage and rents.	Other items.	
	<i>Broad Gauge.</i>	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1	East Indian ..	61,22,814	1,60,00,532	84,629	17,928	3,48,939	2,82,412	2,28,07,254
2	Great Indian Peninsula ..	35,68,973	1,41,77,687	27,804	..	96,653	1,20,526	1,79,91,643
3	Sind, Punjab and Delhi ..	20,60,494	30,17,081	9,425	1,13,093	2,73,513	57,905	55,31,461
4	Madras ..	13,76,118	17,53,971	10,571	..	34,968	52,179	32,27,807
5	Bombay, Baroda and Central India	17,57,846	40,94,343	14,333	..	48,769	87,681	60,02,972
6	Eastern Bengal ..	7,95,756	9,20,818	2,607	1,70,417	2,288	21,460	19,13,346
7	Oudh and Rohilkhand ..	10,84,709	13,45,438	5,772	..	64,754	64,561	25,65,234
8	Indus Valley and Kandahar ..	8,92,128	17,20,310	6,190	76,039	1,31,032	36,351	28,62,050
9	Punjab Northern ..	7,17,199	11,56,778	2,878	..	20,682	32,126	19,29,663
10	Dhond and Manmad ..	..	..	..	..	..	..	..
11	Patna and Gya ..	1,56,549	86,490	1,214	..	335	1,879	2,46,467
12	Nizam's ..	1,57,940	2,30,977	644	..	4,585	4,140	3,98,286
13	Calcutta and South-Eastern ..	44,483	21,886	246	..	14,339	2,772	83,726
14	Khamgaon ..	..	..	..	..	..	..	..
15	Amraoti ..	..	..	..	..	..	..	..
16	Wardha Coal ..	19,121	68,243	583	..	24,083	1,450	1,13,480
17	Sindia ..	..	..	..	..	..	..	..
18	Ghazipur and Dildarnagar ..	9,987	11,833	520	..	..	..	22,340
	Total ..	1,87,64,117	4,46,06,337	1,17,416	3,77,477	10,64,940	7,65,442	6,56,95,729
	<i>Narrow Gauge.</i>							
19	South Indian ..	10,87,726	7,78,649	11,062	..	106	34,287	19,11,830
20	Rajputana ..	10,49,429	26,24,047	10,802	..	4,700	30,173	37,19,156
21	Holkar and Sindia-Neemuch ..	3,68,757	6,22,814	2,855	..	253	2,046	9,92,633
22	Nagpur and Chhattisgarh ..	43,125	1,09,352	501	..	1,264	275	1,54,517
23	Rangoon and Irrawaddy Valley ..	4,61,325	4,99,174	2,857	..	..	6,154	9,69,510
24	Northern Bengal ..	2,67,027	4,28,475	3,155	85,658	..	54,028	8,18,343
25	Tirhoot ..	1,23,232	1,35,267	3,566	49,203	..	1,259	3,12,527
26	Cawnpore and Farukhabad ..	74,827	38,434	805	..	..	199	1,14,265
27	Bhavnagar-Gondal ..	1,79,961	2,29,836	3,115	..	..	1,425	4,14,837
28	Mutra and Hathras ..	40,961	24,695	1,691	..	..	356	67,703
29	Mysore ..	..	..	..	..	..	..	..
30	Nalhati ..	23,557	10,709	477	..	..	74	34,817
31	His Highness the Gaekwar's ..	46,182	41,492	..	..	..	1,649	89,323
	Total ..	37,66,109	55,42,944	40,886	1,34,861	6,323	1,07,838	95,98,961
	GRAND TOTAL ..	2,25,30,226	5,01,49,281	1,58,302	5,12,338	10,71,263	8,73,280	7,52,94,690

No. III.—DETAIL OF COACHING TRAFFIC.

[From Abstract H of Revenue Account.]

CXXVIII

RAILWAYS	PASSENGERS.														Miscellaneous, including parcel, luggage, &c.	Total	Deductions.	Net Total.
	FIRST CLASS.			SECOND CLASS.			THIRD OR INTERMEDIATE CLASS.			FOURTH OR LOWEST CLASS.			TOTAL.					
	Single journey fare	Number.	Receipts	Single journey fare.	Number.	Receipts.	Single journey fare	Number.	Receipts.	Single journey fare.	Number.	Receipts.	Number.	Receipts.				
		Pies.	Rs.	Pies.	Rs.	Pies.	Rs.	Pies.	Rs.	Pies.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	
<i>Broad Gauge.</i>																		
1 East Indian ..	18-00	21,765	2,50,121	9-00	81,577	3,47,846	4-50	299,315	2,38,690	3-00	4,193,465	46,19,246	4,596,122	54,55,903	6,68,940	61,24,843	2,029	61,22,814
2 Great Indian Peninsula ..	18-00	19,662	2,33,757	9-00	105,025	5,32,779	4-00	304,304	6,19,506	2-50	2,432,723	16,30,469	2,861,714	30,16,511	5,52,462	35,68,973	..	35,68,973
3 Sind, Punjab and Delhi ..	12-00	11,853	78,175	8-00	37,987	1,19,740	4-50	16	58	3-00, 2-50 & 2-25	2,134,077	15,56,170	2,183,938	17,54,143	3,06,351	20,60,494	..	20,60,494
4 Madras ..	18-00	6,307	89,817	7-00	28,133	97,268	..	..	..	2-00	2,130,196	9,99,940	2,164,636	11,87,025	1,89,093	13,76,118	..	13,76,118
5 Bombay, Baroda and Central India ..	12-00	35,664	51,751	6-00	240,049	1,33,263	..	..	..	3-00&2-50	3,328,754	13,36,643	4,104,467	15,71,657	1,36,189	17,57,846	..	17,57,846
6 Eastern Bengal ..	12-00	14,322	27,681	6-00	31,291	26,115	4-50	238,261	1,57,464	3-00	904,510	5,12,683	1,188,384	7,23,943	41,813	7,95,756	..	7,95,756
7 Outh and Rohilkhand ..	..	..	..	9-00	11,474	40,584	..	..	..	2-50	1,352,378	9,33,368	1,363,852	10,23,952	60,757	10,84,709	..	10,84,709
8 Indus Valley and Kandahar ..	12-00	2,063	21,160	8-00	8,386	35,510	..	..	..	2-50&2-00	803,234	5,88,787	813,683	6,45,457	2,46,671	8,92,128	..	8,92,128
9 Punjab Northern ..	12-00	2,834	21,629	8-00	7,553	31,747	3-00	179,880	1,39,460	2-00	814,982	4,43,461	1,005,304	6,36,297	80,902	7,17,199	..	7,17,199
10 Dhond and Manmad ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
11 Patna and Gya ..	18-00	683	2,911	9-00	1,348	2,554	..	..	..	3-00	249,398	1,46,814	251,434	1,52,279	4,270	1,56,549	7a	1,56,549
12 Nizam's ..	18-00	1,468	9,919	6-00	6,131	13,012	..	..	..	2-00	189,330	1,09,369	196,929	1,32,300	25,647	1,57,947	..	1,57,947
13 Calcutta and South-Eastern ..	18-00	285	346	9-00	2,635	1,290	..	..	..	3-00&2-62	350,838	41,203	353,758	42,839	1,644	44,483	..	44,483
14 Khamgaon ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
15 Amroha ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
16 Wadhwa Coal ..	18-00	278	538	9-00	438	450	4-00	1,296	784	2-00	55,125	14,439	57,137	16,211	2,910	19,121	..	19,121
17 Sindh ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
18 Ghazipur and Dildarnagar ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	9,987	..	9,987
Total ..	Nil.	117,244	7,87,805	Nil.	562,032	13,82,158	Nil.	1,023,072	11,55,962	Nil.	19,439,010	1,30,32,592	21,141,358	1,63,58,517	23,97,649	1,87,66,153	2,036	1,87,64,117
<i>Narrow Gauge.</i>																		
19 South Indian ..	18-00	3,912	25,692	6-00	19,614	28,604	..	..	..	3-00&2-00	2,362,037	9,76,683	2,385,563	10,30,979	56,747	10,87,726	..	10,87,726
20 Rajputana ..	12-00	5,568	34,059	8-00	16,481	41,275	4-00	78,376	79,761	2-00	1,315,301	7,88,065	1,415,726	9,43,160	1,06,269	10,49,429	..	10,49,429
21 Holkar and Sindh-Neemuch ..	12-00	1,837	7,150	8-00	6,053	11,033	4-00	15,032	16,913	2-00	623,124	2,94,197	646,046	3,29,293	39,464	3,68,757	..	3,68,757
22 Nagpur and Chhatisgarh ..	18-00	1,051	1,215	8-00	8,460	2,975	..	..	..	2-00	216,240	36,812	225,751	41,002	2,123	43,125	..	43,125
23 Rangoon and Irrawaddy Valley ..	14-90	1,556	6,013	7-45	8,633	12,380	..	..	..	2-98	734,457	4,25,372	744,646	4,43,765	17,560	4,61,325	..	4,61,325
24 Northern Bengal ..	18-00	1,735	21,073	9-00	3,024	14,345	4-50	9,441	18,019	2-50	322,929	1,84,597	337,179	2,38,039	28,988	2,67,027	..	2,67,027
25 Tirhoot ..	16-09	1,677	5,660	9-66	1,774	3,765	..	..	..	2-41	248,250	1,02,993	251,701	1,12,418	10,614	1,23,232	..	1,23,232
26 Cawnpore and Farukhabad ..	15-00	42	177	6-00	1,131	1,543	..	..	..	2-00	251,125	69,091	252,298	70,811	4,016	74,827	..	74,827
27 Bhavnagar-Gondal ..	12-00	707	2,300	8-00	3,519	7,345	..	..	..	2-00	360,020	1,56,873	364,246	1,66,518	13,443	1,79,961	..	1,79,961
28 Muttra and Hathras ..	13-42	556	949	5-46	779	351	..	..	..	2-97	149,697	37,647	151,032	38,947	2,014	40,961	..	40,961
29 Mysore ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
30 Nalhati ..	18-00	311	858	6-00	1,520	1,362	..	..	..	3-00	57,935	19,359	59,766	21,579	2,026	23,605	48	23,557
31 His Highness the Gaekwar's ..	..	..	..	7-00	1,676	1,170	..	..	..	8-00	140,815	44,234	142,491	45,404	778	46,182	..	46,182
Total ..	Nil.	19,002	1,05,151	Nil.	72,664	1,26,148	Nil.	102,849	1,14,693	Nil.	6,781,930	31,35,923	6,976,445	34,81,915	2,84,242	37,66,157	48	37,66,109
GRAND TOTAL ..	Nil.	136,246	8,92,956	Nil.	634,696	15,08,306	Nil.	1,125,921	12,70,655	Nil.	26,220,940	1,61,68,515	28,117,803	1,98,40,432	26,81,891	2,25,32,310	2,084	2,25,30,226

APPENDIX F—continued.

NOTE.—Season tickets included with the traffic of the classes to which they belong.

(a) Irrecoverable outstandings.

No. IV.—DETAIL OF GOODS TRAFFIC.

[From Abstract I of Revenue Account].

RAILWAYS.	GENERAL MERCHANDISE.		MILITARY STORES.		RAILWAY MATERIALS AND REVENUE STORES, EXCEPT COAL.		COAL.		Miscellaneous.	Total.	Deductions.	Net Total.
	Ton-miles.	Receipts.	Ton-miles.	Receipts.	Ton-miles.	Receipts.	Ton-miles.	Receipts.				
		Rs.		Rs.		Rs.		Rs.	Rs.	Rs.	Rs.	Rs.
<i>Broad Gauge.</i>												
1 East Indian ..	307,658,353	1,26,40,841	2,768,337	2,13,424	27,691,856	3,87,701	116,581,791	26,77,935	80,784	1,60,00,635	103	1,60,00,532
2 Great Indian Peninsula ..	265,553,212	1,35,51,377	923,116	86,026	7,187,717	1,66,270	12,071,565	2,77,877	96,137	1,41,77,687	..	1,41,77,687
3 Sind, Punjab and Delhi ..	56,205,679	24,43,217	734,133	67,850	6,117,398	1,73,422	10,338,947	2,44,320	88,222	30,17,031	..	30,17,031
4 Madras ..	32,611,708	16,53,476	296,690	27,206	1,922,271	38,799	70,701	670	33,320	17,53,971	..	17,53,971
5 Bombay, Baroda and Central India ..	70,922,473	38,42,325	142,921	12,654	2,680,641	54,511	3,970,249	95,918	88,435	40,94,343	..	40,94,343
6 Eastern Bengal ..	17,174,726	8,40,598	49,717	4,313	525,990	10,602	1,694,787	57,403	7,902	9,20,818	..	9,20,818
7 Oudh and Rohilkhand ..	36,725,168	12,03,794	140,116	10,469	8,481,287	75,996	2,072,139	49,656	5,523	13,45,438	..	13,45,438
8 Indus Valley and Kandahar ..	27,945,968	12,60,314	2,390,101	1,93,983	5,044,973	1,28,242	3,033,285	71,829	65,942	17,20,310	..	17,20,310
9 Punjab Northern ..	7,951,599	9,66,374	176,100	20,300	5,820,319	99,913	2,221,815	46,935	22,756	11,56,778	..	11,56,778
10 Dhond and Manmad ..	..	..	..	..	..	..	..	..	..	..	..	..
11 Patna and Gya ..	1,317,407	72,438	..	..	336,276	9,242	92,273	4,426	384	86,490	..	86,490
12 Nizam's ..	3,669,433	2,09,481	88,086	3,102	337,078	8,746	6,790	221	4,427	2,30,977	..	2,30,977
13 Calcutta and South-Eastern ..	434,352	18,954	..	..	9,292	334	22,136	812	1,786	21,886	..	21,886
14 Khamgaon ..	..	..	..	..	..	..	..	..	..	..	..	..
15 Amraoti ..	..	..	..	..	..	..	..	..	..	..	..	..
16 Wardha Coal ..	612,879	32,934	68	7	23,825	714	1,073,585	33,935	653	68,243	..	68,243
17 Sindia ..	..	..	..	..	..	..	..	..	..	..	..	..
18 Ghazipur and Dildarnagar ..	..	..	..	..	..	..	..	..	..	11,833	..	11,833
Total ..	828,782,957	3,87,37,123	7,758,385	6,44,334	66,173,453	11,54,492	153,255,063	35,61,937	4,96,721	4,46,06,440	103	4,46,06,337
<i>Narrow Gauge.</i>												
19 South Indian ..	17,689,636	6,92,567	51,490	2,088	2,853,896	73,835	375,910	8,132	2,027	7,78,649	..	7,78,649
20 Rayputana ..	45,070,026	23,14,100	34,064	3,068	7,687,140	2,40,404	2,232,521	60,527	5,948	26,24,047	..	26,24,047
21 Holkar and Sindia-Neemuch ..	6,890,243	5,58,517	101,696	10,825	1,479,877	50,232	2,937	805	2,935	6,22,814	..	6,22,814
22 Nagpur and Chhattisgarh ..	682,526	64,761	449	96	699,365	34,486	245,166	7,379	2,630	1,09,352	..	1,09,352
23 Rangoon and Irrawaddy Valley ..	9,598,092	4,83,254	959	77	626,928	10,714	16,423	553	4,663	4,99,261	87a	4,99,174
24 Northern Bengal ..	6,911,763	3,99,641	11,449	813	268,856	10,107	508,534	16,708	1,206	4,28,475	..	4,28,475
25 Turhoot ..	1,729,375	1,14,013	..	..	240,326	7,512	216,101	12,703	1,039	1,35,267	..	1,35,267
26 Cawnpore and Farkhabad ..	452,778	27,432	20,907	3,043	125,850	5,011	70,371	2,621	327	38,434	..	38,434
27 Bhavnagar-Gondal ..	1,997,894	1,83,316	..	..	177,537	43,795	83,192	1,957	763	2,29,836	..	2,29,836
28 Muttra and Hathras ..	261,967	23,859	69	12	1,398	76	3,962	151	597	24,695	..	24,695
29 Mysore ..	..	..	..	..	..	..	..	..	..	..	..	..
30 Nalhati ..	116,290	8,970	..	..	1,313	44	25,237	1,542	156	10,712	3	10,709
31 His Highness the Gaekwar's ..	513,273	40,254	..	..	38,143	980	4,136	137	121	41,492	..	41,492
Total ..	91,913,863	49,10,684	221,083	20,022	14,200,569	4,77,196	3,789,990	1,12,715	22,417	55,43,034	90	55,42,944
GRAND TOTAL ..	920,696,820	4,36,47,307	7,979,468	6,64,356	80,379,022	16,31,688	157,045,053	36,74,652	5,19,138	5,01,49,474	193	5,01,49,281

(a) Less outstandings irrecoverable.

STATISTICS OF INDIAN RAILWAYS.

CXXIX

No. V.—SUMMARY OF EXPENSES.

[From No. VIII of Revenue Account].

CXXX

RAILWAYS.		Maintenance, of Way, Works and Stations	Locomotive Expenses.	Carriage and Wagon Expenses	Traffic Expenses.	General Charges.	Steam-boat Service.	Special and Miscellaneous Expenses.	Total.
<i>Broad Gauge.</i>		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1	East Indian	20,10,572	16,67,274	7,22,104	13,06,333	8,59,415	15,063	1,67,344	67,48,105
2	Great Indian Peninsula	16,73,439	31,31,074	12,32,101	11,16,773	5,42,330	..	3,36,656	80,32,373
3	Sind, Punjab and Delhi	7,61,783	12,32,689	2,97,609	5,34,413	3,40,848	1,97,993	2,55,643	36,20,978
4	Madras	6,09,630	6,69,410	2,49,984	3,23,083	2,26,353	..	34,355	21,12,815
5	Bombay, Baroda and Central India	4,26,142	7,77,874	2,04,980	3,38,805	2,33,594	—4,252	63,055	20,40,198
6	Eastern Bengal	1,72,836	2,16,180	86,667	2,42,042	1,51,577	1,41,226	11,071	10,21,599
7	Orch and Rohilkhand	3,26,916	4,92,571	1,21,333	2,68,537	1,92,032	..	18,212	14,19,601
8	Indus Valley and Kandahar	4,74,658	8,88,970	1,36,687	3,59,969	2,16,519	52,446	2,43,062	23,72,311
9	Punjab Northern	2,42,319	8,29,094	78,940	2,10,871	1,06,555	..	2,20,600	16,88,379
10	Dhond and Manmad	..	..	..	..	..	..	..	..
11	Patna and Gya	20,450	44,757	13,416	19,698	23,041	..	44,583	1,65,945
12	Nizam's	37,003	76,344	17,706	48,316	32,460	..	18,384	2,30,213
13	Calcutta and South-Eastern	22,683	12,145	229	7,063	7,060	..	1,525	50,705
14	Khamgaon	..	..	..	..	..	..	..	..
15	Amraoti	..	..	..	..	..	..	..	..
16	Wardha Coal	12,789	18,012	8,320	9,966*	19,362	..	3,206	71,655
17	Sindia	..	..	..	..	..	..	..	..
18	Ghazipur and Dildarnagar	5,698	4,963	1,907	3,387	4,839	..	658	21,452
	Total	67,96,918	1,00,61,357	31,71,983	47,89,256	29,55,985	4,02,476	14,18,354	2,95,96,329
<i>Narrow Gauge.</i>									
19	South Indian	3,83,622	4,48,892	1,15,687	1,70,949	1,66,010	..	4,386	12,89,546
20	Rajputana	4,06,545	10,57,656	1,19,184	2,64,519	2,06,152	..	27,449	20,31,505
21	Holkar and Sindia-Neemuch	2,25,638	2,53,914	49,408	1,03,715	70,126	..	1,925	7,09,726
22	Nagpur and Chhattisgarh	11,497	35,204	8,898	24,243	21,139	..	120	1,01,101
23	Rangoon and Irrawaddy Valley	1,17,081	1,56,356	21,991	1,24,637	62,584	..	5,615	4,88,264
24	Northern Bengal	1,07,776	1,23,273	19,014	72,199	80,996	49,637	10,399	4,68,294
25	Tirhoot	29,356	38,595	6,901	31,879	30,086	28,854	1,318	1,66,989
26	Cawnpore and Farakhabad	11,605	25,746	2,494	14,334	20,348	..	5	74,532
27	Bhavnagar-Gondal	45,914	95,027	10,172	49,070	55,722	..	4,138	2,60,043
28	Muttra and Hathras	6,966	13,381	1,194	11,817	9,831	..	2,364	47,603
29	Mysore	..	..	..	..	..	..	..	..
30	Nalhati	6,838	6,582	1,629	4,575	7,064	..	129	26,817
31	His Highness the Gackwar's	18,637	15,676	1,643	11,219	3,233	..	..	50,408
	Total	13,71,475	22,82,302	3,58,215	8,83,156	7,33,341	78,491	57,848	57,64,828
	GRAND TOTAL	81,68,393	1,23,43,659	35,30,198	56,72,412	36,89,326	4,80,967	14,76,202	3,53,61,157

APPENDIX F—continued.

No. VI.—DETAIL OF EXPENSES FOR MAINTENANCE OF WAY, WORKS AND STATIONS.

[From Abstract A of Revenue Account].

RAILWAYS.		General Superintendence.	Maintenance of Permanent-way.	Repairs of Bridges, &c.	Conservancy of Rivers.	Repairs of Stations and Buildings.	Other Charges	Total.	Deductions.	Net Total.
<i>Broad Gauge.</i>		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1	East Indian	3,22,847	17,39,179	81,268	..	1,55,335	3,21,758	26,20,387	6,09,815	20,10,572
2	Great Indian Peninsula	1,88,992	9,62,868	2,39,972	..	1,23,087	1,70,494	16,85,413	11,974	16,73,439
3	Sind, Punjab and Delhi	1,19,348	2,25,078	1,95,939	..	88,165	1,33,253	7,61,783	..	7,61,783
4	Madras	1,36,799	3,42,943	43,167	..	39,308	47,413	6,09,630	..	6,09,630
5	Bombay, Baroda and Central India	80,245	2,33,226	32,284	..	37,392	42,995	4,26,142	..	4,26,142
6	Eastern Bengal	36,970	1,22,766	16,863	..	20,214	16,737	2,13,550	40,714	1,72,836
7	Oudh and Rohilkhand	1,07,214	1,04,479	48,070	..	16,606	50,547	3,26,916	..	3,26,916
8	Indus Valley and Kandahar	1,29,711	2,41,684	23,475	..	40,297	39,491	4,74,658	..	4,74,658
9	Punjab Northern	61,872	1,01,883	21,597	29,439	13,872	13,656	2,42,319	..	2,42,319
10	Dhond and Manmad	..	..	..	..	..	..	..	..	..
11	Patna and Gya	7,762	9,149	1,394	..	1,085	1,060	20,450	..	20,450
12	Nizam's	8,676	24,650	749	..	1,286	1,742	37,003	..	37,003
13	Calcutta and South-Eastern	1,432	15,818	2,533	23	2,125	752	22,683	..	22,683
14	Khamgaon	..	..	..	..	..	..	..	..	..
15	Amraoti	..	..	..	..	..	..	..	..	..
16	Wardha Coal	1,059	8,313	565	..	1,146	1,706	12,789	..	12,789
17	Sindia	..	..	..	..	..	..	..	..	..
18	Ghazipur and Dildarnagar	..	..	..	..	..	..	5,698	..	5,698
	Total	12,02,927	41,31,936	7,07,876	29,462	5,39,918	8,41,604	74,59,421	6,62,503	67,96,918
	<i>Narrow Gauge.</i>									
19	South Indian	77,400	1,72,324	59,317	..	16,557	59,318	3,84,916	1,294	3,83,622
20	Rajputana	76,157	2,64,384	10,081	908	23,371	26,644	4,06,545	..	4,06,545
21	Holkar and Sindia-Neemuch	20,133	1,71,322	4,912	..	7,472	21,299	2,25,638	..	2,25,638
22	Nagpur and Chhattasgarh	2,339	5,971	60	..	52	3,075	11,497	..	11,497
23	Rangoon and Irrawaddy Valley	18,057	63,543	20,142	395	6,680	8,264	1,17,081	..	1,17,081
24	Northern Bengal	25,435	54,857	4,294	..	17,328	5,862	1,07,776	..	1,07,776
25	Tirhoot	6,298	11,928	1,580	..	3,555	5,995	29,356	..	29,356
26	Cawnpore and Farukhabad	5,421	5,430	56	..	298	400	11,605	..	11,605
27	Bhavnagar-Gondal	9,849	35,367	..	..	74	624	45,914	..	45,914
28	Muttra and Hathras	740	3,617	264	..	1,527	818	6,966	..	6,966
29	Mysore	..	..	..	..	..	..	..	..	..
30	Nalhati	722	5,650	294	..	43	129	6,838	..	6,838
31	His Highness the Gaekwar's	2,081	7,250	6,975	..	876	1,455	18,637	..	18,637
	Total	2,44,632	8,02,143	1,07,975	1,303	82,833	1,33,383	13,72,769	1,294	13,71,475
	GRAND TOTAL	14,47,559	49,34,079	8,15,851	30,765	6,22,751	9,75,487	88,32,190	6,63,797	81,68,393

STATISTICS OF INDIAN RAILWAYS.

CXXXI

No. VII.—DETAIL OF LOCOMOTIVE EXPENSES.

[From Abstract B of Revenue Account.]

RAILWAYS.		General Superintendence	Wages of Drivers and Firemen, fuelling, cleaning engines, &c.	Fuel.	Water.	Oil, Tallow, and other Stores.	Maintenance and renewal of Locomotive Engines and Machinery.	Other charges	Total.	Deductions.	Net Total.
<i>Broad Gauge.</i>		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1	East Indian	2,58,984	5,33,413	1,55,798	29,904	88,113	3,55,645	3,12,505	17,34,362	67,088	16,67,274
2	Great Indian Peninsula	1,67,985	7,33,178	11,99,832	67,126	95,881	5,54,824	3,12,248	31,31,074	..	31,31,074
3	Sind, Punjab and Delhi	77,262	2,15,417	5,41,151	13,192	35,508	1,97,727	1,52,432	19,32,689	..	19,32,689
4	Madras	53,919	1,36,369	2,13,925	10,498	13,229	2,06,424	35,046	6,69,410	..	6,69,410
5	Bombay, Baroda and Central India	48,849	1,53,456	3,40,870	22,924	14,582	96,591	53,851	7,77,874 ^a	..	7,77,874
6	Eastern Bengal	29,730	60,569	64,678	5,815	8,427	38,268	13,029	2,20,516	4,336	2,16,180
7	Oudh and Rohilkhand	53,991	67,953	2,23,626	6,117	17,186	74,029	52,082	4,94,984	2,413	4,92,571
8	Indus Valley and Khandahar	63,631	1,78,633	3,92,550	18,258	16,688	1,25,071	94,139	8,88,970	..	8,88,970
9	Punjab Northern	38,056	1,55,577	4,27,615	27,001	50,945	79,428	50,472	8,29,094	..	8,29,094
10	Dhond and Manmad	..	..	..	..	..	..	..	..	..	..
11	Patna and Gya	3,483	9,575	18,099	717	1,754	10,011	1,118	44,757	..	44,757
12	Nizam's	5,257	17,207	32,003	4,885	3,383	4,654	8,955	76,344	..	76,344
13	Calcutta and South-Eastern	2,268	1,543	5,018	501	447	2,255	113	12,145	..	12,145
14	Khamgaon	..	..	..	..	..	..	..	..	..	..
15	Amraoti	..	..	..	..	..	..	..	..	..	..
16	Wardha Coal	1,102	3,700	6,700	669	1,176	3,609	1,056	18,012	..	18,012
17	Sindia	..	..	..	..	..	..	..	..	..	..
18	Ghazipur and Dildarnagar	..	..	..	..	..	..	..	4,963	..	4,963
	Total	8,04,517	22,66,590	36,21,865	2,07,607	3,47,319	17,48,536	10,87,046	1,01,35,194	73,837	1,00,61,357
	<i>Narrow Gauge.</i>										
19	South Indian	39,272	75,592	1,33,348	7,699	9,977	1,40,279	37,725	4,48,893	..	4,48,893
20	Rajputana	67,331	2,11,414	4,66,980	19,670	30,992	2,09,375	61,915	10,67,677	..	10,67,677
21	Holkar and Sindia-Neemuch	21,717	65,947	89,918	8,024	9,637	57,160	6,511	2,58,914	..	2,58,914
22	Nagpur and Chhattisgarh	3,931	9,925	12,910	1,217	2,506	2,718	1,997	35,204	..	35,204
23	Rangoon and Irrawaddy Valley	17,177	45,432	43,337	2,369	7,505	31,104	4,382	1,56,356	..	1,56,356
24	Northern Bengal	17,911	32,350	46,944	2,745	6,988	7,888	13,447	1,28,273	..	1,28,273
25	Tirhoot	3,458	11,557	14,306	1,047	1,836	5,973	418	38,595	..	38,595
26	Cawnpore and Farukhabad	5,689	2,076	12,858	590	1,736	1,938	859	25,746	..	25,746
27	Bhavnagar-Gondal	4,443	23,218	59,227	1,981	4,319	1,389	450	95,027	..	95,027
28	Muttra and Hathras	2,279	809	7,476	320	462	1,873	2,162	15,381	..	15,381
29	Mysore	..	..	..	..	..	..	..	..	..	..
30	Nalhati	1,076	775	2,015	253	268	2,189	6	6,532	..	6,532
31	His Highness the Gaekwar's	456	3,101	8,147	1,009	514	2,088	361	15,676	..	15,676
	Total	1,84,740	4,82,246	9,07,466	46,924	76,740	4,63,974	1,30,233	22,92,323	..	22,92,323
	GRAND TOTAL	9,89,257	27,48,836	45,29,331	2,54,531	4,24,059	22,12,510	12,17,279	1,24,27,517	73,837	1,23,53,680

(a) Includes Rs. 46,751 being the cost of duplicate parts of locomotive engines used in previous half-years, but not charged for.

STATISTICS OF INDIAN RAILWAYS.

CXXXIII

No. VIII.—DETAIL OF CARRIAGE AND WAGON EXPENSES.

[From Abstract C of Revenue Account].

RAILWAYS.	General Superintendence.	REPAIRS AND RENEWALS OF VEHICLES AND MACHINERY.		Cleaning and Oiling.	Other charges.	Total.	Deductions.	Net Total.	
		Coaching.	Goods.						
	<i>Broad Gauge.</i>	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	
1	East Indian ..	67,322	2,33,770	3,69,310	42,472	16,364	7,29,238	7,134	7,22,104
2	Great Indian Peninsula ..	47,768	3,05,312	6,91,475	88,370	99,278	12,32,203	102	12,32,101
3	Sind, Punjab and Delhi ..	21,490	75,538	1,18,259	42,806	39,516	2,97,609	..	2,97,609
4	Madras ..	19,960	84,776	1,07,080	26,576	11,592	2,49,984	..	2,49,984
5	Bombay, Baroda and Central India	13,166	33,534	1,42,313	16,464	11,256	2,16,733	11,753	2,04,980
6	Eastern Bengal ..	13,113	31,289	33,091	7,135	2,039	86,667	..	86,667
7	Oudh and Rohilkhand ..	10,600	47,561	42,725	18,959	1,488	1,21,333	..	1,21,333
8	Indus Valley and Kandahar ..	10,821	28,632	60,083	26,736	10,415	1,36,687	..	1,36,687
9	Punjab Northern ..	3,725	18,019	47,265	9,432	449	78,940	..	78,940
10	Dhond and Manmad ..	..	..	..	..	..	..	..	..
11	Patna and Gya ..	1,161	6,145	2,396	1,316	2,397	13,415	..	13,415
12	Nizam's ..	1,500	7,814	6,568	1,438	386	17,706	..	17,706
13	Calcutta and South-Eastern ..	301	228	904	564	..	2,497	2,268 ^a	229
14	Khamgaon ..	..	..	..	..	..	..	..	..
15	Amraoti ..	..	..	..	..	..	..	..	..
16	Wardha Coal ..	807	820	4,837	1,733	73	8,320	..	8,320
17	Sindia ..	..	..	..	..	..	..	..	..
18	Ghaziपुर and Dildarnagar ..	..	..	..	..	..	1,907	..	1,907
	Total ..	2,12,234	8,73,438	16,26,306	2,84,101	1,95,253	31,93,239	21,257	31,71,982
	<i>Narrow Gauge.</i>								
19	South Indian ..	6,937	33,147	65,168	6,792	4,094	1,16,138	451	1,15,687
20	Rajputana ..	14,485	58,846	31,147	21,056	1,166	1,26,700	7,516	1,19,184
21	Holkar and Sindia-Neemuch ..	4,433	8,742	24,847	6,253	5,133	49,408	..	49,408
22	Nagpur and Chhattisgarh ..	2,670	450	3,478	2,292	8	8,898	..	8,898
23	Rangoon and Irrawaddy Valley ..	2,875	5,439	7,075	4,956	1,646	21,991	..	21,991
24	Northern Bengal ..	7,670	4,559	2,502	3,891	382	19,004	..	19,004
25	Tirhoot ..	1,153	2,170	2,191	1,387	..	6,901	..	6,901
26	Cawnpore and Farukhabad ..	589	541	367	769	228	2,494	..	2,494
27	Bhavnagar-Gondal ..	1,673	513	453	7,533	..	10,172	..	10,172
28	Muttra and Hathras ..	427	353	272	142	..	1,194	..	1,194
29	Mysore ..	..	..	..	..	..	..	..	..
30	Nalhati ..	717	63	323	217	309	1,629	..	1,629
31	His Highness the Gaekwar's ..	152	157	1,000	335	..	1,644	..	1,644
	Total ..	43,781	1,14,980	1,38,823	55,623	12,966	3,66,173	7,967	3,58,206
	GRAND TOTAL ..	2,56,015	9,88,418	17,65,129	3,39,724	2,08,219	35,59,412	29,224	35,30,188

(a) Value of stores returned to Stock, &c., &c.

No. IX.—DETAIL OF TRAFFIC EXPENSES.

[From Abstract D of Revenue Account.]

RAILWAYS.		General Superintendence.	Station Staff.	Tram Staff.	Fuel, Lighting and General Stores.	Clothing.	Printing, Stationery, and Tickets.	Charges for delivery and collection of goods	Miscellaneous expenses.	Payment to other lines for expenses at joint stations	Other charges.	Total.	Deductions.	Net Total.
<i>Broad Gauge.</i>		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1	East Indian ..	1,60,550	7,58,557	2,32,926	81,231	14,305	46,940	..	21,736	..	1,709	13,17,954	11,622	13,06,332
2	Great Indian Peninsula ..	1,23,777	4,71,546	3,20,738	1,01,551	7,407	47,230	1,791	2,374	29,353	11,006	11,16,773	..	11,16,773
3	Sind, Punjab and Delhi ..	83,594	2,28,314	94,296	62,683	6,966	42,768	1,495	3,848	..	10,449	5,34,413	..	5,34,413
4	Madras ..	58,314	1,60,230	35,327	38,326	2,333	20,534	..	3,340	..	4,689	3,23,093	10	3,23,083
5	Bombay, Baroda and Central India ..	39,779	1,92,578	30,337	47,819	7,038	16,553	2,258	990	..	1,453	3,33,805	..	3,33,805
6	Eastern Bengal ..	30,535	1,64,390	21,441	16,700	963	7,111	..	853	..	549	2,42,042	..	2,42,042
7	Oudh and Rohilkhand ..	35,529	1,42,499	34,655	17,614	4,280	13,254	643	878	12,202	1,983	2,63,537	..	2,63,537
8	Indus Valley and Kandahar ..	41,350	1,49,355	50,663	47,902	7,113	46,186	..	329	16,033	1,038	3,59,969	..	3,59,969
9	Punjab Northern ..	33,470	70,573	52,925	28,718	1,219	5,225	90	433	17,870	348	2,10,871	..	2,10,871
10	Dhond and Manmad ..	..	..	..	..	..	..	..	..	..	..	..	..	..
11	Patna and Gya ..	4,924	8,190	3,106	831	196	709	..	167	1,574	1	19,698	..	19,698
12	Nizam's ..	7,714	18,189	6,134	8,551	484	2,488	..	720	3,668	368	48,316	..	48,316
13	Calcutta and South-Eastern ..	971	3,924	861	928	78	149	..	146	..	6	7,063	..	7,063
14	Khamgaon ..	..	..	..	..	..	..	..	..	..	..	..	..	..
15	Amraoti ..	..	..	..	..	..	..	..	..	..	..	..	..	..
16	Wardha Coal ..	..	4,595	1,387	807	30	190	..	348	2,584	25	9,966	..	9,966
17	Sindia ..	..	..	..	..	..	..	..	..	..	..	..	..	..
18	Ghazipur and Dildarnagar ..	..	..	..	..	..	..	..	..	..	..	3,387	..	3,387
Total ..		6,20,507	23,72,940	8,84,796	4,53,661	52,412	2,54,337	6,277	35,662	83,284	33,624	48,00,887	11,632	47,89,255
<i>Narrow Gauge</i>														
19	South Indian ..	24,777	95,561	16,345	12,397	2,587	12,063	116	923	..	6,182	1,70,951	2	1,70,949
20	Rajputana ..	38,554	1,15,628	43,511	25,987	3,971	15,970	..	1,409	18,291	1,198	2,64,519	..	2,64,519
21	Holkar and Sindia-Neemuch ..	14,591	38,496	18,328	9,910	2,060	10,459	..	776	..	9,095	1,03,715	..	1,03,715
22	Nagpur and Chhattisgarh ..	4,546	9,057	2,759	937	119	438	..	131	6,211	45	24,243	..	24,243
23	Rangoon and Irrawaddy Valley ..	14,108	71,038	11,964	11,822	909	11,877	..	2,274	..	645	1,24,637	..	1,24,637
24	Northern Bengal ..	12,193	41,056	6,800	7,885	502	2,162	..	584	..	1,017	72,199	..	72,199
25	Turhoot ..	4,622	17,553	4,423	4,028	581	459	..	213	..	..	31,879	..	31,879
26	Cawnpore and Farnkhabad ..	4,069	6,566	656	1,106	172	1,592	10	60	..	103	14,334	..	14,334
27	Bhavnagar-Gondal ..	6,534	12,260	4,381	3,747	..	15,629	..	782	5,637	100	49,070	..	49,070
28	Muttra and Hathras ..	2,428	2,887	436	160	42	103	4,450	39	1,271	1	11,817	..	11,817
29	Mysore ..	..	..	..	..	..	..	..	..	..	..	..	..	..
30	Nalhati ..	756	1,722	386	337	23	95	..	7	1,249	..	4,575	..	4,575
31	His Highness the Gaekwar's ..	608	4,314	690	2,880	134	525	..	..	2,067	..	11,218	..	11,218
Total ..		1,27,786	4,16,138	1,10,679	81,196	11,100	71,372	4,576	7,198	34,726	18,386	8,83,157	2	8,83,155
GRAND TOTAL ..		7,48,293	27,89,078	9,95,475	5,34,857	63,512	3,25,709	10,853	42,860	1,18,010	52,010	56,84,044	11,634	56,72,410

CXXXIV

APPENDIX FF—Continued.

No. X.—DETAIL OF GENERAL CHARGES.

[From Abstract E of Revenue Account].

RAILWAYS.	Home Expenditure or General Administration.	Agent's Office.	Andit, Accounts and Pay Office.	Stores Department.	Medical Department.	Rents and Miscellaneous.	Police.	Advertising.	Electric Telegraph.	Other charges.	Total.	Deductions.	Net Total.
<i>Broad Gauge.</i>													
1 East Indian ..	Rs. 1,27,178(a)	Rs. 72,571	Rs. 1,82,825	Rs. 1,06,544	Rs. 53,936	Rs. 70,469	Rs. 72,541	Rs. 1,803	Rs. 1,92,413	Rs. 5,385	Rs. 8,85,665	Rs. 26,250	Rs. 8,59,415
2 Great Indian Peninsula ..	48,446	36,244	1,23,886	36,234	28,824	41,899	71,024	2,028	1,43,638	10,607	5,42,330	..	5,42,330
3 Sind, Punjab and Delhi ..	41,162	30,778	1,00,303	31,950	12,344	25,442	27,242	2,693	62,699	6,235	3,40,848	..	3,40,848
4 Madras ..	35,377	21,309	66,850	10,229	17,034	10,794	18,114	1,758	38,053	8,195	2,27,713	1,360	2,26,353
5 Bombay, Baroda and Central India ..	81,297	11,240	52,910	40,959	9,720	13,803	29,724	692	37,324	5,425	2,33,594	..	2,33,594
6 Eastern Bengal ..	22,660	27,022	31,547	1,556	8,356	18,042	13,249	2,897	22,929	3,319	1,51,577	..	1,51,577
7 Oudh and Rohilkhand ..	34,224	20,822	42,985	5,667	11,647	8,696	13,947	199	44,948	8,897	1,92,032	..	1,92,032
8 Indus Valley and Kandahar ..	5,148	16,368	64,260	27,666	11,931	48,944	1,312	651	41,608	1,755	2,16,519	..	2,16,519
9 Punjab Northern ..	- 7,703	14,361	29,090	7,259	- 3,360	28,086	2,264	1,486	25,364	2,388	1,06,555	..	1,06,555
10 Dhond and Manmad ..	..	..	..	..	..	..	..	..	..	..	..	..	..
11 Patna and Gya ..	1,675	5,092	6,755	2,669	270	2,057	..	14	4,165	344	23,041	..	23,041
12 Nizam's ..	1,531	5,151	9,890	2,228	1,578	2,524	..	29	7,305	2,224	33,460	..	32,460
13 Calcutta and South-Eastern ..	621	2,535	1,754	264	60	359	..	97	1,295	75	7,060	..	7,060
14 Kamgaon ..	..	..	..	..	..	..	..	..	..	..	..	..	..
15 Amraoti ..	..	..	..	..	..	..	..	..	..	..	..	..	..
16 Wardha Coal ..	..	8,253	3,875	563	1,272	2,743	..	8	1,946	702	19,362	..	19,362
17 Sindia ..	..	..	..	..	..	..	..	..	..	..	..	..	..
18 Ghazipur and Dildarnagar ..	..	..	..	..	..	..	..	..	..	..	4,839	..	4,839
Total ..	3,41,616	2,72,346	7,16,930	2,73,788	1,60,332	2,73,358	2,46,293	14,355	6,24,187	55,551	29,83,595	27,610	29,55,985
<i>Narrow Gauge.</i>													
19 South Indian ..	34,927	19,767	41,611	10,635	5,442	10,636	..	1,134	14,888	..	1,39,040	..	1,39,040
20 Rajputana ..	7,150	19,405	61,498	15,681	12,697	25,549	..	504	57,733	5,935	2,06,152	..	2,06,152
21 Holkar and Sindia-Neemuch ..	..	11,352	16,969	10,735	3,244	9,762	..	518	13,596	3,590	69,766	..	69,766
22 Nagpur and Chhatnagar ..	1,000	5,236	4,725	714	10	3,647	..	123	4,988	696	21,139	..	21,139
23 Rangoon and Irrawaddy Valley ..	..	13,328	20,357	7,405	1,262	4,767	..	449	14,048	468	62,584	..	62,584
24 Northern Bengal ..	4,198	17,155	26,868	1,795	6,334	2,210	..	159	21,126	651	80,996	..	80,996
25 Tirhoot ..	5,690	5,092	6,755	1,869	1,056	2,587	..	181	6,403	453	30,086	..	30,086
26 Cawnpore and Farnkhabad ..	3,764	5,456	6,336	1,054	..	2,255	..	90	766	127	20,348	..	20,348
27 Bhavnagar-Gondal ..	49	7,792	9,728	2,497	2,360	8,884	10,656	986	12,849	21	55,722	..	55,722
28 Muttra and Hathras ..	2,409	1,971	2,148	144	..	96	40	..	3,073	..	9,881	..	9,881
29 Mysore ..	..	..	..	..	..	..	..	..	..	..	..	..	..
30 Nalhati ..	746	2,503	2,316	351	..	286	..	39	748	75	7,064	..	7,064
31 His Highness the Gaekwar's ..	..	608	1,608	152	..	..	865	..	..	..	3,233	..	3,233
Total ..	59,933	1,09,665	2,01,919	53,032	32,305	70,879	11,561	4,133	1,50,218	12,016	7,06,011	..	7,06,011
GRAND TOTAL ..	4,01,549	3,82,011	9,18,849	3,26,820	1,93,137	3,44,037	2,57,854	18,538	7,74,405	67,567	36,89,606	27,610	36,61,996

(a) Includes Rs. 50,000 for Government control.

STATISTICS OF INDIAN RAILWAYS.

CXXXV

No. XI.—SPECIAL AND MISCELLANEOUS EXPENDITURE.

[From Abstract G of Revenue Account].

CXXXVI

APPENDIX F—continued.

RAILWAYS.		Law charges.	Compensation.	Rates and Taxes.	Payments to other Lines.	Other Charges.	Total.	Deductions.	Net Total.
<i>Broad Gauge.</i>		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1	East Indian	3,728	1,686	29,790	1,17,259	16,990	1,69,453	2,109	1,67,344
2	Great Indian Peninsula	— 5,668	5,980	8,315	3,25,226	5,086	3,38,939	2,283	3,36,656
3	Sind, Punjab and Delhi	2,719	12,065	2,772	2,36,177	1,910	2,55,643	...	2,55,643
4	Madras	8,515	5,222	4,184	14,553	1,701	34,175	180	33,995
5	Bombay, Baroda and Central India	726	4,784	4,819	38,197	14,529	63,055	...	63,055
6	Eastern Bengal	564	2,561	6,333	85	1,528	11,071	...	11,071
7	Oudh and Rohilkhand	318	33	600	15,552	1,709	18,212	...	18,212
8	Indus Valley and Kandahar	907	29,975	...	2,08,450	3,730	2,43,062	...	2,43,062
9	Punjab Northern	33	23,485	...	1,95,628	1,454	2,20,600	...	2,20,600
10	Dhond and Manmad	...	...	...	...	...	...	...	...
11	Patna and Gya	...	...	302	43,763	518	44,583	...	44,583
12	Nizam's	...	3,327	...	14,425	632	18,384	...	18,384
13	Calcutta and South-Eastern	...	...	667	850	8	1,525	...	1,525
14	Khamgaon	...	...	...	...	...	...	...	...
15	Amraoti	...	...	...	...	...	...	...	...
16	Wardha Coal	...	782	...	2,343	81	3,206	...	3,206
17	Sindia	...	...	...	...	...	...	...	...
18	Ghazipur and Dildarnagar	...	...	...	...	...	658	...	658
Total		11,842	89,900	57,782	12,12,508	49,376	14,22,566	4,572	14,17,994
<i>Narrow Gauge.</i>									
19	South Indian	422	1,457	2,176	483	606	5,143	757	4,386
20	Rajputana	6	717	...	18,289	8,437	27,449	...	27,449
21	Holkar and Sindia-Neemuch	...	378	...	...	1,547	1,925	...	1,925
22	Nagpur and Chhattisgarh	...	...	...	...	120	120	...	120
23	Rangoon and Irrawaddy Valley	...	143	2,763	...	2,709	5,615	...	5,615
24	Northern Bengal	83	1,868	39	...	8,409	10,399	...	10,399
25	Tirhoot	...	38	289	50	941	1,318	...	1,318
26	Cawnpore and Farukhabad	5	...	...	...	...	5	...	5
27	Bhavnagar-Gondal	...	4,138	...	...	...	4,138	...	4,138
28	Muttra and Hathras	2	80	...	...	2,282	2,364	...	2,364
29	Mysore	...	...	...	...	...	...	...	...
30	Nalhati	43	...	47	...	39	129	...	129
31	His Highness the Gaekwar's	...	...	...	...	...	...	...	...
Total		561	8,819	5,314	18,821	25,090	58,605	757	57,848
GRAND TOTAL		12,403	98,719	63,096	12,31,329	74,966	14,81,171	5,329	14,75,842

No. XII.—STATEMENT OF ROLLING STOCK.

[From No. XII of Revenue Account].

RAILWAYS.	LOCOMOTIVES.			VEHICLES.							
	Total Stock on the list.	Average number spare or hired out.	Average number constantly under repair.	COACHING.		GOODS.		BRAKE-VANS.		TOTAL.	
				Total Stock on the list.	Average number constantly under repair.	Total Stock on the list.	Average number constantly under repair.	Total Stock on the list.	Average number constantly under repair.	Vehicle stock on the list.	Average number of vehicles constantly under repair.
<i>Broad Gauge.</i>											
1 East Indian ..	536	..	104 00	865	94 00	7,634	417 09	295	16 22	8,794	527 31
2 Great Indian Peninsula ..	438	..	125 00	933	118 00	7,815	1043 00	423	59 00	9,171	1220 00
3 Sind, Punjab and Delhi ..	159	..	34 57	474	42 33	3,370	112 91	103	10 76	3,947	166 05
4 Madras ..	157	..	51 00	452	18 00	2,770	155 00	137 ^(a)	6 00	3,359	179 09
5 Bombay, Baroda and Central India ..	98	..	19 00	323	25 00	2,670	184 00	49	7 00	3,042	216 00
6 Eastern Bengal ..	48	..	19 42	175	25 03	953	95 77	31	9 22	1,159	130 02
7 Oudh and Rohilkhand ..	125	..	30 32	275	47 15	3,094	221 43	57	8 66	3,426	277 29
8 Indus Valley and Kandahar ..	101	..	8 98	264	11 69	2,408	71 59	61	1 70	2,733	84 98
9 Punjab Northern ..	95	..	8 31	154	9 22	1,432	86 54	108	18 34	1,694	114 10
10 Dhond and Mamrad ..	..	..	..	..	..	..	..	..	..	..	..
11 Patna and Gya ..	9	..	2 54	51	6 43	81	8 05	7	1 44	139	15 92
12 Nizam's ..	10	..	1 93	61	7 59	121	15 27	22	0 19	204	23 05
13 Calcutta and South-Eastern ..	8	3 00	0 03	55	0 03	247	0 43	8	0 11	310	0 57
14 Khamgaon ..	..	..	..	..	..	..	..	..	..	..	..
15 Amraoti ..	..	..	..	..	..	..	..	..	..	..	..
16 Wardha Coal ..	4	..	0 17	9	0 34	154	0 34	6	0 34	169	1 02
17 Sindia ..	..	..	..	..	..	..	..	..	..	..	..
18 Ghazipur and Dildarnagar ..	..	..	..	..	..	..	..	..	..	..	..
Total ..	1,788	3 00	405 27	4,091	404 86	32,749	2411 47	1,307	138 98	38,147	2955 31
<i>Narrow Gauge.</i>											
19 South Indian ..	114	..	23 46	477	18 95	1,526	38 01	33	0 52 ^(b)	2,036	47 43
20 Rajputana ..	213	..	56 96	523	53 04	2,906	87 19	168	20 18	3,597	160 41
21 Holkar and Sindia-Neemuch ..	57	..	5 94	174	15 80	912	67 32	49	3 34	1,135	86 46
22 Nagpur and Chhattisgarh ..	12	..	1 00	33	0 07	360	7 54	13	1 09	411	8 70
23 Rangoon and Irrawaddy Valley ..	31	..	6 55	169	5 72	636	12 95	30	1 85	835	20 52
24 Northern Bengal ..	38	2 00	0 05	120	0 17	730	0 31	36	0 04	936	0 52
25 Tirhoot ..	10	..	3 35	49	3 66	276	9 15	12	0 81	337	13 62
26 Cawnpore and Farukhabad ..	11	..	..	67	..	220	..	10	..	297	..
27 Bhavnagar-Gondal ..	15	..	..	67	..	466	..	16	..	549	..
28 Muttra and Hathras ..	5	1 00	..	28	..	75	..	4	..	107	..
29 Mysore ..	..	..	..	..	..	..	..	..	..	..	..
30 Nalhati ..	4	..	0 03	10	0 03	24	0 04	..	..	34	0 07
31 His Highness the Gaekwar's ..	6	..	..	27	..	187	..	6	..	220	..
Total ..	516	3 00	97 34	1,744	92 44	8,368	217 51	382	27 83	10,494	337 78
GRAND TOTAL ..	2,304	6 00	502 61	5,835	497 30	41,117	2628 98	1,689	166 81	48,641	3293 09

N.B.—Total stock on the list will be obtained from column 5 of Statement XII in the Revenue Account, and "average number constantly under repair" from column 11.

(a) Includes Luggage Vans.

(b) Exclusive of 16 Passenger Brake-Vans, Post Office and 41 Passenger Brake-Vans, 3rd class included under coaching.

No. XIII.—STATEMENT OF TRAIN-MILEAGE.

[From No. XIV of Revenue Account.]

RAILWAYS.	TRAIN-MILES.				TRAIN-MILES AFTER APPORTIONING MIXED AND LIGHT MILEAGE.		Total Train-mileage.	Assisting, Shunting and miscellaneous mileage.	Total Engine mileage.
	Passengers.	Goods.	Mixed.	Light.	Coaching.	Goods.			
<i>Broad Gauge.</i>									
1 East Indian	689,148	2,248,508	1,031,776	122,062	1,278,517	2,812,977	4,091,494	544,645	4,636,139
2 Great Indian Peninsula	892,064	2,647,756	467,363	202,646	..	..	4,209,829	344,257	4,554,086
3 Sind, Punjab and Delhi	355,207	676,185	379,283	30,359	638,313	802,721	1,441,034	201,205	1,642,239
4 Madras	318,801	105,137	506,365	26,993	469,714	487,582	957,296	147,268	1,104,564
5 Bombay, Baroda and Central India	306,897	472,253	133,179	2,659	364,453	550,535	914,988	111,382	1,026,370
6 Eastern Bengal	124,341	86,082	103,888	810	152,395	162,726	315,121	73,550	388,671
7 Ondh and Rohilkhand	7,509	268,306	402,188	18,941	225,896	471,048	696,944	111,354	808,298
8 Indus Valley and Kandahar	23,496	396,559	468,014	24,517	233,488	679,098	912,586	155,378	1,068,464
9 Punjab Northern	83,716	322,537	232,199	10,096	259,021	389,577	648,598	69,420	718,018
10 Dhond and Manmad	..	..	..	..	..	..	..	..	..
11 Patna and Gya	351	15,152	41,268	491	27,317	29,945	57,262	5,968	63,230
12 Nizam's	1,148	36,559	90,266	84	57,273	70,784	128,057	8,220	131,277
13 Calcutta and South-Eastern	8,218	1,858	10,602	568	12,424	8,822	21,246	4,859	26,105
14 Khamgaon	..	..	..	..	..	..	..	..	..
15 Amraoti	..	..	..	..	..	..	..	..	..
16 Wardha Coal	..	3,929	32,580	..	12,565	23,944	36,509	9,406	45,915
17 Sindia	..	..	..	..	..	..	..	..	..
18 Ghazipur and Dildarnagar	..	..	..	..	..	..	..	..	..
Total	2,810,896	7,280,871	3,898,971	440,226	37,31,376	6,489,759	14,430,964	1,782,412	16,213,376
<i>Narrow Gauge.</i>									
19 South Indian	5,327	111,786	571,419	6,763	232,607	302,688	635,295	158,839	794,134
20 Rajputana	237,461	795,653	356,378	31,890	..	..	1,421,382	156,473	1,577,855
21 Holkar and Sindia-Neemuch	30,243	132,631	156,891	7,037	138,462	188,340	326,802	46,693	373,495
22 Nagpur and Chhattisgarh	90	21,075	29,356	504	15,081	35,944	51,025	3,145	54,170
23 Rangoon and Irrawaddy Valley	61,116	102,414	107,914	50	113,788	157,706	271,494	49,791	321,285
24 Northern Bengal	392	70,981	165,844	6,121	92,480	150,858	243,338	33,728	277,066
25 Turhoot	591	21,587	59,368	669	81,071	51,144	82,215	12,652	94,867
26 Cawnpore and Farukhabad	..	6,535	57,784	351	45,629	19,041	64,670	4,664	69,334
27 Bhavnagar-Gondal	17,510	94,000	57,047	3,615	48,365	123,807	172,172	5,344	177,516
28 Muttra and Hathras	29	359	21,130	..	11,713	9,805	21,518	2,209	23,727
29 Mysore	..	..	..	..	..	..	..	..	..
30 Nalhati	60	1,433	16,513	..	10,082	7,924	18,006	104	18,110
31 His Highness the Gaekwar's	960	17,307	21,396	27	15,317	24,373	36,960	560	40,250
Total	853,779	1,375,761	1,561,040	57,027	754,595	1,071,630	3,344,877	474,202	3,821,809
GRAND TOTAL	3,164,675	8,656,632	5,460,011	497,253	4,485,971	7,561,389	17,775,841	2,256,614	20,036,185

CXXXVIII

APPENDIX F—continued.

STATISTICS OF INDIAN RAILWAYS.

CXXXIX

No. XIV.—NET EARNINGS COMPARED WITH INTEREST ON CAPITAL.

[From Nos. VIII and XVII of the Revenue Account].

RAILWAYS.	Interest on Capital.	Net Earnings of the half-year.	DIFFERENCE.	
			Excess.	Deficit.
<i>Broad Gauge.</i>				
1 East Indian	Rs. 1,01,39,204	Rs. 1,60,59,149	Rs. 59,19,945	Rs. ..
2 Great Indian Peninsula	62,46,600	99,59,270	37,02,670	..
3 Sind, Punjab and Delhi	30,20,531	19,10,483	..	— 11,10,048
4 Madras	28,53,182	11,14,992	..	— 17,43,190
5 Bombay, Baroda and Central India	21,84,627	39,62,774	17,78,147	..
6 Eastern Bengal	8,44,333	8,91,747	47,414	..
7 Oudh and Rohilkhand	14,40,000	11,45,633	..	— 2,94,367
8 Indus Valley and Kandahar	17,06,253	4,89,739	..	— 12,16,514
9 Punjab Northern	13,47,557	2,41,284	..	— 11,06,273
10 Dhond and Manmad	..	..	..	..
11 Patna and Gya	79,680	80,522	842	..
12 Nizam's	2,77,084	1,68,073	..	— 1,09,011
13 Calcutta and South-Eastern	1,54,600	33,021	..	— 1,21,579
14 Khamgaon	..	..	..	..
15 Amraoti	..	..	..	..
16 Wardha Coal	1,19,597	41,825	..	— 71,772
17 Sindia	..	..	..	..
18 Ghazipur and Dildarnagar	13,240	888	..	— 12,352
Total	3,04,25,488	3,60,99,400	1,14,49,018	— 57,85,106
<i>Narrow Gauge.</i>				
19 South Indian	10,64,347	6,22,284	..	— 4,42,063
20 Rajputana	11,76,066	16,37,651	4,61,585	..
21 Holkar and Sindia-Neemuch	6,09,128	2,82,907	..	— 3,26,221
22 Nagpur and Chhattisgarh	81,109	53,416	..	— 27,693
23 Rangoon and Irrawaddy Valley	2,84,172	4,81,246	1,97,074	..
24 Northern Bengal	4,74,183	3,50,049	..	1,24,134
25 Tirhoot	1,22,594	1,45,538	22,944	..
26 Cawnpore and Farukhabad	66,988	39,733	..	— 27,255
27 Bhavnagar-Gondal	1,28,541	1,54,294	25,753	..
28 Muttra and Hathras	24,473	20,100	..	— 4,373
29 Mysore	..	..	..	..
30 Nalhati	7,646	6,000	354	..
31 His Highness the Gaekwar's	26,381	38,915	12,534	..
Total	40,65,628	38,32,133	7,20,244	— 9,51,739
GRAND TOTAL	3,44,91,116	3,99,33,533	1,21,69,262	— 67,36,845

INDIAN RAILWAYS.

STATISTICS OF THEIR WORKING

FOR THE

HALF-YEAR ENDED 31ST DECEMBER, 1881.

PART I.

SUMMARY OF THE REVENUE ACCOUNTS.

(Pages cxli to clv).

SUMMARY OF THE REVENUE ACCOUNTS OF INDIAN RAILWAYS FOR THE HALF-YEAR ENDED 31st DECEMBER, 1881.

No. I.—GENERAL RESULTS.

CXIII

RAILWAYS.		Gauge.	Capital expended. (f)	Mean Mileage open.	Traffic Train Mileage.	Earnings.	Expenses.	Net Earnings.
		Ft. In.	Rs.			Rs.	Rs.	Rs.
<i>Broad Gauge.</i>								
1	East Indian	5 6	83,26,62,788	1,596(a)	4,064,690(j)	2,26,04,218	77,15,057	1,48,89,161
2	Great Indian Peninsula	5 6	25,10,85,907	1,443(b)	3,569,518	1,40,65,180	78,04,962	62,60,218
3	Sind, Punjab and Delhi	5 6	11,61,01,093	676½(c)	1,282,849	46,42,686	34,76,508	11,66,178
4	Madras	5 6	11,10,37,589	858	940,984	30,83,506	21,22,641	9,60,865
5	Bombay, Baroda and Central India	5 6	8,37,48,733(i)	444	736,645	37,42,160	19,59,232	17,82,928
6	Eastern Bengal	5 6	3,46,50,090	172½(d)	427,622	37,88,696	13,11,162	24,77,534
7	Oudh and Rohilkhand	5 6	5,84,40,769	547	614,685	23,63,497	15,33,431	8,30,066
8	Indus Valley and Kandahar	5 6	7,44,77,194	660(e)	921,786	26,73,111	19,85,562	6,87,549
9	Punjab Northern	5 6	5,47,31,396	357½	479,024	15,39,901	14,21,687	1,18,314
10	Dhond and Manmad	5 6	..	145(l)	..	2,86,072	2,26,472(m)	59,600
11	Patna and Gya	5 6	35,04,401	57	44,850	2,66,964	1,68,341	98,623
12	Nizam's	5 6	1,21,75,473	117	123,274	3,58,548	2,33,846	1,24,702
13	Calcutta and South-Eastern	5 6	67,36,171	23	19,604	68,786	50,602	18,184
14	Khamgaon	5 6	..	74(l)	..	27,080	16,549(n)	10,531
15	Amraoti	5 6	..	5½(l)	..	28,820	17,219(o)	11,601
16	Wardha Coal	5 6	50,02,023	45	85,137	1,01,733	77,622	24,161
17	Sindia	5 6	85,86,577	75(k)	30,883(k)	1,51,948(p)	1,14,129	37,819
18	Ghazipur and Dildarnagar	5 6	5,92,433	12(k)	8,640(k)	16,692	17,391	- 699
	Total	..	1,15,35,32,577	7,002	13,260,668	5,98,09,648	3,02,52,313	2,95,57,335
<i>Narrow Gauge.</i>								
19	South Indian	Metre.	4,28,06,756	663(l)	575,967	18,43,858	12,28,416	6,15,442
20	Rajputana	..	5,20,44,975	743½	1,384,105	35,23,090	22,93,701	12,29,389
21	Holkar and Sindia-Neemuch	..	3,16,69,537	289	317,797	9,56,946	6,37,554	3,19,392
22	Nagpur and Chhattisgarh	..	56,83,159	62	36,636	1,27,012	1,14,372	12,640
23	Rangoon and Irrawaddy	..	1,24,92,079	161	155,193	5,74,112	4,10,230	1,63,882
24	Northern Bengal	..	2,03,79,182	233	275,861	10,25,546	4,76,280	5,49,266
25	Tirhoot	..	56,62,426	79	76,488	2,71,727	1,81,065	90,662
26	Cawnpore and Farukhabad	..	31,26,855	86½	66,508	1,64,320	1,19,815	44,505
27	Muttra-Achnera	..	5,91,245	22½	..	6,943	6,180	763
28	Bhavnagar-Gondal	..	67,34,108	157½	117,976	2,74,048	2,23,088	50,960
29	Muttra and Hathras	..	10,50,961	29	22,098	67,632	46,029	21,603
30	Mysore	..	(g)	58	42,759	76,648	47,952	28,696
31	Nalhati	Ft. In. 4 0	3,07,780	27½	20,219	32,189	26,255	5,934
32	Gaekwar of Baroda's	2 6	12,34,622	59	23,721	51,910	41,976	9,934
	Total	..	18,37,73,685	2,670½	3,115,328	89,95,981	58,52,963	31,43,018
	GRAND TOTAL	..	1,33,73,06,262	9,672½	16,375,996	6,88,05,629	3,61,05,276	3,27,00,353

APPENDIX F—continued.

- (a). Includes 3 miles, the length of the Barrh Branch, 75 miles of the Sindia, and 19 miles of the Dildarnagar and Ghazipur Railways.
- (b). Exclusive of 7½ miles (Dadur Junction to Colaba, Bombay, Baroda and Central India Railway) worked over by the Company.
- (c). Excludes 18 miles of the East Indian Railway from Ghazilabad to Delhi, worked over by the Company.
- (d). Includes 18 miles, the length of the Damukdia Branch.
- (e). Excludes 7 miles of the Sind, Punjab and Delhi Railway from Mooltan to Musafirabad worked over by this Railway.
- (f). Capital expended on open mileage charged to final heads, inclusive of rolling stock.
- (g). Not returned.
- (h). Includes 8 miles of foreign line worked by the Company.

- (i). Includes expenditure on lines in course of construction which has not been shown separately.
- (j). Includes the train mileage of the Sindia and Ghazipur-Dildarnagar Railways also 2,418 train miles for Barrh Branch.
- (k). These figures have not been included in the total, as the lines are worked by the East Indian Railway, and the mileages are shown against that line.
- (l). Ditto ditto ditto by the G. I. P. Railway ditto.
- (m). Of this amount Rs 62,898 are also included with the G. I. P. Railway.
- (n). " Rs 10,381 " " " "
- (o). " Rs 14,601 " " " "
- (p). " Rs 26,269 " " " E. I. Railway.

N.B.—In cases where short lengths of railways are worked over by Foreign Railways, the mileage so worked over should be included in the length used for calculating earnings and expenses per mile of railway worked.

No. II. SUMMARY OF EARNINGS.
[From No. VIII of Revenue Account.]

RAILWAYS.		Coaching.	Goods.	Electric Telegraph.	Steam-boat.	SUNDRIES.		Total.
						Receipts from other lines for hire, mileage and rents.	Other items.	
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
<i>Broad Gauge.</i>								
1	East Indian ..	57,69,319	1,62,37,963	25,131	13,921	2,66,498	2,91,386	2,26,04,218
2	Great Indian Peninsula ..	27,99,446	1,10,63,754	21,416	..	68,054	1,12,510	1,40,65,180
3	Sind, Punjab and Delhi ..	15,83,290	26,77,179	9,926	40,210	2,74,724	57,357	46,42,686
4	Madras ..	12,66,791	17,31,474	9,826	..	23,396	52,019	80,83,506
5	Bombay, Baroda and Central India ..	15,72,641	20,92,815	10,494	..	34,153	32,057	37,42,160
6	Eastern Bengal ..	8,21,529	25,19,388	1,874	4,02,018	884	43,003	37,88,696
7	Ondh and Rohilkhand ..	9,74,346	11,81,697	5,534	..	1,03,695	98,225	23,63,497
8	Indus Valley and Kandahar ..	6,06,573	13,21,082	2,649	1,30,432	73,859	33,486	26,73,111
9	Punjab Northern ..	6,34,947	8,32,226	1,970	..	20,184	50,574	15,39,901
10	Dhond and Manmad ..	..	..	..	..	..	..	..
11	Patna and Gya ..	1,90,646	73,643	1,481	..	..	1,194	2,66,964
12	Nizam's ..	1,37,256	2,12,974	2,112	..	3,326	2,880	3,58,548
13	Calcutta and South-Eastern ..	38,800	17,518	155	..	183	12,130	63,736
14	Khamgaon ..	..	..	..	..	..	..	..
15	Amraoti ..	..	..	..	..	..	..	..
16	Wardha Coal ..	16,934	61,855	484	..	21,084	1,426	1,01,733
17	Sindia ..	90,945	59,697	1,285	..	..	21	1,51,948
18	Ghazipur and Dildarnagar ..	8,333	7,845	514	..	..	..	16,692
	Total ..	1,65,11,796	4,05,91,110	94,851	5,86,581	8,90,070	7,93,268	5,94,67,676
<i>Narrow Gauge.</i>								
19	South Indian ..	10,18,724	7,62,885	10,858	..	107	51,284	13,43,858
20	Rajputana ..	11,86,270	22,85,860	7,953	..	..	43,007	35,23,090
21	Holkar and Sindia-Neemuch ..	3,73,064	5,73,099	1,892	..	..	8,891	9,56,946
22	Nagpur and Chhattisgarh ..	44,373	79,958	704	..	..	1,977	1,27,012
23	Rangoon and Irrawaddy ..	3,49,574	2,16,381	2,227	..	..	5,930	5,74,112
24	Northern Bengal ..	2,69,888	6,02,460	2,883	1,07,050	..	43,265	10,25,546
25	Tirhoot ..	1,06,982	1,05,607	3,537	48,064	21	7,516	2,71,727
26	Cawnpore and Farukhabad ..	73,343	83,675	730	..	..	572	1,64,320
27	Muttra-Achnera ..	6,532	362	49	..	..	..	6,943
28	Bhavnagar-Gondal ..	1,81,582	88,422	2,034	..	..	2,010	2,74,043
29	Muttra and Hathras ..	48,820	17,774	902	..	..	136	67,633
30	Mysore ..	57,711	18,623	22	..	..	287	76,647
31	Nalhati ..	22,576	8,973	567	..	..	73	32,139
32	Gaekwar of Baroda's ..	39,254	12,432	..	..	..	224	51,910
	Total ..	37,84,693	48,56,516	34,358	1,55,114	128	1,65,172	89,95,981
	GRAND TOTAL ..	2,02,96,489	4,54,47,626	1,29,209	7,41,695	8,90,198	9,58,440	6,84,63,657

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STATISTICS OF INDIAN RAILWAYS.

CXIII

No. III.—DETAIL OF COACHING TRAFFIC.

[From Abstract H of Revenue Account].

CXII

RAILWAYS.	PASSENGERS.															Miscellaneous, including parcel, luggage, &c.	Total.	Deductious.	Net Total.	
	FIRST CLASS.			SECOND CLASS.			THIRD OR INTERMEDIATE CLASS.			FOURTH OR LOWER CLASS.			TOTAL.							
	Single journey fare.	Number.	Receipts.	Single journey fare.	Number.	Receipts.	Single journey fare.	Number.	Receipts.	Single journey fare.	Number.	Receipts.	Number.	Receipts.						
	<i>Broad Gauge.</i>	Pies.	Rs.	Pies.	Rs.	Pies.	Rs.			Pies.	Rs.		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	
1	East Indian	18-00	20,484	2,31,747	9 00	76,581	3,13,142	4-50	806,668	2,39,196	3-00	3,969,308	43,82,917	4,373,041	51,67,002	6,03,073	57,70,075	756	57,69,319	
2	Great Indian Peninsula	18-00	16,699	1,66,814	9-00	66,840	2,59,909	4-00	286,906	4,29,465	2-50	2,306,151	15,54,519	2,676,596	24,10,707	3,88,739	27,99,446	...	27,99,446	
3	Sind, Punjab and Delhi	12-00	11,200	71,849	8 00	27,832	91,812	4 50	5,529	9,762	3-00 & 2 50	1,873,654	12,18,696	1,918,215	13,92,119	1,91,171	15,83,290	...	15,83,290	
4	Madras	18-00	6,521	83,642	7-00	26,090	74,243	...	...	...	2-00	2,080,198	9,59,194	2,112,809	11,17,079	1,49,712	12,66,791	...	12,66,791
5	Bombay, Baroda and Central India	12-00	34,489	51,133	6-00	207,655	98,453	...	...	...	3 00 & 2 50	3,796,483	12,54,484	4,038,627	14,04,070	1,68,571	15,72,641	...	15,72,641
6	Eastern Bengal	12-00	14,825	29,844	6 00	31,343	29,532	4-50	228,887	1,65,647	3 00	906,130	5,24,719	1,181,185	7,49,742	71,787	8,21,529	...	8,21,529	
7	Oudh and Rohilkhand	...	...	...	9-00	10,688	39,394	...	...	...	2 50	1,257,332	8,82,478	1,268,020	9,21,872	52,474	9,74,346	...	9,74,346
8	Indus Valley and Kandahar	12-00	1,546	16,339	8-00	5,566	22,724	...	...	...	2 50	739,174	4,65,343	746,286	4,94,406	1,12,167	6,06,573	...	6,06,573
9	Punjab Northern	12-00	3,289	19,840	8 00	11,224	28,698	2-50	603,242	4,20,571	2 00	305,120	1,07,539	922,875	5,76,648	60,456	6,37,104	2,157	6,34,947	
10	Dhond and Manmad
11	Patna and Gya	18 00	803	3,535	9-00	1,294	2,610	...	...	...	3 00	293,037	1,79,838	295,134	1,85,981	4,665	1,90,646	...	1,90,646
12	Nizam's	18 00	1,124	7,915	6-00	5,765	12,019	...	...	...	2 00	171,063	99,000	177,952	1,18,934	18,322	1,37,256	...	1,37,256
13	Calcutta and South-Eastern	18-00	229	364	9-00	2,464	1,237	3-00	213,403	28,180	2 62	85,473	7,547	301,569	37,328	1,472	38,800	...	38,800	
14	Khamgaon
15	Amraoti
16	Wardha Coal	18 00	239	459	9 00	302	328	4-00	1,185	646	2-00	57,925	13,762	59,651	15,195	1,739	16,934	...	16,934	
17	Sindia	90,945	...	90,945
18	Ghazipur and Dildarnagar	8,333	...	8,333
	Total	Nil.	111,448	683,461	Nil.	473,644	9,74,101	Nil.	1,645,820	12,93,467	Nil.	17,841,048	1,16,40,036	20,071,960	1,45,91,083	18,24,348	1,65,14,709	2,913	1,65,11,796	
	<i>Narrow Gauge.</i>																			
19	South Indian	18 00	3,950	19,921	6-00	18,137	24,605	...	...	...	2 50	1,926,231	9,35,858	1,948,318	9,79,884	38,840	10,18,724	...	10,18,724
20	Rajputana	12-00	6,203	44,658	8-00	15,998	44,469	4 00	68,326	82,528	2 00	1,451,055	8,81,482	1,541,582	10,53,137	1,33,133	11,86,270	...	11,86,270	
21	Holkar and Sindia-Neemuch	12 00	2,154	7,429	8 00	6,355	11,793	4-00	11,799	12,032	2-00	641,456	3,04,012	661,764	3,35,266	37,798	3,73,064	...	3,73,064	
22	Nagpur and Chhatusgarh	18-00	1,349	1,232	8 00	7,611	2,948	...	...	...	2-00	228,724	37,271	237,684	41,501	2,872	44,373	...	44,373
23	Rangoon and Irrawaddy	14 90	1,823	5,926	7-45	6,324	8,852	...	...	...	2 98	608,460	3,22,496	616,607	3,37,274	12,300	3,49,574	...	3,49,574
24	Northern Bengal	18 00	2,013	24,670	9 00	3,726	18,146	4-50	9,114	13,726	2 50	334,206	1,81,391	349,064	2,42,933	26,955	2,69,888	...	2,69,888	
25	Tirhoot	18-00	1,588	6,097	9-00	1,666	3,301	...	...	...	2 50	212,589	89,430	215,343	98,828	8,154	1,06,982	...	1,06,982
26	Cawnpore and Farnkhabad	15 00	308	1,275	6-00	1,185	1,776	...	...	...	2-00	257,311	71,402	258,804	74,453	4,890	79,343	...	79,343
27	Muttra-Achnera	9,461	...	6,532
28	Bhavnagar-Gondal	12-00	495	1,430	8 00	3,310	4,134	...	...	...	2-00	284,579	1,66,557	288,384	1,72,121	...	1,81,582	...	1,81,582
29	Muttra and Hathras	13 42	349	670	5-46	817	445	...	...	...	2-97	174,125	45,792	175,291	46,907	1,913	48,820	...	48,820
30	Mysore	12 00	906	3,071	6-00	617	675	...	...	...	3 00	90,915	47,648	92,438	51,394	6,317	57,711	...	57,711
31	Nalhati	18 00	497	1,298	6 00	1,713	1,549	...	...	...	3 00	54,398	17,466	56,608	20,313	2,263	22,576	...	22,576
32	Gaekwar of Baroda's	...	...	...	7 00	892	681	...	...	...	3 00	130,641	37,438	131,533	38,119	1,135	39,254	...	39,254
	Total	Nil.	21,640	1,17,727	Nil.	68,351	1,23,374	Nil.	89,239	1,13,286	Nil.	6,394,690	31,37,743	6,573,920	34,92,130	2,86,031	37,84,963	...	37,84,693	
	GRAND TOTAL	...	133,088	8,01,208	Nil.	541,995	10,97,475	Nil.	1,735,059	14,06,753	Nil.	24,235,738	1,47,77,779	26,645,880	1,80,83,213	21,10,379	2,02,99,402	2,913	2,02,96,489	

NOTE.—Season tickets included with the traffic of the classes to which they belong.

APPENDIX FF—continued.

No. IV.—DETAIL OF GOODS TRAFFIC.

[From Abstract I of Revenue Account].

RAILWAYS.		GENERAL MERCHANDISE.		MILITARY STORES.		RAILWAY MATERIALS AND REVENUE STORES, EXCEPT COAL.		MINERALS.		Miscellaneous.	Total.	Deductions.	Net Total.	
		Ton-miles.	Receipts.	Ton-miles.	Receipts.	Ton-miles.	Receipts.	Ton-miles.	Receipts.					
			Rs.		Rs.		Rs.		Rs.	Rs.	Rs.	Rs.	Rs.	
1	East Indian	..	363,441,895	1,23,67,239	3,499,679	2,83,059	26,251,920	3,90,546	116,154,907	26,37,070	60,097	1,62,38,011	48	1,62,37,963
2	Great Indian Peninsula	..	211,716,239	1,03,74,792	954,561	84,783	13,969,710	2,66,600	10,912,270	2,60,521	77,058	1,10,63,754	..	1,10,63,754
3	Sind, Punjab and Delhi	..	47,258,815	23,14,420	761,597	67,170	4,284,118	1,21,472	5,683,736	1,34,298	39,819	26,77,179	..	26,77,179
4	Madras	..	33,707,449	16,27,737	413,506	39,766	2,177,166	41,015	23,106	858	22,098	17,31,474	..	17,31,474
5	Bombay, Baroda and Central India	..	33,635,468	18,20,511	107,777	10,672	3,694,477	75,688	6,378,138	1,19,437	66,510	20,92,818	3	20,92,815
6	Eastern Bengal	..	36,250,154	24,37,090	83,080	7,148	310,125	6,461	1,884,826	61,885	6,804	25,19,388	..	25,19,388
7	Oudh and Rohilkhand	..	33,917,418	10,38,617	151,363	10,928	4,358,044	57,488	2,990,436	70,993	3,671	11,81,697	..	11,81,697
8	Indus Valley and Kandahar	..	47,935,588	15,86,181	266,383	25,095	6,362,047	1,65,609	295,161	7,159	37,038	13,21,032	..	13,21,032
9	Punjab Northern	..	8,321,644	6,11,112	138,332	16,949	3,377,673	1,62,703	1,055,106	29,330	13,345	8,33,439	1,213	8,32,226
10	Dhond and Manmad	..	..	..	..	..	..	..	..	..	..	..	..	..
11	Patna and Gya	..	1,074,401	58,177	..	..	517,919	11,245	81,619	3,910	811	73,643	..	73,643
12	Nizam's	..	3,533,856	1,97,743	98,206	9,499	146,303	4,127	7,665	266	1,367	2,13,002	28	2,13,002
13	Calcutta and South-Eastern	..	370,951	16,211	..	..	7,666	317	10,370	347	643	17,518	..	17,518
14	Khamgaon	..	..	..	..	..	..	..	..	..	..	..	..	..
15	Amraoti	..	..	..	..	..	..	..	..	..	..	..	..	..
16	Wardha Coal	..	349,543	19,303	93	6	36,726	1,303	1,210,077	39,827	1,416	61,855	..	61,855
17	Sindia	..	..	..	..	..	..	..	..	..	..	59,697	..	59,697
18	Ghazipur and Dildarnagar	..	..	..	..	..	..	..	..	..	..	7,845	..	7,845
	Total	..	821,512,921	3,49,69,083	6,474,577	5,55,075	65,493,894	13,04,574	146,687,417	33,65,901	3,30,227	4,05,92,402	1,292	4,05,91,110
Narrow Gauge.														
19	South Indian	..	16,136,874	6,80,961	18,590	2,422	3,231,020	72,405	299,246	6,283	814	7,62,885	..	7,62,885
20	Rajputana	..	41,950,369	20,15,529	79,875	8,813	3,943,244	1,08,999	6,478,005	1,47,420	5,099	22,85,860	..	22,85,860
21	Holkar and Sindia-Neemuch	..	6,983,797	5,88,579	82,791	9,370	658,761	21,685	11,262	299	3,166	5,73,099	..	5,73,099
22	Nagpur and Chhattisgarh	..	543,760	60,084	2,287	207	382,760	14,010	150,301	4,915	742	79,958	..	79,958
23	Rangoon and Irrawaddy	..	3,825,141	1,93,569	..	..	477,960	3,464	3,512	149	14,198	2,16,381	..	2,16,381
24	Northern Bengal	..	9,051,214	5,73,570	29,382	2,442	158,740	6,085	552,508	19,150	1,213	6,02,460	..	6,02,460
25	Tirhoot	..	1,483,027	82,677	194	17	325,907	13,539	235,810	8,723	651	1,05,607	..	1,05,607
26	Cawnpore and Farukhabad	..	1,398,608	69,036	56,409	6,240	81,769	1,556	142,563	6,597	246	83,675	..	83,675
27	Muttra-Achnera	..	..	..	..	..	..	..	..	..	..	362	..	362
28	Bhavnagar-Gondal	..	595,888	46,869	..	..	2,394,705	38,314	131,352	2,877	362	88,422	..	88,422
29	Muttra and Hathras	..	204,346	17,331	811	84	478	21	3,728	127	211	17,774	..	17,774
30	Mysore	..	41,731	2,953	612	43	437,786	15,517	..	..	110	18,628	..	18,628
31	Nalhati	..	84,397	7,290	..	..	5,144	200	22,416	1,347	136	8,973	..	8,973
32	Gaekwar of Baroda's	..	188,747	11,802	..	..	17,130	474	2,383	65	91	12,432	..	12,432
	Total	..	82,487,899	43,00,255	270,951	29,638	12,115,404	3,01,269	8,033,586	1,97,952	27,039	48,56,516	..	48,56,516
	GRAND TOTAL	..	904,000,820	3,92,69,338	6,745,528	5,84,713	77,609,298	16,05,843	154,721,003	35,63,853	8,57,266	4,54,48,918	1,292	4,54,47,626

STATISTICS OF INDIAN RAILWAYS.

No. V.—SUMMARY OF EXPENSES.

[From No. VIII of Revenue Account.]

RAILWAYS.		Maintenance of Way, Works and Stations.	Locomotive Expenses.	Carriage and Wagon Expenses.	Traffic Expenses.	General Charges.	Steam-boat Service.	Special and Miscellaneous Expenses.	Total.
<i>Broad Gauge.</i>		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1	East Indian ..	23,43,214	22,03,466	7,35,240	13,25,816	8,67,598	13,319	2,26,409	77,15,057
2	Great Indian Peninsula ..	19,22,039	29,40,522	10,85,134	10,42,473	5,46,350	..	2,68,444	78,04,962
3	Sind, Punjab and Delhi ..	7,69,180	11,98,243	3,33,468	5,24,980	3,33,624	97,684	1,69,329	34,76,508
4	Madras ..	6,44,667	6,56,432	2,34,931	3,29,715	2,23,942	..	32,954	21,22,641
5	Bombay, Baroda and Central India ..	4,89,360	6,59,686	2,36,573	2,92,762	2,40,477	..	40,374	19,59,232
6	Eastern Bengal ..	1,65,474	3,65,200	1,10,390	3,04,903	1,54,520	1,73,156	37,519	13,11,162
7	Oudh and Rohilkhand ..	3,56,563	4,77,044	1,61,055	2,62,669	1,98,289	..	77,811	15,33,431
8	Indus Valley and Kandahar ..	3,34,377	7,78,648	81,872	2,72,302	2,03,153	1,19,149	1,96,060	19,85,561
9	Punjab Northern ..	2,42,246	7,05,207	74,347	2,06,180	1,23,026	..	70,581	14,21,587
10	Dhond and Manmad ..	..	..	..	..	..	..	..	..
11	Patna and Gya ..	17,468	43,118	8,499	23,313	20,326	..	55,617	1,68,341
12	Nizam's ..	37,241	66,670	36,286	49,649	28,868	..	15,132	2,33,846
13	Calcutta and South-Eastern ..	22,051	10,945	2,801	7,067	6,316	..	1,422	60,602
14	Khamgaon ..	..	..	..	..	..	..	..	..
15	Amraoti ..	..	..	..	..	..	..	..	..
16	Wardha Coal ..	11,856	23,638	10,238	10,051	19,308	..	2,531	77,622
17	Sindia ..	25,129	17,771	9,019	14,571	9,687	..	37,952	1,14,129
18	Ghazipur and Dildarnagar ..	5,065	5,202	1,818	2,937	1,946	..	423	17,391
	Total ..	73,85,930	1,01,51,792	31,71,671	46,69,388	29,77,425	4,03,308	12,32,558	2,99,92,072
	<i>Narrow Gauge.</i>								
19	South Indian ..	3,27,395	4,37,719	1,20,604	1,70,110	1,55,380	..	17,208	12,28,416
20	Rajputana ..	5,23,404	10,71,198	1,53,853	2,97,389	2,06,721	..	36,136	22,93,701
21	Holkar and Sindia-Neemuch ..	1,68,011	2,30,801	52,177	1,09,433	71,390	..	5,742	6,37,554
22	Nagpur and Chhattisgarh ..	25,318	31,788	10,126	24,792	22,017	..	331	1,14,372
23	Rangoon and Irrawaddy ..	1,01,776	1,17,610	27,101	93,926	56,405	..	13,462	4,10,280
24	Northern Bengal ..	1,02,514	1,40,267	21,489	73,610	79,329	50,484	8,687	4,76,280
25	Tirhoot ..	37,603	38,326	7,486	30,716	25,966	40,045	923	1,81,065
26	Cawnpore and Farukhabad ..	27,574	29,741	2,099	19,148	40,618	..	635	1,19,815
27	Muttra-Achnera ..	..	3,782	426	946	737	..	289	6,180
28	Bhavnagar-Gondal ..	49,031	70,128	11,347	33,029	53,715	..	838	2,23,088
29	Muttra and Hathras ..	6,865	12,153	5,980	8,405	10,369	..	2,257	46,029
30	Mysore ..	..	18,593	4,323	9,227	14,094	..	1,215	47,952
31	Nalhati ..	7,636	5,827	1,658	3,478	7,497	..	159	26,255
32	Gaekwar of Baroda's ..	15,205	13,074	1,119	9,191	3,387	..	..	41,976
	Total ..	13,97,332	22,12,007	4,20,288	8,88,400	7,47,625	90,529	87,782	58,52,963
	GRAND TOTAL ..	87,83,262	1,23,72,799	35,91,959	55,57,788	37,25,050	4,93,837	13,20,340	3,58,45,035

CXVI

APPENDIX F—continued.

NO. VI.—DETAIL OF EXPENSES FOR MAINTENANCE OF WAY, WORKS AND STATIONS.

[From Abstract A of Revenue Account.]

RAILWAYS.		General Superintendence.	Maintenance of Permanent-way.	Repairs of Bridges, &c.	Conservancy of Rivers.	Repairs of Stations and Buildings.	Other Charges.	Total.	Deductions.	Net Total.
<i>Broad Gauge.</i>		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1	East Indian	3,20,550	17,49,073	92,597	..	1,63,009	3,96,401	27,21,632	3,78,417	23,43,215
2	Great Indian Peninsula	2,19,571	10,60,433	2,26,917	..	1,24,321	2,94,037	19,25,279	3,240	19,22,039
3	Sind, Punjab and Delhi	1,26,289	2,97,989	1,56,282	..	1,04,753	90,663	7,75,976	6,796	7,69,180
4	Madras	1,39,933	3,50,030	51,601	..	50,902	52,201	6,44,667	..	6,44,667
5	Bombay, Baroda and Central India	79,593	2,59,593	61,139	..	35,028	54,007	4,89,360	..	4,89,360
6	Eastern Bengal	33,495	1,16,260	13,825	..	17,831	12,556	1,93,967	28,493	1,65,474
7	Oudh and Rohilkhand	93,081	1,01,446	87,440	..	33,094	41,502	3,56,563	..	3,56,563
8	Indus Valley and Kandahar	1,08,049	1,53,455	20,855	..	35,205	16,813	3,34,377	..	3,34,377
9	Punjab Northern	65,869	1,17,484	17,935	5,616	20,586	14,757	2,42,246	..	2,42,246
10	Dhond and Maunad	..	..	..	..	..	..	..	..	..
11	Patna and Gya	7,688	6,993	870	..	694	1,223	17,468	..	17,468
12	Nizam's	8,351	25,589	892	..	1,413	996	37,241	..	37,241
13	Calcutta and South-Eastern	1,412	16,988	1,886	..	589	1,176	22,051	..	22,051
14	Khamgaon	..	..	..	..	..	..	..	..	..
15	Amraoti	..	..	..	..	..	..	..	..	..
16	Wardha Coal	1,015	7,702	1,944	..	963	232	11,856	..	11,856
17	Sindia	..	..	..	..	..	..	25,129	..	25,129
18	Ghazipur and Dildarnagar	..	..	..	..	..	..	5,065	..	5,065
Total		12,04,896	42,63,085	7,34,183	5,616	5,88,388	9,76,564	78,02,877	4,16,946	73,85,931
<i>Narrow Gauge.</i>		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
19	South Indian	79,512	1,66,101	22,883	..	11,665	55,993	3,36,154	8,759	3,27,395
20	Rajputana	1,02,627	2,70,128	45,574	1,879	40,303	67,893	5,28,404	..	5,28,404
21	Holkar and Sindia-Neemuch	13,891	1,16,067	8,901	..	4,983	19,169	1,68,011	..	1,68,011
22	Nagpur and Chhattisgarh	4,837	15,932	256	..	480	3,313	25,318	..	25,318
23	Rangoon and Irrawaddy	13,915	64,239	6,244	..	4,852	7,526	1,01,776	..	1,01,776
24	Northern Bengal	29,229	54,929	3,040	..	8,886	6,430	1,02,514	..	1,02,514
25	Tirhoot	5,802	16,936	5,451	..	4,416	4,998	37,603	..	37,603
26	Cawnpore and Farnkhabad	7,705	12,851	1,990	..	2,340	2,688	27,574	..	27,574
27	Matra-Achnera	..	..	..	..	..	..	..	..	..
28	Bhavnagar-Gondal	13,037	35,238	..	..	12	744	49,031	..	49,031
29	Mutra and Hathras	881	4,363	474	..	865	282	6,865	..	6,865
30	Mysore	6,381	16,254	1,451	..	..	92	24,128	..	24,128
31	Nalhati	722	6,346	7	..	86	525	7,636	..	7,636
32	Gaekwar of Baroda's	2,243	10,025	1,753	..	766	418	15,205	..	15,205
Total		2,90,732	7,89,409	98,024	1,879	79,604	1,70,571	14,30,219	8,759	14,21,460
GRAND TOTAL		14,95,628	50,52,444	8,32,207	7,495	6,67,992	11,47,135	92,33,096	4,25,705	88,07,391

STATISTICS OF INDIAN RAILWAYS.

CXLVII

NO. VII.—DETAIL OF LOCOMOTIVE EXPENSES.

[From Abstract B of Revenue Account.]

RAILWAYS.		General Superintendence.	Wages of Drivers and Firemen, fueling, cleaning engines, &c.	Fuel.	Water.	Oil, Tallow, and other Stores.	Maintenance and Renewal of Locomotive Engines and Machinery.	Other Charges.	Total.	Deductions.	Net Total.
<i>Broad Gauge.</i>		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1	East Indian	2,65,461	5,35,726	1,88,654	33,133	87,225	10,38,481	3,07,718	24,36,399	2,32,933	22,03,466
2	Great Indian Peninsula	1,64,047	6,57,762	10,57,509	63,143	88,412	5,71,974	3,37,675	29,40,522	..	29,40,522
3	Sind, Punjab and Delhi	82,947	1,98,490	4,54,288	14,099	31,133	2,11,186	2,06,100	11,98,243	..	11,98,243
4	Madras	53,256	1,38,303	1,98,906	70,541	12,903	2,06,796	35,727	6,56,432	..	6,56,432
5	Bombay, Baroda and Central India	46,031	1,27,151	2,47,804	15,721	12,126	86,837	1,24,016	6,59,686	..	6,59,686
6	Eastern Bengal	31,391	68,699	92,952	5,753	10,101	1,38,649	23,703	3,71,248	6,048	3,65,200
7	Oudh and Rohilkhand	48,402	67,272	1,94,356	6,679	14,469	48,844	67,022	4,77,044	..	4,77,044
8	Indus Valley and Kandahar	59,739	1,50,194	3,62,745	38,809	23,620	1,25,146	18,394	7,78,647	..	7,78,647
9	Punjab Northern	49,493	1,23,609	3,89,480	21,976	16,757	71,791	32,101	7,05,207	..	7,05,207
10	Dhond and Manmad	..	..	..	..	..	..	..	..	..	..
11	Patna and Gya	3,721	9,753	17,593	1,708	1,607	8,621	115	43,118	..	43,118
12	Nizam's	4,805	16,604	26,480	3,737	2,743	9,464	2,837	66,670	..	66,670
13	Calcutta and South-Eastern	1,541	1,536	4,929	318	389	2,232	..	10,945	..	10,945
14	Khamgaon	..	..	..	..	..	..	..	..	..	..
15	Amraoti	..	..	..	..	..	..	..	..	..	..
16	Wardha Coal	1,022	3,397	8,054	738	1,408	8,051	968	23,638	..	23,638
17	Sindia	..	..	..	..	..	..	..	17,771	..	17,771
18	Ghazipur and Dildarnagar	..	..	..	..	..	..	..	5,202	..	5,202
Total		8,11,856	20,98,496	32,23,750	2,16,355	3,02,893	25,58,072	11,56,376	1,03,90,772	2,38,981	1,01,51,791
<i>Narrow Gauge.</i>		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
19	South Indian	37,159	74,801	1,48,489	8,055	9,091	1,32,100	28,300	4,37,995	276	4,37,719
20	Rajputana	78,248	2,20,847	3,75,540	20,303	25,863	2,13,201	1,51,000	10,85,002	13,804	10,71,198
21	Holkar and Sindia-Neemuch	25,019	62,035	87,337	8,111	8,176	34,657	5,394	2,30,801	..	2,30,801
22	Nagpur and Chhattisgarh	5,413	7,970	9,461	1,485	2,094	4,777	608	31,788	..	31,788
23	Rangoon and Irrawaddy	17,112	37,042	25,787	2,255	4,330	28,630	2,454	1,17,610	..	1,17,610
24	Northern Bengal	16,163	33,842	49,327	2,693	7,893	14,253	16,096	1,40,267	..	1,40,267
25	Tirhoot	3,557	11,846	12,877	810	1,679	7,460	97	38,326	..	38,326
26	Cawnpore and Farukhabad	6,049	2,192	16,412	652	1,306	2,629	501	29,741	..	29,741
27	Muttra-Achnera	..	..	..	..	..	..	..	8,782	..	8,782
28	Bhavnagar-Gondal	9,187	20,720	31,414	2,668	2,816	2,824	499	70,128	..	70,128
29	Muttra and Hathras	1,865	770	6,059	268	477	2,548	166	12,153	..	12,153
30	Mysore	1,513	978	5,487	322	911	7,795	587	18,593	..	18,593
31	Nalhati	1,064	681	1,973	288	250	1,557	14	5,827	..	5,827
32	Gaekwar of Baroda's	456	2,258	5,246	946	387	3,562	219	13,074	..	13,074
Total		2,02,877	4,75,982	7,75,409	49,356	65,274	1,55,979	2,05,935	22,35,087	14,080	22,21,007
GRAND TOTAL		10,14,733	25,74,478	39,99,159	2,65,711	3,68,166	30,14,051	13,62,311	1,26,25,859	2,53,061	1,23,72,798

CXLVIII

APPENDIX F—continued

No. VIII.—DETAIL OF CARRIAGE AND WAGON EXPENSES.

[From Abstract C of Revenue Account.]

RAILWAYS		General Superintendence.	REPAIRS AND RENEWALS OF VEHICLES AND MACHINERY.		Cleaning and Oiling.	Other Charges.	Total.	Deductions.	Net Total.
			Coaching.	Goods.					
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
<i>Broad Gauge.</i>									
1	East Indian	70,370	1,98,449	4,26,239	41,815	11,278	7,48,152	12,912	7,35,240
2	Great Indian Peninsula	46,825	2,84,807	6,18,331	84,106	54,874	10,88,943	3,809	10,85,134
3	Sind, Punjab and Delhi	21,684	85,424	1,83,441	38,437	54,482	3,83,468	..	3,83,468
4	Madras	17,314	1,12,330	71,485	26,681	7,122	2,84,932	..	2,84,932
5	Bombay, Baroda and Central India	16,953	65,109	1,29,877	13,375	11,259	2,36,573	..	2,36,573
6	Eastern Bengal	12,490	47,916	39,404	8,199	2,429	1,10,438	48	1,10,390
7	Oudh and Rohilkhand	11,045	68,013	60,547	17,556	3,894	1,61,055	..	1,61,055
8	Indus Valley and Kandahar	9,995	19,856	31,767	13,144	1,110	81,372	..	81,372
9	Punjab Northern	5,213	9,985	41,887	13,010	4,352	74,347	..	74,347
10	Dhond and Manmad	..	..	..	..	..	..	..	..
11	Patna and Gya	1,240	2,557	3,183	1,165	354	8,499	..	8,499
12	Nizam's	1,500	7,862	24,617	2,212	95	36,286	..	36,286
13	Calcutta and South-Eastern	904	944	402	551	..	2,801	..	2,801
14	Khamgaon	..	..	..	..	..	..	..	..
15	Amraoti	..	..	..	..	..	..	..	..
16	Wardha Coal	824	864	6,327	1,669	54	10,238	..	10,238
17	Sindia	..	..	..	..	..	9,019	..	9,019
18	Ghazipur and Dildarnagar	..	..	..	..	..	1,818	..	1,818
	Total	2,16,357	9,04,116	16,38,007	2,67,920	1,51,203	31,88,441	16,769	31,71,672
<i>Narrow Gauge.</i>									
19	South Indian	8,528	26,261	66,981	12,894	7,356	1,22,520	1,916	1,20,604
20	Rajputana	14,978	58,353	55,552	22,455	10,457	1,61,795	7,942	1,53,853
21	Holkar and Sindia-Neemuch	4,874	20,803	19,557	4,515	2,428	52,177	..	52,177
22	Nagpur and Chhattisgarh	3,156	656	4,888	1,416	10	10,126	..	10,126
23	Rangoon and Irrawaddy	4,916	12,536	5,743	3,379	527	27,101	..	27,101
24	Northern Bengal	7,165	5,738	3,202	3,583	1,751	21,489	..	21,489
25	Tirhoot	1,186	945	2,737	1,179	1,439	7,486	..	7,486
26	Cawnpore and Farukhabad	261	824	399	615	..	2,099	..	2,099
27	Muttra-Achnera	..	..	..	..	..	426	..	426
28	Bhavnagar-Gondal	3,010	1,641	1,377	5,320	..	11,347	..	11,347
29	Muttra and Hathras	782	889	2,279	169	1,861	5,980	..	5,980
30	Mysore	1,196	610	1,362	1,653	..	4,823	..	4,823
31	Nalhati	709	137	605	207	..	1,653	..	1,653
32	Gaekwar of Baroda's	152	96	524	347	..	1,119	..	1,119
	Total	50,913	1,29,539	1,65,206	57,734	26,329	4,30,146	9,858	4,20,288
	GRAND TOTAL	2,67,270	10,33,655	18,03,213	3,25,654	1,77,532	36,18,587	26,627	35,91,960

STATISTICS OF INDIAN RAILWAYS.

CXLIX

No. IX.—DETAIL OF TRAFFIC EXPENSES.

[From Abstract D of Revenue Account.]

RAILWAYS.		General Superintendence.	Station Staff.	Train Staff.	Fuel, Lighting and General Stores.	Clothing.	Printing, Stationery, and Tickets.	Charges for delivery and collection of goods.	Miscellaneous Expenses.	Payments to other lines for expenses at joint stations.	Other Charges.	Total.	Deductions.	Net Total.
<i>Broad Gauge.</i>		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1	East Indian	1,66,879	7,70,993	2,38,471	74,760	13,290	56,994	..	21,139	..	1,585	13,44,112	18,296	13,25,816
2	Great Indian Peninsula	1,23,384	4,46,600	2,85,956	82,210	28,840	32,590	1,601	7,095	23,014	11,183	10,42,473	..	10,42,473
3	Sind, Punjab and Delhi	87,881	2,22,775	91,146	56,384	3,222	36,583	1,505	1,427	16,195	7,912	5,24,980	..	5,24,980
4	Madras	58,737	1,59,562	34,337	45,895	3,686	20,041	..	3,250	..	4,252	3,29,760	45	3,29,715
5	Bombay, Baroda and Central India	42,497	1,71,157	23,915	32,466	5,151	14,333	2,228	990	..	25	2,92,762	..	2,92,762
6	Eastern Bengal	38,616	2,06,658	25,177	23,935	2,255	7,842	..	267	..	153	3,04,903	..	3,04,903
7	Oudh and Rohilkhand	34,731	1,45,014	31,651	19,160	4,202	11,850	515	603	13,245	1,698	2,62,669	..	2,62,669
8	Indus Valley and Kandahar	41,674	1,15,113	46,732	37,664	2,659	9,165	954	1,643	13,959	2,842	2,72,302	..	2,72,302
9	Punjab Northern	38,287	71,859	41,077	17,891	17,186	3,787	..	987	11,576	3,530	2,06,180	..	2,06,180
10	Dhond and Manmad	..	..	..	..	..	..	..	..	..	..	..	..	..
11	Patna and Gya	5,555	8,113	3,112	867	200	468	..	..	4,825	..	23,313	..	23,313
12	Nizam's	9,514	18,180	5,993	8,360	4	2,427	..	873	3,884	414	49,649	..	49,649
13	Calcutta and South-Eastern	1,244	3,651	837	922	173	144	..	95	..	1	7,067	..	7,067
14	Khamgaon	..	..	..	..	..	..	..	..	..	..	..	..	..
15	Amraoti	..	..	..	..	..	..	..	..	..	..	..	..	..
16	Wardha Coal	2	4,610	1,510	1,065	40	167	2	296	2,427	12	10,051	..	10,051
17	Sindia	..	..	..	..	..	..	..	..	..	..	14,571	..	14,571
18	Ghazipur and Dildarnagar	..	..	..	..	..	..	..	..	..	..	2,937	..	2,937
Total		6,48,948	23,44,285	8,29,914	4,01,479	80,828	1,96,391	6,865	38,838	89,125	33,607	46,87,729	18,341	46,69,388
<i>Narrow Gauge.</i>														
19	South Indian	25,273	95,303	16,300	10,874	5,980	10,241	298	1,136	..	4,724	1,70,129	19	1,70,110
20	Rajputana	45,451	1,26,517	42,870	38,896	7,270	15,280	..	619	19,172	2,259	2,98,334	945	2,97,389
21	Holkar and Sindia-Neemuch	13,893	40,887	20,046	11,188	3,014	10,078	..	453	9,635	239	1,09,433	..	1,09,433
22	Nagpur and Chhattisgarh	5,167	7,632	2,234	1,414	74	377	..	183	7,646	65	24,792	..	24,792
23	Rangoon and Irrawaddy	15,617	53,072	11,562	5,889	1,353	4,099	..	2,081	..	248	93,926	..	93,926
24	Northern Bengal	12,027	42,456	6,823	8,350	546	2,449	..	879	..	80	73,610	..	73,610
25	Tirhoot	5,462	16,821	4,044	3,223	542	413	..	204	..	7	30,716	..	30,716
26	Cawnpore and Farukhabad	5,246	7,988	690	3,563	150	1,355	..	109	40	7	19,148	..	19,148
27	Muttra-Achnera	..	..	..	..	..	..	..	..	..	..	946	..	946
28	Bhavnagar-Gondal	7,009	10,909	3,765	1,937	49	11,882	..	383	1,958	137	88,029	..	88,029
29	Muttra and Hathras	3,353	2,450	283	275	41	507	135	24	1,334	3	8,405	..	8,405
30	Mysore	4,247	3,154	788	577	..	89	..	277	..	95	9,227	..	9,227
31	Nalhati	783	1,278	460	154	42	87	..	36	..	636	3,478	..	3,478
32	Gaekwar of Baroda's	608	3,953	610	2,207	128	366	..	..	1,319	..	9,191	..	9,191
Total		1,44,136	4,12,420	1,10,475	88,547	19,194	57,223	433	6,384	41,740	7,866	8,89,364	964	8,88,400
GRAND TOTAL		7,93,084	27,56,705	9,40,389	4,90,026	1,00,022	2,53,614	7,238	45,222	1,30,865	41,473	55,77,093	19,305	55,57,788

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APPENDIX F—continued.

No. X.—DETAIL OF GENERAL CHARGES.

[From Abstract E of Revenue Account.]

RAILWAYS.		Home Ex- penditure or General Adminis- tration.	Agent's Office.	Audit, Ac- counts and Pay Office.	Stores De- partment.	Medical De- partment.	Rents and Miscella- neous.	Police.	Advertis- ing.	Electric Telegraph.	Other Charges	Total.	Deductions	Net Total.
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
<i>Broad Gauge.</i>														
1	East Indian	71,372	75,290	1,82,672	1,12,436	54,015	66,343	70,445	1,717	1,97,073	53,746	8,85,110	17,517	8,67,593
2	Great Indian Peninsula	52,992	39,508	1,28,921	41,572	27,985	36,138	67,314	2,307	1,43,213	11,405	5,46,350	..	5,46,350
3	Sind, Punjab and Delhi	40,994	30,793	95,837	31,826	12,230	23,397	25,947	1,365	64,567	9,292	3,36,248	2,624	3,33,624
4	Madras	35,492	21,390	66,838	10,468	15,923	9,676	17,134	1,747	38,834	6,630	2,24,152	210	2,23,942
5	Bombay, Baroda and Central India	32,841	14,272	55,598	34,710	9,593	15,762	31,207	648	40,041	5,805	2,40,477	..	2,40,477
6	Eastern Bengal	22,257	30,635	30,549	1,877	8,763	18,410	14,040	2,676	23,043	2,770	1,54,520	..	1,54,520
7	Oudh and Rohilkhand	39,065	21,407	43,715	5,322	11,788	6,730	13,827	101	44,949	11,385	1,98,289	..	1,98,289
8	Indus Valley and Kandahar	..	19,628	64,775	9,411	10,951	31,182	285	633	65,766	522	2,03,153	..	2,03,153
9	Punjab Northern	—102	14,359	39,849	14,196	4,976	26,551	1,336	403	21,791	—333	1,23,026	..	1,23,026
10	Dhond and Manmad	..	..	..	..	..	..	..	..	..	..	..	..	..
11	Patna and Gya	1,920	3,736	6,463	2,439	270	1,492	..	129	3,828	49	20,326	..	20,326
12	Nizam's	1,516	4,381	9,460	2,632	1,607	2,178	..	218	6,811	65	28,868	..	28,868
13	Calcutta and South-Eastern	..	2,397	1,815	264	160	318	..	80	1,276	6	6,316	..	6,316
14	Khamgaon	..	..	..	..	..	..	..	..	..	..	..	..	..
15	Amraoti	..	..	..	..	..	..	..	..	..	..	..	..	..
16	Wardha Coal	..	9,051	4,026	568	1,272	2,215	..	12	2,162	2	19,308	..	19,308
17	Sindia	..	..	..	..	..	..	..	..	..	..	9,687	..	9,687
18	Ghazipur and Dildarnagar	..	..	..	..	..	..	..	..	..	..	1,946	..	1,946
	Total	2,98,347	2,86,842	7,25,518	2,67,241	1,59,533	2,40,392	2,41,535	12,026	6,53,855	1,01,344	29,97,776	20,351	29,77,425
<i>Narrow Gauge.</i>														
19	South Indian	31,511	19,782	42,505	10,681	5,433	10,794	..	972	26,002	7,700	1,55,380	..	1,55,380
20	Rajputana	..	25,280	68,530	15,411	12,509	19,037	..	966	59,722	6,003	2,07,458	737	2,06,721
21	Holkar and Sindia-Neemuch	..	11,530	20,257	7,376	3,583	6,321	..	14	22,282	27	71,390	..	71,390
22	Nagpur and Chhattisgarh	..	7,922	5,819	1,290	21	2,992	..	63	3,905	5	22,017	..	22,017
23	Rangoon and Irrawaddy	..	10,024	16,150	7,562	1,258	4,364	..	602	16,367	78	56,405	..	56,405
24	Northern Bengal	..	18,820	27,826	1,333	6,811	2,307	..	191	21,958	83	79,329	..	79,329
25	Tirhoot	2,880	3,736	6,463	1,624	1,296	2,084	..	430	7,031	422	25,966	..	25,966
26	Cawnpore and Farukhabad	8,479	6,207	8,223	1,137	131	3,980	..	79	12,432	..	40,618	..	40,618
27	Muttra-Achnera	..	..	..	..	..	..	..	..	..	..	737	..	737
28	Bhavnagar-Gondal	..	5,791	10,645	1,829	1,773	8,103	10,834	137	14,557	39	53,715	..	53,715
29	Muttra and Hathras	3,485	1,999	2,750	144	..	200	..	49	1,741	1	10,369	..	10,369
30	Mysore	..	7,736	2,600	2,812	..	470	..	..	399	77	14,094	..	14,094
31	Nalhati	810	2,666	2,301	442	15	472	..	26	763	2	7,497	..	7,497
32	Gaekwar of Baroda's	..	608	1,615	152	..	..	1,012	..	..	..	3,387	..	3,387
	Total	47,165	1,22,101	2,15,684	51,793	32,835	61,076	11,846	3,529	1,87,159	14,437	7,48,362	737	7,47,625
	GRAND TOTAL	3,45,512	4,00,943	9,41,202	3,19,034	1,92,368	3,01,468	2,53,381	15,565	8,40,514	1,15,781	37,46,138	21,088	37,25,050

STATISTICS OF INDIAN RAILWAYS.

31

No. XI.—SPECIAL AND MISCELLANEOUS EXPENDITURE.

[From Abstract G of Revenue Account.]

ciii

RAILWAYS.		Law Charges.	Compensation.	Rates and Taxes.	Payments to other Lines.	Other Charges.	Total.	Deductions.	Net Total.
<i>Broad Gauge.</i>		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1	East Indian	5,481	1,239	26,335	1,79,590	16,285	2,28,930	2,521	2,26,409
2	Great Indian Peninsula	2,914	4,736	8,445	2,44,783	10,140	2,71,018	2,574	2,68,444
3	Sind, Punjab and Delhi	1,921	9,277	8,056	1,52,140	2,935	1,69,329	..	1,69,329
4	Madras	2,181	960	10,430	17,937	1,598	33,106	152	32,954
5	Bombay, Baroda and Central India	1,553	2,452	5,221	20,187	10,961	40,374	..	40,374
6	Eastern Bengal	1,957	28,230	5,661	268	1,403	37,519	..	37,519
7	Ouda and Rohilkhand	-1,032	144	303	25,923	52,473	77,811	..	77,811
8	Indus Valley and Kandahar	341	12,775	..	1,79,201	3,743	1,96,060	..	1,96,060
9	Punjab Northern	2	26,713	..	43,165	701	70,581	..	70,581
10	Dhond and Manmad	..	..	..	..	..	..	..	..
11	Patna and Gya	206	..	108	53,800	1,503	55,617	..	55,617
12	Nizam's	..	604	..	13,029	1,499	15,132	..	15,132
13	Calcutta and South-Eastern	..	574	690	12	146	1,422	..	1,422
14	Khamgaon	..	..	..	..	..	..	..	..
15	Amraoti	..	..	..	..	..	..	..	..
16	Wardha Coal	..	-99	..	2,421	209	2,531	..	2,531
17	Sindia	..	..	..	..	..	37,952	..	37,952
18	Ghazipur and Dildarnagar	..	..	..	..	..	423	..	423
Total,		15,524	87,605	60,249	9,32,456	1,03,596	12,37,805	5,247	12,32,558
<i>Narrow Gauge.</i>									
19	South Indian	1,511	7,738	7,478	482	..	17,209	1	17,208
20	Rajputana	35	2,244	..	12,684	21,271	36,234	98	36,136
21	Holkar and Sindia-Neemuch	..	..	..	4,040	1,702	5,742	..	5,742
22	Nagpur and Chhattisgarh	..	59	..	..	272	331	..	331
23	Rangoon and Irrawaddy	100	196	5,871	..	7,295	13,462	..	13,462
24	Northern Bengal	20	798	48	..	7,721	8,587	..	8,587
25	Tirhoot	25	20	197	..	681	923	..	923
26	Cawnpore and Farukhabad	5	63	..	..	567	635	..	635
27	Muttra-Achnera	..	..	..	..	..	289	..	289
28	Bhavnagar-Gondal	..	584	..	..	254	838	..	838
29	Muttra and Hathras	..	2	..	..	2,255	2,257	..	2,257
30	Mysore	39	1,013	..	..	163	1,215	..	1,215
31	Nalhati	81	..	48	..	29	158	..	158
32	Gackwar of Baroda's	..	..	..	..	..	..	..	..
Total		1,816	12,717	13,642	17,206	42,210	87,880	99	87,781
GRAND TOTAL		17,340	1,00,322	73,891	9,49,662	1,45,806	13,25,685	5,346	13,20,339

APPENDIX FF—continued.

No. XII.—STATEMENT OF ROLLING STOCK.

[From No. XII of Revenue Account.]

RAILWAYS.	LOCOMOTIVES.			VEHICLES.							
	Total Stock on the list.	Average number spare or hired out.	Average number constantly under repair.	COACHING.		GOODS.		BRAKE-VANS.		TOTAL.	
				Total Stock on the list.	Average number constantly under repair.	Total Stock on the list.	Average number constantly under repair.	Total Stock on the list.	Average number constantly under repair.	Vehicle Stock on the list.	Average number of vehicles constantly under repair.
<i>Broad Gauge.</i>											
1 East Indian	539	..	17 00	988	60.88	7,934	459 22	295	14.71	9,167	534.31
2 Great Indian Peninsula	438	..	119 00	938	114 00	7,815	1,291.00	457	68.00	9,210	1,473 00
3 Sind, Punjab and Delhi	159	..	37.51	487	50 10	3,388	177 06	109	14.94	3,984	242 10
4 Madias	157	..	50 00	453	29 00	2,771	131 00	(b) 138	13 00	3,362	173 00
5 Bombay, Baroda and Central India	98	..	20 00	355	34 00	2,729	225 00	49	10 00	3,133	269 00
6 Eastern Bengal	48	..	11 89	175	36 58	959	100 60	31	9 60	1,159	146 78
7 Oudh and Rohilkhand	125	..	31.83	275	53 48	3,094	280 99	57	10 50	3,426	344 97
8 Indus Valley and Kandahar	101	..	8 71	292	9 64	2,580	61.26	73	2 35	2,945	73 25
9 Punjab Northern	119	..	9.86	154	5 10	1,431	61.64	108	5.80	1,693	72 54
10 Dhond and Manmad	..	..	..	..	..	..	..	..	..	..	..
11 Patna and Gya	6	..	3 80	51	5 33	81	12 15	7	0.91	139	18 39
12 Nizam's	10	..	1 00	61	5 49	121	5.70	22	1 94	204	13 13
13 Calcutta and South-Eastern	8	8	0 01	55	0 05	243	0.27	8	0 02	306	0 34
14 Khamgaon	..	..	..	..	..	..	..	..	..	..	..
15 Amraoti	..	..	..	..	..	..	..	..	..	..	..
16 Wardha Coal	5	..	0 17	9	..	154	1.50	6	0 17	169	1.67
17 Sindia	..	..	..	..	..	..	..	..	..	..	..
18 Ghazipur and Dildarnagar	..	..	..	..	..	..	..	..	..	..	..
Total	1,813	3	309 78	4,243	403 15	33,294	2,807 39	1,360	151 94	38,897	3,362 48
<i>Narrow Gauge.</i>											
19 South Indian	120	..	22 81	491	22 12	1,575	51 94	(a) 35	1 49	2,101	75 55
20 Rajputana	216	..	67 46	549	61 54	3,096	97 86	168	16 94	3,813	176 34
21 Holkar and Sindia-Neemuch	57	..	21 07	185	10 84	962	55 67	49	4 89	1,196	71 40
22 Nagpur and Chhattisgarh	12	..	2 99	44	0 33	368	28 18	18	0 56	430	29 05
23 Rangoon and Irrawaddy	31	..	4 58	169	6 74	636	13 67	30	0 88	835	21 49
24 Northern Bengal	36	..	0 12	120	0 30	730	0 49	30	0 06	930	0 85
25 Tirhoot	14	..	3 99	49	2 55	302	12 05	20	2 44	371	17 04
26 Cawnpore and Farukhabad	11	..	0 96	(c) 98	1 60	219	0 16	..	..	317	1 76
27 Muttra-Achnera	..	..	..	..	..	..	..	..	..	..	..
28 Bhavnagar-Gondal	20	..	1 50	82	1 00	494	4 00	22	1 00	598	6 00
29 Muttra and Hathras	5	..	1 10	28	1.50	75	3 00	(d) 4	0 50	107	5 00
30 Mysore	7	..	..	36	..	77	..	5	..	118	..
31 Nalhati	4	..	0 02	10	0 03	24	0 04	..	..	34	0 07
32 Gaekwar of Baroda's	6	..	1 00	27	..	187	..	6	..	220	..
Total	539	..	127 60	1,868	108 55	8,795	267 24	387	28 76	11,070	404 55
GRAND TOTAL	2,352	3	437 38	6,131	511 70	42,089	3,074 63	1,747	180 70	49,967	3,767 03

N B.—Total stock on the list will be obtained from column 5 of Statement XII in the Revenue Account, and "average number constantly under repair" from column 11.

(a) Exclusive of 16 passenger brake vans, Post Office, and 41 passenger brake-vans 3rd class included under Coaching.

(b) Includes luggage vans.

(c) Includes 10 combined brake-vans.

(d) Postal accommodation was provided in one fourth of a brake-van.

STATISTICS OF INDIAN RAILWAYS.

cliii

No. XIII.—STATEMENT OF TRAIN-MILEAGE.

[From No. XIV of Revenue Account.]

cliv

RAILWAYS	TRAIN-MILES.				TRAIN-MILES AFTER APPORTIONING MIXED AND LIGHT MILEAGE.		Total Train-mileage.	Assisting, Shunting and Miscellaneous mileage.	Total Engine mileage.
	Passengers.	Goods.	Mixed.	Light.	Coaching	Goods.			
<i>Broad Gauge.</i>									
1 East Indian ..	689,951	2,363,204	1,072,666	113,220	1,302,724	2,936,317	(a) 4,292,962	563,818	4,856,780
2 Great Indian Peninsula ..	961,824	2,042,621	451,677	177,004	1,175,873	2,457,253	3,633,126	310,930	3,944,056
3 Sind, Punjab and Delhi ..	314,442	623,607	376,941	86,169	581,595	769,564	1,351,159	185,251	1,536,410
4 Madras ..	317,754	110,509	511,065	25,292	456,086	508,534	964,620	143,178	1,107,798
5 Bombay, Baroda and Central India ..	350,513	251,642	148,384	1,299	414,969	336,869	751,838	80,561	832,399
6 Eastern Bengal ..	126,808	198,920	102,710	221	154,206	274,453	428,659	98,776	527,435
7 Oudh and Rohilkhand ..	764	202,650	405,273	18,994	232,213	395,468	627,681	109,080	736,761
8 Indus Valley and Kandahar ..	6,388	378,345	515,741	21,312	258,832	662,954	921,736	141,524	1,063,310
9 Punjab Northern ..	2,367	206,140	288,464	3,234	239,972	260,233	500,205	73,510	573,715
10 Dhond and Manmad ..	..	..	..	..	..	..	..	..	..
11 Patna and Gya ..	1,734	16,393	41,952	594	30,129	30,544	60,673	7,116	67,789
12 Nizam's ..	2,056	34,351	87,858	578	58,846	65,997	124,843	2,440	127,283
13 Calcutta and South-Eastern ..	7,478	732	11,366	28	11,658	7,946	19,604	4,018	23,622
14 Khamgaon ..	..	..	..	..	..	..	..	..	..
15 Amraoti ..	..	..	..	..	..	..	..	..	..
16 Wardha Coal ..	..	4,615	33,120	107	14,261	23,581	37,842	8,731	46,573
17 Sindia ..	342	14,461	28,060	..	..	..	42,863	935	43,798
18 Ghazipur and Dildarnagar ..	..	..	..	..	..	..	8,640	..	8,640
Total ..	2,732,421	6,448,190	4,075,277	398,052	4,931,364	8,729,713	13,714,998	1,729,868	15,444,866
<i>Narrow Gauge.</i>									
19 South Indian ..	621	113,168	508,507	3,916	238,079	388,133	626,212	155,810	782,022
20 Rajputana ..	277,775	726,239	440,355	29,320	718,130	756,059	1,474,189	148,823	1,623,012
21 Holkar and Sindia-Neemuch ..	34,203	105,507	183,302	5,809	165,747	163,074	328,821	49,062	377,883
22 Nagpur and Chhattisgarh ..	18	12,955	30,080	3	15,785	27,271	43,056	1,993	45,049
23 Rangoon and Irrawaddy ..	59,418	40,536	75,827	9	96,123	79,667	175,790	34,050	209,840
24 Northern Bengal ..	73,658	101,750	98,230	4,947	102,004	176,581	278,585	32,208	310,793
25 Tirhoot ..	566	18,407	58,370	2,208	34,243	45,308	79,551	18,223	97,784
26 Cawnpore and Farukhabad ..	..	2,546	65,596	108	42,563	25,687	68,250	4,062	72,312
27 Muttra-Achnera ..	..	..	..	..	..	..	..	..	..
28 Bhavnagar-Gondal ..	20,775	55,667	39,500	2,034	54,814	63,162	117,976	2,979	120,955
29 Muttra and Hathras ..	..	..	22,098	..	14,970	7,128	22,098	2,396	24,494
30 Mysore ..	19,392	23,620	518	..	19,565	23,965	43,530	17,388	60,918
31 Nalhati ..	..	163	20,056	..	13,170	7,049	20,219	1,659	21,878
32 Gekwar of Baroda's ..	971	1,491	21,804	135	17,540	6,861	24,401	248	24,649
Total ..	487,397	1,202,049	1,564,243	48,989	1,532,733	1,769,945	3,302,678	468,911	3,771,589
GRAND TOTAL ..	3,269,818	7,650,239	5,639,520	447,041	6,464,097	10,499,658	17,017,676	2,198,779	19,216,455

(a). Includes 53,921 train-miles for State Railways, not shown in any of the previous columns.

APPENDIX F—continued.

NO. XIV.—NET EARNINGS COMPARED WITH INTEREST ON CAPITAL.

[From Nos. VIII and XVII of the Revenue Account.]

RAILWAYS.		Interest on Capital.	Net Earnings of the half-year.	DIFFERENCE.	
				Deficient.	Excess.
<i>Broad Gauge.</i>		Rs.	Rs.	Rs.	Rs.
1	East Indian	.. 1,01,80,288	1,48,89,161	47,08,873	..
2	Great Indian Peninsula	.. 62,46,600	62,60,218	13,618	13,54,353
3	Sind, Punjab and Delhi	.. 30,20,531	11,66,178	..	18,97,318
4	Madras	.. 28,58,183	9,60,865	..	4,01,699
5	Bombay, Baroda and Central India	.. 21,84,627	17,82,928	..	..
6	Eastern Bengal	.. 8,43,933	24,77,910	16,33,977	6,44,071
7	Oudh and Rohilkhand	.. 14,74,137	8,30,066	..	6,94,035
8	Indus Valley and Kandahar	.. 13,81,584	6,87,549	..	10,34,019
9	Punjab Northern	.. 11,52,333	1,18,314	..	..
10	Dhond and Mauwad	.. ..	..	..	..
11	Patna and Gya	.. 72,745	98,623	25,878	1,21,022
12	Nizam's	.. 2,45,724	1,24,702	..	1,17,918
13	Calcutta and South-Eastern	.. 1,36,102	18,184	..	..
14	Khamgaon	.. ..	..	..	..
15	Amraoti	.. ..	..	..	84,481
16	Wardha Coal	.. 1,16,589	32,108	..	..
17	Sindia	.. ..	..	..	..
18	Ghazipur and Dildarnagar	.. 12,652	- 699	..	13,351
Total		.. 2,99,26,028	2,94,46,107	63,82,346	68,62,267
<i>Narrow Gauge.</i>					
19	South Indian	.. 10,64,321	6,15,443	..	4,48,878
20	Rajputana	.. 10,81,411	12,29,989	1,47,978	..
21	Holkar and Sindia-Neemuch	.. 6,47,420	3,19,392	..	3,28,028
22	Nagpur and Chhattisgarh	.. 1,40,725	12,640	..	1,28,085
23	Rangoon and Irrawaddy	.. 2,54,661	1,63,832	..	90,829
24	Northern Bengal	.. 4,20,690	5,49,266	1,28,576	..
25	Tirhoot	.. 1,35,581	90,662	..	44,919
26	Cawnpore and Farnkhabad	.. 63,068	44,505	..	18,563
27	Muttra-Achnera	.. 11,272	768	..	10,509
28	Bhavnagar-Gondal	.. 1,39,529	50,960	..	88,569
29	Muttra and Hathras	.. 21,750	21,608	..	127
30	Mysore	.. 63,184	23,696	..	34,488
31	Nalhati	.. 6,620	5,934	..	686
32	Gaskwar of Baroda's	.. 22,760	9,934	..	12,826
Total		.. 40,72,972	31,43,019	2,76,554	12,06,507
GRAND TOTAL		.. 3,39,99,000	3,25,89,126	66,58,900	80,68,774

STATISTICS OF INDIAN RAILWAYS.

CIV

INDIAN RAILWAYS.

STATISTICS OF THEIR WORKING

FOR THE

HALF-YEAR ENDED 30TH JUNE, 1881.

PART II.

SUMMARY OF ANALYSES OF WORKING.

(Pages clvii to clxxix).

Progressive number.	HEADINGS.	BROAD						
		East Indian.	Great Indian Peninsula.	Sind, Punjab and Delhi.	Madras.	Bombay, Baroda and Central India.	Eastern Bengal.	Oudh and Rohilkhand.
No. I.								
DESCRIPTION OF RAILWAY WORKED.								
1	Gauge of Railway,	5' 6"	5' 6"	5' 6"	5' 6"	5' 6"	5' 6"	5' 6"
2	Mean mileage worked, Miles.	1504.25	(c) 1446.50	663.51	857.98	444.00	(a) 171.75	546.85
3	Number of stations, No.	159	181	84	109	77	(b) 36	80
4	Total length of the following gradients—							
	(a), $\frac{1}{100}$ and less, Miles.	..	19.31	..	..	..	..	..
	(b), $\frac{1}{75}$ to $\frac{1}{100}$, "	4.04	2.36	..	17	..	..	..
	(c), $\frac{1}{50}$ to $\frac{1}{75}$, "	12.46	61.87	..	47.50	0.18	..	..
	(d), $\frac{1}{25}$ to $\frac{1}{50}$, "	98.04	487.49	10.40	206.75	1.53	0.55	1.54
	(e), $\frac{1}{10}$ to $\frac{1}{25}$, "	97.54	199.18	24.25	123.75	8.98	0.41	3.55
5	Steepest gradient worked—							
	Length, "	*.9848	5.84	7.20	0.75	0.18	0.14	0.40
	Inclination, "	† $\frac{1}{100}$	$\frac{1}{17}$	$\frac{1}{100}$	$\frac{1}{80}$	$\frac{1}{100}$	$\frac{1}{100}$	$\frac{1}{100}$
No. II.								
FINANCIAL RESULTS.								
6	Percentage of net earnings (including steam-boat traffic) on capital outlay, .. Per cent.	4.17	3.81	3.18	0.98	4.62	2.50	1.89
7	Percentage of net earnings on paid up capital, "	..	3.90	3.16	(j) 0.96	4.47	2.52	1.85
No. III.								
OUTLAY, EARNINGS AND EXPENSES.								
<i>(Exclusive of Steam-boat Service).</i>								
8	Capital outlay per mile open, Rs.	2,47,299	1,73,123	1,66,056	1,29,274	1,85,931	2,09,040	1,06,223
9	Total earnings per mile open per week, .. "	585.91	478.00	307.00	145.40	520.00	390.00	180.42
10	Total working expenses per mile open per week, "	173.10	214.00	195.00	95.20	177.00	197.00	99.84
11	Total earnings per train-mile, "	5.57	4.27	3.76	3.37	6.56	5.53	3.68
12	Total working expenses per train mile, .. "	1.65	1.91	2.37	2.21	2.23	2.79	2.04
13	Net earnings per train-mile, "	3.92	2.36	1.39	1.16	4.33	2.74	1.64
14	Cost per 1,000 gross ton-miles moved (freight and dead-weight), "	4.65	7.62	7.62	9.76	6.33	10.15	6.61
15	Percentage of total working expenses upon total earnings, Per cent.	29.54	44.65	63.17	65.46	34.06	50.51	55.34
16	Percentage of total working expenses upon total earnings, excluding from both sides of the account the charges for carriage of revenue stores, "	27.76	42.92	61.52	65.02	33.85	50.17	54.34
<i>(Inclusive of Steam-boat Service).</i>								
17	Percentage of total working expenses on total earnings (for details, see Table No. VII.), "	29.59	44.64	65.46	..	33.99	53.39	55.34

(a)—Includes 13 miles of the Porajaha Section of the Northern Bengal State Railway.
 (b)—Includes two stations on the Pofadaha Section.
 (c)—Includes 158½ miles for Dhond-Manmad, Khamgaon and Amraoti lines, and 12½ miles for Mohpan branch opened for coal traffic.
 (d)—Includes 1.62 miles on the 5' 6" gauge.

(e)—Includes 0.17 which is the gradient of the 5' 6" gauge line.
 (f)—Includes 0.53 which is the gradient of the 5' 6" line.
 (g)— " 0.19 " "
 (h)— " 0.17 " length of " "
 (i)—Includes 8 miles of the Pondicherry Railway."
 (j)—Includes 2 stations of the " "

* Kurhurballee Branch, 4.81 Main Line, 5.682 Jubbulpore Line.
 † $\frac{1}{100}$ " $\frac{1}{100}$

STATISTICS OF INDIAN RAILWAYS.

clix

GAUGE 5' 6".					NARROW GAUGE, METRE = 3' 3 3/4".										Progressive number.
Indus Valley.	Punjab Northern.	Dhond and Manmad.	Patna and Gya.	Nizam's.	South Indian.	Rajputana.	Holkar and Sindh-Neebuch.	Nagpur and Chhat-tugarh.	Rangoon and Irrawaddy Valley.	Northern Bengal.	Turkoot.	Cawnpore and Fa-rnkhabad.	Bhavnagar-Gondal.		
5' 6" (n) 659 67 66	(o) 5' 6" 323.75 55	Worked by the Great Indian Peninsula Railway.	5' 6" 57 20 8	5' 6" 120 44 15	3' 3 3/4" (s) 663 (j) 102	3' 3 3/4" (d) 728.37 88	3' 3 3/4" 276 17 86	3' 3 3/4" 61.57 9	3' 3 3/4" 161 27	3' 3 3/4" 230 69 29	3' 3 3/4" 82 02 (p) 12	3' 3 3/4" 86.00 16	3' 3 3/4" 178 00 27	1	
..	2.84		..	..	..	..	..	..	..	..	..	..	..	..	2
..	14.87		..	..	..	..	..	..	..	..	..	..	..	..	3
1 00	72 33		..	..	..	..	..	..	..	..	..	..	..	..	4
9 20	48.07		..	..	..	..	..	..	..	..	..	..	..	..	5
30.51	13.57		..	..	..	..	..	..	..	..	..	..	..	..	6
1.00	2.84		..	..	..	..	..	..	..	..	..	..	..	..	7
1/75	1/40		..	..	..	..	..	..	..	..	..	..	..	..	8
..	..		..	..	..	..	..	..	..	..	..	..	..	..	9
0.65	0.45		..	..	..	..	..	..	..	..	..	..	..	..	10
..	..		..	..	..	..	..	..	..	..	..	..	..	..	11
..	..		..	..	..	..	..	..	..	..	..	..	..	..	12
..	..		..	..	..	..	..	..	..	..	..	..	..	..	13
..	..		..	..	..	..	..	..	..	..	..	..	..	..	14
..	..		..	..	..	..	..	..	..	..	..	..	..	..	15
..	..		..	..	..	..	..	..	..	..	..	..	..	..	16
..	..		..	..	..	..	..	..	..	..	..	..	..	..	17
116,236 163	1,44,187 229.24	Worked by the Great Indian Peninsula Railway.	62,871 166	1,03,881 127 00	64,696 113	70,117 197	93,605 138 24	42,915 97 00	76,856 231.61	(m) 80,731 118 49	74 726 123 48	35,368 51.00	33,539 84 64	8	
136	200 58		112	74 00	76	110	98 84	63.00	116.64	68 73	64.78	33 00	53 12	10	
3 05	2 97		4 30	3 11	3 01	2 62	3 04	3 03	3 57	2 92	3 20	.. 76	2 41	11	
2 54	2 60		2 90	1 80	(k) 2 02	1 47	2 17	1 98	1 80	1 69	1 68	1 15	1 51	12	
0 51	0 37		1 41	1 31	0 98	1 15	0 87	1 05	1 77	1 23	1 17	0 61	0 90	13	
9.59	13 70		12 68	8 16	13 19	10 18	16 07	14 84	11.17	11 06	12 84	10 28	13 25	14	
83.27	87 50		67.33	57 30	67 45	55.97	71 50	65.43	50.36	57 14	52.46	65.22	62 76	15	
82.61	87 14		67.17	56.97	66 33	..	71 23	64 25	50.05	56 24	52 26	64 96	62.71	16	
82.89	87 50		67.33	..	67.45	55 97	71 50	65 43	50.36	57 22	53.43	65.22	62.76	17	

(k) — Includes mileage run on Pondicherry Company's line
 (l) — Excluding £10,122 2s. 3d. capital not bearing interest.
 (m) — Capital outlay, Poradaha Section per mile open is Rs. 1,03,527.

(n) — Includes 6.57 miles of Foreign line worked by State.
 (o) — The Salt line is on the metre gauge.
 (p) — Including Ganges bank.

Progressive number.	HEADINGS.	BROAD						
		East Indian.	Great Indian Penninsula.	Sind, Punjab and Delhi.	Madras.	Bombay Baroda and Central India.	Eastern Bengal.	Ordh and Rohilkhand.
No. IV.								
DIVISION OF EXPENDITURE BETWEEN COACHING AND GOODS TRAFFIC.								
18	Total Working Expenses for both coaching and goods traffic excluding steam-boat expenses, and after deducting telegraph and sundry receipts and leaving only the balance of payments to other lines for mileage, &c., <i>Rs.</i>	62,98,742	77,93,026	31,19,478	20,40,272	19,33,451	8,56,222	13,33,717
Proportions, dividing expenditure in ratio of gross ton mileage (freight and dead-load).								
19	Coaching, "	13,35,133	14,02,655	10,53,030	8,01,890	4,89,125	3,26,851	3,96,929
20	Goods, "	49,63,609	63,90,371	20,61,448	12,38,382	14,44,326	5,29,371	9,36,788
No. V.								
COACHING TRAFFIC.								
GROSS RECEIPTS AND TRAIN-MILEAGE—								
21	Receipts from coaching traffic, <i>Rs.</i>	61,22,814	35,68,973	20,60,494	13,76,117	17,57,846	7,95,753	10,84,709
22	Coaching train miles run, <i>No.</i>	1,278,517	1,102,948	638,313	469,714	364,453	152,395	225,896
23	Average coaching receipts per train-mile, <i>Rs.</i>	4.79	3.24	3.23	2.93	4.82	5.22	4.80
UNITS AND UNIT-MILEAGE—								
Number of units carried one mile—								
24	1st class, <i>Unit-miles</i>	3,118,902	3,104,795	1,473,009	1,063,402	962,347	505,989	} 850,270
25	2nd " "	13,115,784	20,684,719	5,628,003	2,962,493	5,534,421	987,675	
26	3rd or intermediate class, "	11,889,425	30,438,401	2,476	..	24,806,336	7,991,228	..
27	4th or lowest class, "	295,065,264	126,158,850	123,302,655	96,416,867	77,907,492	33,629,248	75,027,085
28	Total passenger unit-mileage, "	322,689,375	180,386,765	130,406,143	100,442,762	109,210,596	43,114,140	75,877,855
29	Other coaching traffic, <i>Ton-miles</i>	4,104,883	2,295,924	1,636,075	993,449	1,209,619	198,824	300,042
Average sum received for carrying a unit one mile—								
30	1st class, <i>Pies.</i>	15.40	14.46	10.19	16.21	10.33	10.50	} 9.16
31	2nd " "	5.09	4.95	4.08	6.30	4.62	5.07	
32	3rd or intermediate class, "	4.02	3.91	4.50	..	3.03	3.78	..
33	4th or lowest class, "	3.00	2.48	2.42	1.99	2.45	2.92	2.52
34	Average for all classes, "	3.25	3.21	2.58	2.27	2.76	3.22	2.59
35	Other coaching traffic per ton-mile, "	31.19	46.20	35.34	36.54	29.55	63.34	38.87
Average number of units in a train—								
36	1st class, <i>No.</i>	2.44	2.81	2.31	2.26	2.64	3.32	} 3.76
37	2nd " "	10.26	18.75	8.82	6.31	15.19	6.48	
38	3rd or intermediate class, "	8.90	27.60	..	..	68.06	52.43	..
39	4th or lowest class, "	230.79	114.38	193.17	205.27	213.77	226.67	332.13
40	Total passenger units, "	252.39	163.55	204.30	213.84	299.66	282.90	335.89
41	Other coaching traffic, <i>Tons</i>	3.21	2.08	2.56	2.12	3.32	1.30	1.33

STATISTICS OF INDIAN RAILWAYS.

GAUGE.					NARROW GAUGE.										Progressive number.
Indus Valley.	Punjab Northern.	Dhond and Maunmad	Patna and Gya.	Nizam's.	South Indian.	Rajputana.	Holkar and Sindia-Neemuch.	Nagpur and Chhat-tesgarh.	Rangoon and Irrawaddy Valley.	Northern Bengal.	Tirhoot.	Cawnpore and Fa-rukhabad	Bhavnagar-Gondal		
21,46,292	16,32,692	..	1,62,516	2,20,844	12,44,091	20,35,825	7,08,664	1,00,324	4,79,254	3,97,038	1,33,310	73,528	2,55,503	18	
6,26,745	6,21,162	..	80,454	1,00,289	4,68,418	6,44,315	2,82,022	29,162	1,87,293	1,37,484	55,309	50,779	1,04,634	19	
15,19,547	10,11,530	..	82,062	1,20,555	7,75,673	13,91,510	4,26,642	71,162	2,91,961	2,59,554	78,001	22,749	1,50,869	20	
8,92,128	7,17,199	..	1,56,549	1,57,940	10,87,726	10,49,429	3,68,757	43,125	4,61,325	2,67,027	1,23,232	74,827	1,79,961	21	
233,488	259,021	..	27,317	57,273	232,607	515,182	138,462	15,081	113,788-25	92,480	31,071	45,629	48,365	22	
3.82	2.76	..	5.73	2.76	4.67	2.04	2.66	2.86	4.05	2.89	3.97	1.64	3.72	23	
411,736	323,348	Worked by the Great Indian Peninsula Railway.	31,112	109,496	271,735	5,80,705	123,848	14,796	82,255	231,333	67,771	2,557	35,830	24	
1,994,926	720,591		54,740	460,160	925,786	12,55,770	4,96,762	96,758	493,733	360,605	75,462	54,268	171,907	25	
..	8,925,418		..	..	..	4,148,752	1,050,514	..	..	768,823	..	..	15,059,785	26
50,445,401	42,680,850		9,396,322	10,090,368	75,406,531	79,745,855	23,241,499	3,610,520	27,438,711	14,191,651	8,205,949	6,632,735	..	27	
52,852,063	52,650,207		9,482,174	10,660,024	76,604,052	85,731,032	29,912,623	3,722,074	28,014,699	15,552,412	8,349,182	6,689,560	15,267,522	28	
4,453,360	280,667		14,025	109,700	190,452	498,152	185,376	5,809	74,982	103,592	27,291	16,624	48,839	29	
9.87	12.00		17.97	17.40	18.15	11.26	11.08	15.77	14.04	17.49	16.03	13.70	12.32	30	
3.42	0.64		8.96	5.43	5.93	6.31	4.26	5.90	4.81	7.64	9.85	5.46	8.20	31	
..	3.00		..	..	..	3.69	3.09	..	..	4.50	..	..	2.00	32
2.24	2.67		3.00	2.08	2.49	1.90	2.00	1.96	2.98	2.50	2.41	2.00	..	33	
2.34	2.32		3.08	2.39	2.58	2.11	2.11	2.11	3.04	2.94	2.59	2.03	2.09	34	
32.59	55.34		58.44	44.88	44.34	40.96	40.87	70.13	44.96	53.33	76.08	46.38	52.85	35	
1.76	1.24		1.14	1.91	1.17	1.12	0.89	0.98	0.72	2.59	2.18	0.05	0.74	36	
8.55	2.73		2.00	8.03	3.98	2.43	3.59	6.42	4.34	3.90	2.43	1.19	3.55	37	
..	34.46		..	..	..	8.06	7.59	..	..	8.81	..	..	311.38	38
216.05	164.77	343.97	176.18	324.18	154.80	203.96	239.41	241.14	153.46	264.10	145.36	..	39		
226.36	203.25	347.11	186.12	329.33	166.41	216.03	246.81	246.20	168.17	268.71	146.60	315.67	40		
6.22	1.08	0.51	1.92	0.82	0.97	1.34	0.38	0.66	1.12	0.88	0.36	1.01	41		

Progressive number.	HEADINGS.	BROAD						
		East Indian.	Great Indian Peninsula.	Sind, Punjab and Delhi.	Madras.	Bombay, Baroda and Central India.	Eastern Bengal.	Oudh and Rohilkhand.
No. V.—contd.								
COACHING TRAFFIC—contd.								
VEHICLES AND VEHICLE-MILEAGE—								
Number of coaching vehicles hauled one mile—								
42	1st class, <i>Vehicle-miles.</i>	2,517,620	2,070,025	919,314	785,352	544,870	340,807	} 569,815
43	2nd „ „	2,652,402	2,446,422	874,659	1,175,540	776,858	237,636	
44	3rd or intermediate class, „	1,502,319	5,436,347	99,544	..	} 4,055,323	632,809	..
45	4th or lowest class, „	12,690,955	3,004,166	6,614,672	3,545,567		899,277	4,050,346
46	Other vehicles, „	2,655,378	1,902,060	1,887,920	628,195	495,159	352,080	468,199
47	Brake-vans, „	2,479,634	2,318,118	1,304,115	557,819	529,522	327,933	313,858
48	Total,	24,498,308	17,177,138	11,700,224	6,692,473	6,401,732	2,790,542	5,402,218
Average number of vehicles in a coaching train—								
49	1st class, <i>No.</i>	1 97	1 88	1 44	1 67	1 50	2 24	} 2 52
50	2nd „ „	2 07	2 22	1 36	2 50	2 13	1 56	
51	3rd or intermediate class, „	1 17	4 93	0 16	..	} 11 13	4 15	..
52	4th or lowest class, „	9 93	2 72	10 37	7 55		5 90	17 93
53	Other vehicles, „	2 08	1 72	2 96	1 34	1 36	2 31	2 07
54	Brake-vans, „	1 94	2 10	2 04	1 19	1 45	2 15	1 39
55	Total,	19 16	15 57	18 33	14 25	17 57	18 31	23 91
Average earnings per coaching vehicle per mile—								
56	1st class, <i>Pres.</i>	19 07	21 68	16 33	21 96	18 24	15 59	} 13 67
57	2nd „ „	25 18	41 81	26 28	15 89	32 94	21 09	
58	3rd or intermediate class, „	30 51	21 88	0 01	..	} 65 65	47 77	..
59	4th or lowest class, „	69 88	104 21	45 17	54 15		109 46	46 61
60	Other vehicles, „	48 22	55 77	31 15	57 79	72 20	89 16	24 91
Carrying capacity hauled one mile (excluding brakes)—								
61	1st class, <i>Seats.</i>	40,153,986	58,719,057	13,467,771	10,665,133	10,108,842	6,893,807	} 5,114,809
62	2nd „ „	57,584,419	96,900,329	22,462,173	41,794,009	28,923,437	7,580,602	
63	3rd or intermediate class, „	72,336,659	211,334,139	3,185,408	..	} 231,370,120	44,737,271	..
64	4th or lowest class, „	729,201,770	150,208,300	359,904,303	173,296,817		52,001,783	234,982,360
65	Other vehicles, <i>Tons.</i>	20,718,092	1,503,082	5,663,760	3,774,166	2,124,232	708,680	2,106,895
Percentage of freight upon capacity hauled—								
66	1st class, <i>Per cent.</i>	7 77	5 29	10 94	9 97	9 52	7 34	} 1 66
67	2nd „ „	22 78	21 35	25 05	7 09	19 13	13 02	
68	3rd or intermediate class, „	15 74	14 40	0 08	..	} 44 39	17 86	..
69	4th or lowest class, „	40 46	83 99	34 26	55 64		64 66	31 92
70	Other vehicles, „	19 81	152 75	28 88	26 32	56 94	28 05	14 24
WEIGHT OF TRAIN AND TON-MILEAGE—								
Gross ton-mileage of all coaching trains—								
71	Freight, <i>Ton-miles.</i>	23,853,317	13,657,016	9,631,924	7,121,800	7,911,437	2,825,663	} 4,886,701
72	Dead weight, „	263,234,015	170,391,998	129,134,658	75,032,647	69,358,107	29,353,028		55,121,853
73	Total,	287,087,332	184,049,014	138,766,582	82,154,447	77,269,544	32,178,691	60,008,554
Average weight of a coaching train—								
74	Freight, <i>Tons.</i>	18 66	12 38	15 09	15 16	21 71	13 54	} 21 63
75	Dead-weight, „	205 89	154 49	202 30	159 74	190 31	192 61		244 01
76	Total,	224 55	166 87	217 39	174 90	212 02	211 15	265 64

STATISTICS OF INDIAN RAILWAYS.

GAUGE.					NARROW GAUGE.									
Indus Valley.	Punjab Northern.	Dhond and Mamnad	Fatma and Gya.	Nizam's.	South Indian.	Rajputana.	Holkar and Sindia-Neemuch.	Nagpur and Chhat-tisgath.	Rangoon and Irra-waddy Valley.	Northern Bengal.	Turhook.	Cawnpore and Fa-rukhabad.	Dhavanagar-Gondal	Progressive number.
470,923	225,705		44,157	118,845	374,319	869,224	228,095	41,303	133,525	189,552	71,200	18,648	43,321	42
463,507	165,203		43,491	135,890	388,498	754,183	194,427	42,042	281,018	158,553	58,320	64,757	130,738	43
..	2,191,889		..	..	..	..	286,384	..	..	216,659	..	..	951,613	44
3,770,397	..		434,319	546,828	3,668,698	5,429,268	1,641,170	190,661	1,734,327	875,124	373,357	642,982	..	45
781,830	266,478		41,513	150,613	459,265	915,804	170,208	1,958	235,524	184,032	98,127	53,664	..	46
273,546	736,512		10,517	183,621	..	941,317	375,500	60,225	180,537	151,208	29,784	24,402	113,892	47
5,765,203	3,585,787		573,997	1,135,797	4,890,780	8,909,796	2,895,784	336,189	2,565,431	1,775,128	631,288	804,453	1,244,564	48
2 02	0 87		1-62	2 07	1-61	1 69	1-65	2-74	1 17	2-05	2 29	0 41	0 99	49
1 98	0 64		1-59	2 37	1-67	1-46	1-40	2 79	2-47	1-71	1-88	1-42	2 71	50
..	8 46		..	..	..	..	2 07	..	..	2 34	..	..	19 68	51
16-15	..		15-90	9-55	15-77	10-54	11-85	12-64	15-25	9 46	12-03	14 09	..	52
2-35	1-03		1 52	2-63	1-97	1 78	1 23	0-13	2-07	1 99	3-16	1 18	..	53
1-19	2 84		0-3	3-21	..	1-82	2-71	3-99	1 59	1-64	0 96	0 53	2-35	54
24 69	13 84		21-01	19 83	21-02	17-29	20 91	22 29	22 55	19 19	20-32	17 63	25 73	55
8 63	13 40		12-60	16-00	13-28	7-52	6-02	5-65	8 65	21 35	15-26	1-82	9-13	56
14-71	36-90		11-28	18-38	14-14	10-51	10-90	13-59	8-46	17 37	12-40	4 57	10-73	57
..	51 06		..	..	..	..	11 34	..	..	15 97	..	..	31 65	58
29 98	..		64 90	38 40	51-11	30 69	34-42	37-07	47-08	40-50	52 89	20-63	..	59
60-58	53-29		19-74	32 69	18-39	22 28	44 52	208 07	14 32	30-02	21-16	14 37	..	60
4,697,655	2,178,821		540,030	1,650,048	6,416,904	8,605,317	2,194,838	334,972	1,371,072	1,069,443	567,348	149,134	579,352	61
4,597,864	2,371,141		532,044	3,261,360	11,816,652	11,448,498	3,205,206	586,314	6,014,572	1,115,009	927,884	1,036,096	3,137,712	62
..	94,404,702		..	..	..	..	9,164,288	..	..	4,333,180	..	..	38,064,520	63
166,392,842	..		16,644,263	26,247,744	133,504,425	169,447,454	52,517,440	6,646,442	64,012,819	28,868,896	14,317,719	20,575,424	..	64
4,140,001	1,756,682		151,669	547,634	1,290,128	3,324,308	378,858	5,290	912,570	355,182	225,394	108,978	..	65
8-76	14 84		5-76	6 64	4 23	6-75	5-64	4 42	6-00	21 63	11 93	1 71	6-13	66
43-39	30-39		10-29	14-11	7-83	10-97	15-50	16-50	8 21	32 34	8 13	5-24	5 48	67
..	54-66		..	..	..	..	11 46	..	..	17-74	..	..	39 56	68
30 32	..		56 45	38-44	54-44	49-51	53-73	54-32	42 86	49-16	57 31	32 23	..	69
35 11	16 00		9 25	20 03	14 75	14 98	48-93	109-81	8 22	29-17	12-11	15 25	..	70
4,680,852	3,467,024		585,295	762,885	4,816,080	5,690,361	1,995,023	231,660	1,769,029	1,053,201	532,462	419,135	969,762	71
60,689,546	41,873,630		5,757,531	11,525,266	30,687,136	57,582,039	15,552,500	1,733,790	14,992,714	11,373,931	3,776,267	4,518,709	6,924,885	72
65,370,398	45,340,654		6,342,826	12,288,151	35,503,216	63,272,400	17,547,523	1,965,460	16,761,743	12,427,132	4,308,729	4,937,894	7,894,647	73
20-05	13 39		21 42	13 32	20-70	11 05	14 41	15 36	15 54	11 89	17 14	9-19	20-06	74
259 92	161 66		210 77	201-23	131-93	111-77	112 32	114 97	131-76	122 99	121-53	99 03	143 17	75
279 97	175-05		232-19	214 55	152 63	122-82	126 73	130-33	147 30	134-38	138-67	103 22	163-23	76

Progressive number.	HEADINGS.	BROAD						
		East Indian.	Great Indian Peninsula.	Sind, Punjab and Delhi.	Madras.	Bombay, Baroda and Central India.	Eastern Bengal	Ordn and Kohli-Khand.
No. V—concl'd.								
COACHING TRAFFIC—concl'd.								
COST OF WORKING AND PROFIT—								
77	Average cost of hauling a coaching train one mile, <i>Rs.</i>	1-04	1-27	1 65	1-71	1-34	2 14	1-75
78	Average cost of hauling a coaching vehicle with its load one mile, <i>Pies.</i>	10-46	18-12	19 54	25 10	15-99	25 48	14-97
Average cost of hauling a coaching unit one mile—								
79	Per passenger-unit, "	0-70	1 14	1-28	1 37	0-79	1 27	0-94
80	Other traffic per ton, "	7-12	28 01	22-29	16 34	6-74	38 76	16-61
81	Average profit on working a coaching train one mile, <i>Rs.</i>	3-75	1-97	1 58	1 22	3-48	3 08	3 05
Average profit on working a coaching vehicle one mile—								
82	1st class, <i>Pies.</i>	8-61	3-46	-3 21	-3 14	2 25	-9-89	}
83	2nd " "	14-72	23 69	6-74	-9 21	16 95	-4 39	
84	3rd or Intermediate class, "	20 05	3 76	..	..	22-29	..	}
85	4th or Lowest " "	59-42	86-09	25 63	29-05	49 66	83 98	
86	Other vehicles, "	37-76	37-65	11-61	32-69	56-21	13 63	31-64
Average profit on working a coaching unit one mile—								
87	Per passenger-unit, "	2 55	2 07	1 30	0 90	1-97	1 95	1-65
88	Other traffic per ton, "	24-07	18 19	13-05	20 20	22 81	30 58	22-26
No. VI.								
GOODS TRAFFIC.								
GROSS RECEIPTS AND TRAIN-MILEAGE—								
89	Receipts from goods traffic, <i>Rs.</i>	1,60,00,532	14,177,688	30,17,031	1,753,971	4,094,343	920,818	13,45,438
90	Goods train-miles run, <i>No.</i>	2,812,977	3,106,881	802,721	455,548	550,535	157,769	471,048
91	Average goods receipts per train-mile, <i>Rs.</i>	5 69	4 56	3-76	3-85	7-44	5 83	2 86
UNITS AND UNIT-MILEAGE—								
92	Tons of goods carried one mile, <i>Ton-miles.</i>	454,818,125	286,239,632	75,262,027	35,053,253	78,697,365	19,446,738	47,419,976
93	Average sum received for carrying a ton one mile, <i>Pies.</i>	6-75	9-51	7-70	9-61	9 99	9 09	5-44
94	Average number of tons in a train, <i>Tons.</i>	161 69	92 13	93 76	76 96	142 95	123 26	100-66
VEHICLES AND VEHICLE-MILEAGE.—								
Number of goods vehicles hauled one mile—								
95	Loaded, <i>Vehicle-miles.</i>	57,904,321	45,052,513	15,098,322	7,723,571	16,285,481	3,175,094	8,043,667
96	Empty, "	22,188,139	21,776,596	9,046,545	1,627,221	4,913,159	691,609	4,264,944
97	Brake-vans, "	3,038,390	5,733,054	756,325	1,259,621	474,565	91,047	567,344
98	Total, "	83,130,850	72,562,163	24,901,192	10,615,413	21,673,205	3,957,750	12,875,955
Average number of vehicles on a goods train—								
99	Freight vehicles, <i>No.</i>	28 47	21-51	30-08	20 54	38-51	24-51	26 13
100	Brake-vans, "	1-08	1 85	0 94	2 76	0 86	0 57	1 20
101	Total, "	29-55	23-36	31 02	23 30	39 37	25 08	27-33
102	Average earnings per goods vehicle per mile (excluding brakes), <i>Pies.</i>	38 36	40 73	23 99	35 99	37-08	45-72	20 98
103	Carrying capacity hauled one mile (excluding brakes), <i>Tons.</i>	754,764,565	564,533,628	192,620,780	76,708,508	172,641,817	37,359,452	122,241,688
104	Percentage of freight upon capacity hauled, <i>Per cent.</i>	60-26	50-70	39 07	45-70	45-58	52 05	38 79
105	Average load of a goods vehicle, including both loaded and empty, <i>Tons.</i>	5 68	4 28	3 12	3-75	3 71	5-03	3 85
106	Average load of a loaded goods vehicle, "	7-85	6 35	4 98	4-54	4 83	6-12	5-89

STATISTICS OF INDIAN RAILWAYS.

GAUGE.					NARROW GAUGE.										Progressive number.
Indus Valley.	Punjab Northern.	Dhond and Mandmad.	Patus and Gya.	Nizam's.	South Indian.	Rajputana.	Holkar and Sindia-Nemuch.	Nagpur and Chhat-tisgarh.	Rangoon and Irrawaddy Valley.	Northern Bengal.	Tubhoor.	Cawnpore and Farrukhabad.	Bhavnagar-Gondal.		
2-68	2-40	Worked by the G. I. P. Railway.	2-95	1-75	2-01	1-25	2-04	1-93	1-65	1-49	1-78	1-11	2-16	77	
21-93	41-86		27-41	20-22	18-38	15-52	21-48	20-29	15-08	16-26	17-65	12-50	17-77	78	
1-95	2-14		1-52	1-55	1-07	1-28	1-70	1-49	1-17	1-54	1-09	1-36	1-20	79	
11-84	24-08		71-01	24-83	42-02	27-78	13-40	11-47	44-08	24-06	55-10	37-27	37-49	80	
1-14	0-36		2-78	1-01	2-66	0-79	0-62	0-93	2-40	1-40	2-19	0-53	1-56	81	
-13-90	-23-46		-14-75	-4-22	-5-11	-8-00	-15-46	-14-64	6-43	5-09	-2-39	-10-68	-8-64	82	
-7-22	-4-96		-16-13	-1-84	-4-25	-5-01	-10-58	-6-70	6-62	1-11	-5-25	-7-93	-6-99	83	
8-05	9-20		..	..	..	..	..	..	..	..	..	..	..	84
38-65	16-43		37-41	18-18	32-72	15-17	12-94	16-78	32-00	24-24	35-24	8-13	..	85	
0-39	0-18		-7-67	12-47	..	6-76	23-04	18-78	0-76	13-76	3-51	1-87	..	86	
20-75	31-26	1-56	0-84	1-51	0-83	0-41	0-62	1-87	1-40	1-50	0-67	0-89	87		
		-12-57	20-05	2-32	13-18	22-47	58-66	0-88	29-27	20-98	9-11	15-86	88		
1,720,310	1,156,778	Worked by the G. I. P. Railway.	86,490	230,977	778,648	2,624,047	622,814	109,352	499,175	428,475	135,267	38,434	229,836	89	
679,098	374,381		29,945	70,784	402,688	906,200	188,340	30,932	157,705	150,858	51,144	19,041	122,030	90	
2-53	3-09		2-89	3-26	1-93	2-90	3-31	3-54	3-17	2-84	2-64	2-02	1-88	91	
38,693,171	16,169,834	Worked by the G. I. P. Railway.	1,745,956	4,139,794	20,984,226	55,031,103	8,474,735	1,627,507	10,253,833	7,700,602	2,185,801	670,401	2,263,628	92	
8-54	13-73		9-51	10-71	7-12	9-16	14-11	12-90	9-35	10-68	11-88	11-01	19-49	93	
58-98	43-00		58-31	58-48	52-11	60-72	45-00	52-61	65-02	51-05	42-74	35-21	18-54	94	
7,108,888	3,858,172	Worked by the G. I. P. Railway.	351,254	708,057	5,514,305	12,966,133	2,701,370	513,735	2,068,579	2,454,424	653,319	242,179	1,197,729	95	
6,079,016	2,263,056		170,780	474,851	2,077,672	4,975,753	824,260	217,380	1,359,906	726,067	245,165	70,780	586,179	96	
780,904	238,532		16,823	68,826	206,784	744,978	277,292	34,731	119,959	222,027	19,761	30,811	53,453	97	
13,968,308	6,359,760	Worked by the G. I. P. Railway.	538,857	1,251,734	7,798,761	18,686,864	3,802,922	765,846	3,548,444	3,402,518	918,245	343,770	1,837,861	98	
19-42	16-35		17-43	16-71	18-85	19-80	18-72	23-64	21-74	21-08	17-57	16-44	22-98	99	
1-15	0-63		0-56	0-97	0-51	0-82	1-47	1-12	0-76	1-47	0-39	1-61	0-68	100	
20-57	16-93		17-99	17-68	19-36	20-62	20-19	24-76	22-50	22-55	17-96	18-05	23-66	101	
25-05	36-28		31-81	37-48	19-69	28-08	33-92	28-72	27-95	25-87	28-91	23-58	24-96	102	
111,467,041	51,588,925		3,148,091	9,729,015	44,257,461	87,243,663	16,821,830	3,655,575	17,142,425	14,705,955	4,389,553	1,564,795	8,419,540	103	
84-71	31-34		55-46	42-55	47-41	63-08	50-38	44-52	59-82	52-36	49-80	42-84	26-89	104	
2-93	2-62		3-34	3-50	2-76	3-07	2-40	2-22	2-99	2-42	2-43	2-14	1-27	105	
5-44	4-19		4-97	5-85	3-80	4-24	3-14	3-17	4-96	3-14	3-35	2-77	1-89	106	

Progressive number.	HEADINGS.	BROAD						
		East Indian.	Great Indian Peninsula.	Sind, Punjab and Delhi.	Madras.	Bombay, Baroda and Central India.	Eastern Bengal.	Oudh and Rohilkhand.
No. VI—contd.								
GOODS TRAFFIC—contd.								
WEIGHT OF TRAIN AND TON-MILEAGE—								
Gross ton-mileage of all goods trains—								
107	Freight, Tons.	454,818,125	286,239,632	75,262,027	35,058,253	78,697,365	19,446,738	47,419,976
108	Dead-weight, "	612,483,386	552,271,371	195,108,634	91,815,190	149,470,066	32,670,218	94,205,823
109	Total, "	1,067,301,461	838,511,003	270,370,661	126,873,443	228,167,431	52,116,956	141,625,799
Average weight of a goods train—								
110	Freight, "	161.69	92.13	93.76	76.96	142.95	123.26	100.67
111	Dead-weight, "	217.73	177.76	243.06	201.55	271.50	207.07	199.99
112	Total, "	379.42	269.89	336.82	278.51	414.45	320.33	300.66
COST OF WORKING AND PROFIT—								
113	Average cost of hauling a goods train one mile, Rs.	1.76	2.06	2.57	2.72	2.62	3.35	1.98
114	Average cost of hauling a goods vehicle with its load one mile, Pies.	11.90	18.36	16.39	25.41	13.08	28.29	14.61
115	Average cost of hauling a goods unit (viz., one ton) one mile, "	2.09	4.29	5.26	6.78	3.52	5.23	3.79
116	Average profit on working a goods train one mile, Rs.	3.93	2.50	1.19	1.13	4.82	2.48	0.88
117	Average profit on working a goods vehicle with its load one mile, Pies.	26.46	22.37	7.60	10.58	24.00	19.43	6.37
118	Average profit on working a goods unit (viz., one ton) one mile, "	4.66	5.22	2.44	2.83	6.47	3.86	1.65
No. VII.								
DETAILED PERCENTAGES OF EARNINGS AND EXPENDITURE.								
Percentage to Total Earnings—								
119	Coaching Traffic, Per cent.	26.85	19.84	37.36	42.63	29.28	41.59	42.28
120	Goods Traffic, "	70.15	78.80	54.70	54.34	68.21	48.13	52.45
121	Sundries including Telegraph, "	2.92	1.36	5.89	3.03	2.51	1.37	5.27
122	Steam-boat Earnings, "	0.08	..	2.05	..	..	8.91	..
	Total, "	100	100	100	100	100	100	100
Percentage of Working Expenses upon Total Earnings.								
23	Maintenance, Per cent.	8.81	9.30	13.77	18.89	7.10	9.03	12.74
24	Locomotive Expenses, "	7.31	17.40	22.29	20.74	12.96	11.30	19.20
25	Carriage and Wagon Expenses, "	3.17	6.85	5.38	7.75	3.42	4.53	4.73
26	Traffic Expenses, "	5.73	6.20	9.66	10.01	5.64	12.65	10.47
27	General Charges, "	3.77	3.02	6.16	7.01	3.89	7.92	7.49
28	Miscellaneous Expenses, "	0.73	1.87	3.58	1.08	1.05	0.58	0.71
29	Steam-boat Expenses, "	0.07	..	4.62	..	-0.07	7.38	..
30	Total Working Expenses, "	29.59	44.64	65.46	65.46	33.99	53.39	55.34

STATISTICS OF INDIAN RAILWAYS.

clxvii

GAUGE.			NARROW GAUGE.											Progressive number.
Indus Valley.	Punjab Northern.	Dhond and Mand.	Patna and Gya.	Nizam's.	South Indian.	Rajputana.	Holkar and Sindia-Neemuch.	Nagpur and Chhat-tasgarh.	Rangoon and Irrawaddy Valley.	Northern Bengal.	Turhoot.	Cawnpore and Fe-rukhabad.	Bhavnagar-Gondal.	
38,693,171	16,169,834	Worked by the G. I. P. Ry.	1,745,956	4,139,794	20,984,226	55,031,103	8,474,785	1,627,507	10,253,833	7,700,602	2,185,801	670,401	2,263,623	107
119,797,699	57,664,964		4,723,673	10,631,412	37,307,014	81,616,658	18,071,063	3,163,717	15,875,110	15,760,505	3,890,761	1,541,718	9,119,472	108
153,490,870	73,834,798		6,469,629	14,771,206	53,791,240	136,647,761	26,545,848	4,796,224	26,128,943	23,461,107	6,076,562	2,212,119	11,383,095	109
56-97	43 19	Worked by the G. I. P. Ry.	53 31	58 48	52 11	60 73	45-00	52 62	65 02	51-05	42 74	35 21	18 54	110
176 41	154-03		157-74	150 20	93 89	90 06	95-95	102 44	100 66	104 47	76 07	80 96	74 73	111
233 38	197 22		216 05	208 68	146 00	150-79	140 95	155 06	165 68	155-52	118 81	116 17	93 27	112
2-24	2-70	Worked by the G. I. P. Railway.	2 74	1 70	1 92	1-54	2 27	2 30	1-35	1 72	1 52	1 19	1 24	113
22 12	31-73		30 18	19-57	19 61	14-89	23 23	18 69	16-35	15 67	16 67	13 95	16 24	114
7-54	12 01		9 02	5 59	7-09	4 85	9 67	8 40	5-47	6 47	6 85	6 51	12 80	115
0 29	0-39		0 15	1-56	..	1-36	1-04	1 24	1-32	1 12	1-12	0 83	0 64	116
2-93	4 55		1-63	17 91	0 07	13-19	10 69	10 03	11-60	10 20	12 24	9 63	8-72	117
1 00	1 72		0 49	5-12	0 02	4 31	4 44	4 50	3 88	4 21	5-03	4-50	6-69	118
31-17	37 16	Worked by the C. I. P. Railway	63 52	39-66	56 89	28 22	37 15	27 91	47 58	32 63	39-44	65 48	43 43	119
60 11	59 95		35 09	57-99	40 74	70-55	62 74	70 77	51 49	52 36	43 28	33 64	55-47	120
6-06	2 89		1 39	2-35	0-57	1-23	0-11	1-32	00 93	4 54	1-54	0 88	1 01	121
2-66	..		..	..	1-80	..	..	..	..	10 47	15-75	..	..	122
100	100	..	100	100	100	100	100	100	100	100	100	100	100	
16-58	12-56	Worked by the G. I. P. Railway.	8 30	9-29	20 07	10 93	22 73	7-44	12 08	13-17	9 39	10-16	11-08	123
31 06	42-96		18-16	19 17	23 48	28-44	26 08	22 78	16 12	15 67	12 35	22-53	22 93	124
4-78	4-10		5 44	4 44	6 05	3-21	4-98	5-76	2 27	2 32	2 21	2-18	2 46	125
12-58	10-93		7-99	12 13	8 94	7 11	10 45	15-69	12-86	8 82	10 20	12-55	11-84	126
7-57	5 52		9 35	8 15	8-68	5-54	7 07	13 68	6 45	9-90	9 63	17-81	13-45	127
8-49	11 43		18 09	4-62	0 23	0-74	0-19	0 08	0-53	1 27	0 42	..	1-00	128
1 83	..		..	..	..	..	..	..	..	6 07	9-23	..	..	129
82 89	87 50		67-33	57 80	67 45	55-97	71 50	65 43	50 86	57 22	53-43	65 23	62 76	130

Table A—Maintenance of Way,

Progressive number.	HEADINGS.	BROAD						
		East Indian.	Great Indian Penin- sula.	Sind, Punjab and Delhi.	Madras.	Bombay, Baroda and Central India.	Eastern Bengal.	Ondh and Khond.
PER MILE OF LINE MAINTAINED.								
131a	General Superintendence (including office expenses), Rs.	214.63	130.65	179.88	159.44	180.73	214.94	196.06
132a	Maintenance and Renewal of Permanent-way, "	1,156.17	665.63	339.22	399.70	525.28	713.76	191.06
133a	Repairs of Bridges, &c., "	54.02	165.89	141.74	50.31	72.71	98.04	87.90
134a	Conservancy of Rivers, .. .. . "	..	..	153.56	..	..	..	..
135a	Repairs of Stations and Buildings, "	103.26	85.09	132.87	45.81	84.22	117.52	30.30
136a	Other Charges (net), "	-191.49	109.58	200.84	55.26	96.83	-139.40	92.44
137a	Total Maintenance, &c., "	1,336.59	1,156.84	1,148.11	710.52	959.77	1,004.86	597.82
PER MILE OF TRACK, INCLUDING SIDINGS.								
131b	General Superintendence (including office expenses), Rs.	143.87	94.87	150.17	137.35	146.70	171.16	171.02
132b	Maintenance and Renewal of Permanent-way, "	775.03	483.30	283.20	344.32	426.37	568.36	166.65
133b	Repairs of Bridges, &c., "	36.22	118.45	118.34	43.34	59.02	78.06	76.67
134b	Conservancy of Rivers, .. .. . "	..	..	128.20	..	..	..	..
135b	Repairs of Stations and Buildings, "	69.23	61.78	110.94	39.47	68.36	93.58	26.49
136b	Other Charges (net), "	-123.37	79.57	167.67	47.60	78.60	-111.01	80.63
137b	Total Maintenance, &c., "	895.98	837.97	958.52	612.08	779.05	800.15	521.46
PER TOTAL TRAIN-MILE.								
131c	General Superintendence (including office expenses), Annas.	1.26	0.72	1.32	2.29	1.40	1.87	2.46
132c	Maintenance and Renewal of Permanent-way, "	6.80	3.66	2.50	5.73	4.08	6.24	2.39
133c	Repairs of Bridges, &c., "	0.32	0.92	1.04	0.72	0.56	0.85	1.11
134c	Conservancy of Rivers, .. .. . "	..	..	1.13	..	..	..	..
135c	Repairs of Stations and Buildings, "	0.61	0.47	0.98	0.66	0.66	1.02	0.38
136c	Other Charges (net), "	-1.13	0.59	1.48	0.79	0.75	-1.21	1.17
137c	Total Maintenance, &c., "	7.86	6.36	8.45	10.19	7.45	8.77	7.51
PER 1,000 GROSS TON-MILES.								
131d	General Superintendence (including office expenses), Rs.	0.24	0.19	0.29	0.65	0.26	0.44	0.53
132d	Maintenance and Renewal of Permanent-way, "	1.29	0.94	0.55	1.64	0.76	1.46	0.52
133d	Repairs of Bridges, &c., "	0.06	0.23	0.23	0.21	0.11	0.20	0.23
134d	Conservancy of Rivers, .. .. . "	..	..	0.25	..	..	..	..
135d	Repairs of Stations and Buildings, "	0.11	0.12	0.22	0.19	0.12	0.24	0.09
136d	Other Charges (net), "	-0.22	0.15	0.32	0.23	0.14	-0.29	0.25
137d	Total Maintenance, &c., "	1.43	1.63	1.86	2.92	1.39	2.05	1.62

STATISTICS OF INDIAN RAILWAYS.

EXPENSES.

Works and Stations.

GAUGE.					NARROW GAUGE.										Progressive number.
Indus Valley.	Punjab Northern.	Dhond and Mand.	Patna and Gya.	Nizam's.	South Indian.	Rajputana.	Holkar and Sindia-Neemuch.	Nagpur and Chhat-tisgarh.	Bangoon and Irrawaddy Valley.	Northern Bengal.	Tirhoot.	Cawnpore and Fa-rukhabad.	Bhavnagar-Gondal.		
198.61	191.11	Worked by the G. I. P. Railway.	135.72	74.08	124.68	116.05	72.90	44.13	112.162	110.26	76.77	63.04	51.16	131a	
370.05	314.70		159.94	209.65	277.60	402.87	622.16	112.66	394.677	237.80	145.43	63.14	133.73	132a	
35.94	66.71		24.37	6.39	95.55	15.36	17.79	1.13	125.100	18.61	19.27	0.64	..	133a	
..	90.93		..	..	..	1.38	..	..	2.45	..	..	..	..	134a
61.71	42.85		18.87	10.97	26.67	43.23	27.05	0.98	41.48	75.11	43.34	3.47	0.38	135a	
60.46	42.18		18.51	14.87	93.47	40.60	77.13	58.02	51.33	25.41	73.10	4.65	3.24	136a	
726.77	748.48		..	357.51	315.96	617.97	619.49	817.03	216.92	727.21	467.19	357.91	134.94	238.51	137a
183.43	173.09	Worked by the G. I. P. Railway.	123.37	68.53	113.89	101.71	66.36	40.68	93.70	97.60	66.81	56.63	44.83	131b	
341.77	285.03		145.41	193.93	253.58	353.11	566.38	103.85	329.71	210.49	126.56	56.71	160.94	132b	
33.19	60.42		22.16	5.92	87.28	13.47	16.19	1.04	104.50	16.48	16.76	0.57	..	133b	
..	82.35		..	..	..	1.21	..	..	2.05	..	..	..	..	134b
56.99	38.81		17.24	10.15	24.36	37.89	24.63	0.90	34.65	66.49	37.72	3.11	0.34	135b	
55.84	38.20		16.83	13.77	85.38	35.53	70.21	53.48	42.88	22.49	63.61	4.18	2.85	136b	
671.22	677.90		..	325.01	292.30	564.49	542.97	743.77	199.95	607.51	413.55	311.46	121.20	208.96	137b
2.27	1.53	Worked by the G. I. P. Railway.	2.17	1.08	1.95	0.86	0.99	0.73	1.06	1.67	1.23	1.34	0.91	131c	
4.24	2.51		2.55	3.07	4.34	2.98	8.41	1.87	3.74	3.61	2.32	1.34	3.29	132c	
0.41	0.53		0.99	0.09	1.50	0.11	0.24	0.02	1.18	0.28	0.31	0.02	..	133c	
..	0.73		..	..	..	0.01	..	..	0.02	..	..	..	..	134c
0.71	0.34		0.30	0.16	0.42	0.32	0.37	0.02	0.39	1.14	0.69	0.07	0.01	135c	
0.69	0.34		0.30	0.21	1.45	0.30	1.04	0.96	0.48	0.39	1.16	0.10	0.06	136c	
8.32	5.98		..	5.71	4.61	9.66	4.58	11.05	3.60	6.90	7.09	5.71	2.87	4.27	137c
0.58	0.52	Worked by the G. I. P. Railway.	0.61	0.32	0.82	0.38	0.46	0.34	0.42	0.71	0.61	0.76	0.51	131d	
1.08	0.85		0.71	0.91	1.83	1.32	3.89	0.89	1.48	1.53	0.15	0.76	1.83	132d	
0.10	0.18		0.11	0.03	0.62	0.05	0.11	0.01	0.47	0.12	0.15	0.01	..	133d	
..	0.25		..	..	..	0.01	..	..	0.01	..	..	..	..	134d
0.18	0.12		0.09	0.05	0.17	0.14	0.17	0.01	0.15	0.48	0.34	0.04	..	135d	
0.18	0.11		0.08	0.07	0.61	0.13	0.49	0.45	0.19	0.16	0.58	0.05	0.04	136d	
2.12	2.03		..	1.60	1.38	4.05	2.03	5.12	1.70	2.72	3.00	2.83	1.62	2.38	137d

Table B—Locomotive

Progressive number.	HEADINGS.	BROAD						
		East Indian.	Great Indian Peninsular.	Sind, Punjab and Delhi.	Madras.	Bombay, Baroda and Central India	Eastern Bengal.	Oudh and Rohilkhand.
†	Average price of fuel per ton in terms of { coal, .. Rs. .. wood, .. "	4 47	15 28	21 55	..	17 60	9 49	15 50
		..	..	..	5 24	..	..	..
	PER TOTAL TRAIN-MILE.							
138a	General Superintendence (including office expenses), Annas.	1 01	0 64	0 86	0 90	0 85	1 51	1 24
139a	Running Expenses, "	2 09	2 79	2 40	2 28	2 69	3 07	1 55
140a	Fuel, † "	0 61	4 56	6 01	3 58	5 96	3 28	5 13
141a	Water, "	0 12	0 26	0 15	0 18	0 40	0 30	0 15
142a	Oil, tallow, and other stores, "	0 34	0 36	0 39	0 22	0 25	0 43	0 39
143a	Maintenance and Renewal of Locomotives and Machinery, "	1 39	2 11	2 20	3 45	1 69	1 94	1 70
144a	Other Charges (net), "	0 96	1 19	1 68	0 58	0 94	0 44	1 20
145a	Total Locomotive Expenses, "	6 52	11 91	13 69	11 19	(a) 13 60	10 97	11 36
†	Fuel consumed in terms of { coal, .. lbs. .. wood, .. "	50 58	41 36	39 04	..	47 41	48 73	46 85
		..	..	..	95 50	..	..	..
	PER ENGINE MILE.							
138b	General Superintendence (including office expenses), Annas.	0 89	0 59	0 75	0 78	0 76	1 22	1 07
139b	Running Expenses, "	1 84	2 58	2 10	1 98	2 39	2 49	1 34
140b	Fuel, † "	0 54	4 21	5 27	3 09	5 31	2 66	4 43
141b	Water, "	0 10	0 23	0 13	0 15	0 36	0 24	0 12
142b	Oil, tallow, and other stores, .. .. . "	..	..	..	..	..	..	..
143b	Maintenance and Renewal of Locomotives and Machinery, "	0 30	0 34	0 35	0 19	0 23	0 35	0 34
144b	Other Charges (net), "	1 23	1 95	1 93	2 99	1 51	1 57	1 46
145b	Total Locomotive Expenses, "	5 75	11 00	12 01	9 69	(b) 12 12	8 89	9 79
†	Fuel consumed in terms of { coal, .. lbs. .. wood, .. "	44 64	38 23	34 26	..	42 26	39 51	39 97
		..	..	..	82 77	..	..	..
	PER 1,000 GROSS TON-MILES.							
138c	General Superintendence (including office expenses), Rs.	0 19	0 16	0 19	0 26	0 16	0 35	0 27
139c	Running Expenses, "	0 39	0 72	0 53	0 65	0 50	0 72	0 33
140c	Fuel, † "	0 12	1 17	1 32	1 02	1 12	0 77	1 11
141c	Water, "	0 02	0 07	0 03	0 05	0 07	0 07	0 03
142c	Oil, tallow, and other stores, "	0 07	0 09	0 09	0 06	0 05	0 10	0 09
143c	Maintenance and Renewal of Locomotives and Machinery, "	0 26	0 54	0 48	0 99	0 31	0 45	0 36
144c	Other Charges (net), "	0 18	0 31	0 37	0 17	0 18	0 10	0 26
145c	Total Locomotive Expenses, "	1 23	3 06	3 01	3 20	(c) 2 54	2 56	2 45
†	Fuel consumed in terms of { coal, .. lbs. .. wood, .. "	152 81	170 28	137 25	..	142 01	182 19	160 23
		..	..	..	0 44	..	..	..

(a) Includes 0 82 on account of cost of duplicate parts of
 (b) " 0 73 " " "
 (c) " 0 15 " " "

STATISTICS OF INDIAN RAILWAYS.

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EXPENSES—contd.

Expenses.

GAUGE.					NARROW GAUGE.										Progressive Number.
India Valley.	Punjab Northern.	Dhond and Mandmad.	Patna and Gya.	Nizam's.	South Indian.	Rajputana.	Holkar and Sindia-Necmunch.	Nagpur and Chhat-tisgarh.	Rangoon and Irrawaddy Valley.	Northern Bengal.	Turhook.	Cawnpore and Ferozkhabad.	Bhavnagar-Gondal.		
30.44	31.11		12.58	..	16.75	23.88	..	8.61	17.47	12.31	12.72	15.03	19.75	†	
..	..		..	5.30	..	..	8.54	..	..	..	..	..	..	..
1.12	0.94	Worked by the G. I. P. Railway.	0.97	0.66	0.99	0.72	1.06	1.24	1.01	1.18	0.67	1.41	0.42	138a	
3.13	3.83		2.67	2.14	1.90	2.38	3.24	3.12	2.68	2.13	2.25	0.51	2.16	139a	
6.88	10.55		5.06	4.00	3.48	5.26	4.40	4.05	2.84	3.08	2.79	3.18	5.50	140a	
0.32	0.66		0.20	0.61	0.19	0.22	0.39	0.33	0.14	0.18	0.20	0.15	0.18	141a	
0.30	1.26		0.49	0.42	0.25	0.35	0.47	0.79	0.44	0.46	0.36	0.43	0.40	142a	
2.19	1.96		2.30	0.58	3.53	2.39	2.80	0.85	1.83	0.52	1.16	0.48	0.13	143a	
1.65	1.25		0.31	1.12	0.95	0.59	0.32	0.63	0.25	0.88	0.08	0.21	0.04	144a	
15.59	20.45			12.50	9.53	11.29	12.02	12.68	11.08	9.21	8.43	7.51	6.37	8.83	145a
31.65	47.47			56.27	..	29.07	30.82	..	65.81	22.83	35.09	50.65	29.62	39.10	†
..	96.53	72.21
0.96	0.85	Worked by the G. I. P. Railway.	0.88	0.65	0.79	0.65	0.93	1.16	0.85	1.03	0.58	1.31	0.40	138b	
2.67	3.46		2.43	2.09	1.52	2.14	2.83	2.93	2.26	1.87	1.95	0.48	2.09	139b	
5.88	9.53		4.58	3.90	2.79	4.73	3.85	3.81	2.40	2.71	2.41	2.97	5.34	140b	
0.27	0.60		0.18	0.59	0.16	0.20	0.34	0.36	0.11	0.16	0.18	0.14	0.18	141b	
0.25	1.13		0.44	0.41	0.20	0.32	0.41	0.74	0.37	0.40	0.31	0.40	0.39	142b	
1.87	1.77		2.53	0.57	2.83	2.15	2.45	0.81	1.54	0.46	1.01	0.44	0.13	143b	
1.41	1.13		0.28	1.09	0.75	0.53	0.28	0.59	0.21	0.78	0.07	0.20	0.04	144b	
13.31	18.47			11.32	9.30	9.04	10.82	11.09	10.40	7.78	7.41	6.51	5.94	8.57	145b
27.03	42.88			50.96	..	23.26	27.77	..	61.98	19.29	30.82	26.56	27.62	37.91	†
..	94.16	63.18
0.29	0.32	Worked by the G. I. P. Railway.	0.27	0.20	0.41	0.32	0.49	0.58	0.40	0.50	0.33	0.80	0.23	138c	
0.80	1.31		0.74	0.63	0.80	1.06	1.50	1.46	1.06	0.90	1.11	0.29	1.21	139c	
1.75	3.59		1.41	1.18	1.46	2.34	2.04	1.91	1.12	1.31	1.38	1.80	3.07	140c	
0.08	0.22		0.06	0.18	0.08	0.10	0.18	0.18	0.05	0.08	0.10	0.08	0.10	141c	
0.07	0.43		0.14	0.13	0.10	0.15	0.22	0.37	0.17	0.19	0.18	0.24	0.22	142c	
0.56	0.66		0.78	0.17	1.48	1.06	1.29	0.40	0.72	0.22	0.58	0.27	0.08	143c	
0.42	0.43		0.09	0.33	0.39	0.26	0.15	0.30	0.10	0.37	0.04	0.12	0.02	144c	
3.97	6.96			3.49	2.82	4.72	5.34	5.87	5.20	3.64	3.57	3.72	3.60	4.93	145c
129.02	258.39			251.49	..	195.86	219.14	..	496.65	144.08	237.95	242.62	267.93	349.27	†
..	456.83	535.17

Locomotive Engines used in previous half-years but not charged.

..

Progressive number.	HEADINGS.	BROAD						
		East Indian.	Great Indian Pen- insula.	Sind, Punjab and Delhi.	Madras.	Bombay, Beroda and Central India.	Eastern Bengal.	Oudh and Rohil- khand.
	PER TOTAL TRAIN-MILE,							
146a	General Superintendence (including office expenses), <i>Annas.</i>	0.26	0.17	0.24	0.33	0.23	0.67	0.24
147a	Repairs and Renewals of Coaching Vehicles, "	0.92	1.16	1.89	1.42	0.58	1.59	1.09
148a	" " of Goods Vehicles, "	1.44	2.64	2.35	1.79	2.49	1.68	0.98
149a	Cleaning and Oiling, "	0.16	0.33	0.47	0.45	0.29	0.36	0.44
150a	Other Charges (net), "	0.04	0.38	0.44	0.19	0.19	0.10	0.08
151a	Total Carriage and Wagon Expenses, "	2.82	4.68	5.39	4.18	(a) 8.58	4.40	2.78
	PER 1,000 VEHICLE MILES RUN BY HOME VEHICLES.							
146b	General Superintendence (including office expenses), <i>Rs.</i>	0.59	0.53	0.68	1.16	0.44	1.94	0.48
147b	Repairs and Renewals of Coaching Vehicles (c), "	9.45	17.77	6.90	10.71	5.24	11.22	8.78
148b	Repairs and Renewals of Goods Vehicles (c), "	4.18	9.53	5.67	11.65	6.17	8.87	2.62
149b	Cleaning and Oiling, "	0.38	0.98	1.35	1.55	0.56	1.06	0.87
150b	Other Charges (net), "	0.08	1.10	1.24	0.68	0.88	0.80	0.06
151b	Total Carriage and Wagon Expenses, "	6.38	13.73	9.36	14.62	(b) 12.89	12.86	5.58

(a) Exclusive of 0.20 being the amount transferred to Wagon Renewal Reserve

(b) 0.40

(c) These two items are calculated respectively upon the "coaching" and goods

STATISTICS OF INDIAN RAILWAYS.

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EXPENSES—contd.

and Wagon Expenses.

GAUGE.					NARROW GAUGE.									Progressive number.
Indus Valley.	Punjab Northern.	Dhond and Mandmad.	Panna and Gya.	Nizam's.	South Indian.	Rajputana.	Holkar and Sindhanemuch.	Nagpur and Chhat-tisgarh.	Rangoon and Irrawaddy Valley.	Northern Bengal.	Tirhoot.	Cawnpore and Farrukhabad.	Bhavnagar-Gondal.	
0.19	0.09	Worked by the G. I. P. Railway.	0.32	0.19	0.17	0.16	0.22	0.83	0.16	0.50	0.22	0.15	0.15	146a
0.50	0.45		1.72	0.98	0.84	0.66	0.43	0.14	0.32	0.30	0.42	0.13	0.05	147a
1.05	1.17		0.67	0.82	1.64	0.35	1.22	1.09	0.41	0.16	0.43	0.09	0.05	148a
0.47	0.23		0.37	0.18	0.17	0.24	0.30	0.72	0.29	0.26	0.27	0.19	0.70	149a
0.19	0.01		0.67	0.04	0.09	-0.06	0.25	..	0.09	0.03	..	0.06	..	150a
2.40	1.95	..	3.75	2.21	2.91	1.43	2.42	2.78	1.29	1.25	1.30	0.62	0.95	151a
0.62	0.48	Worked by the G. I. P. Railway.	1.26	0.81	0.55	0.52	0.66	2.42	0.47	1.48	0.74	0.51	0.55	146b
5.99	5.05		11.76	7.06	6.83	6.60	2.77	1.63	2.03	2.28	3.36	0.67	0.42	147b
4.78	11.22		5.95	8.72	8.29	1.67	6.99	4.20	2.05	0.79	2.42	1.05	0.26	148b
1.54	1.22		1.42	0.77	9.53	0.77	0.93	2.08	0.81	0.75	0.89	0.66	2.45	149b
0.60	0.06		2.59	0.21	0.28	-0.24	0.77	0.01	0.26	0.08	..	0.19	..	150b
7.88	10.15	..	14.50	9.52	16.48	3.59	7.37	8.06	3.59	3.67	4.45	2.16	3.30	151b

Account.

vehicle mileage; all other items in the table being calculated upon the aggregate of both coaching and goods vehicle mileage.

Progressive number.	HEADINGS.	BROAD						
		East Indian	Great Indian Peninsula.	Sind, Punjab and Delhi.	Madras.	Bombay, Baroda and Central India.	Eastern Bengal.	Oradh and Rohilkhand.
PER TOTAL TRAIN-MILE.								
152a	General Superintendence (including office expenses), <i>Annas.</i>	0.63	0.47	0.93	0.97	0.69	1.54	0.81
153a	Station Staff,	2.97	1.79	2.53	2.68	3.37	3.85	3.27
154a	Train Staff,	0.91	1.22	1.04	0.59	0.53	1.09	0.79
155a	Fuel, Lighting, Water and General Stores, ..	0.32	0.39	0.70	0.64	0.84	0.84	0.41
156a	Clothing,	0.06	0.03	0.08	0.04	0.12	0.05	0.09
157a	Printing, Stationery and Tickets,	0.18	0.18	0.47	0.34	0.29	0.36	0.42
158a	Charges for delivery and collection of goods, &c., .. .. .	..	0.01	0.02	..	0.04	..	0.02
159a	Miscellaneous Expenses,	0.08	0.01	0.47	0.06	0.02	0.02	0.02
160a	Payments to other lines, .. .. .	..	0.11	..	..	..	..	0.28
161a	Other charges (net),	-0.04	0.04	0.12	0.08	0.02	0.03	0.05
162a	Total traffic expenses,	5.11	4.25	5.93	5.40	5.92	12.28	6.16
PER CENT. ON TRAFFIC EARNINGS. <i>(Abstracts H. and I. of Revenue Accounts).</i>								
152b	General Superintendence (including office expenses), † <i>Per cent.</i>	0.72	0.70	1.64	1.86	0.68	1.78	1.46
153b	Station Staff,	3.43	2.66	4.50	5.12	3.29	9.58	5.86
154b	Train Staff,	1.05	1.81	1.85	1.13	0.52	1.25	1.43
155b	Fuel, Lighting, Water and General Stores, ..	0.37	0.57	1.23	1.22	0.82	0.97	0.73
156b	Clothing,	0.06	0.04	0.14	0.08	0.12	0.06	0.17
157b	Printing, Stationery and Tickets,	0.21	0.26	0.84	0.66	0.28	0.41	0.75
158b	Charges for delivery and collection of goods, &c., .. .. .	..	0.01	0.03	..	0.04	..	0.03
159b	Miscellaneous Expenses,	0.10	0.01	0.08	0.10	0.02	0.02	0.04
160b	Payments to other lines, .. .. .	..	0.17	..	..	..	..	0.50
161b	Other charges (net),	-0.04	0.06	0.21	0.15	0.02	0.03	0.08
162b	Total traffic expenses,	5.90	6.29	10.52	10.32	5.79	14.10	11.05
†	General Superintendence per cent. on traffic earnings (including steam-boat) .. <i>Per cent.</i>	0.72	0.70	1.61	1.86	0.68	1.62	1.46

STATISTICS OF INDIAN RAILWAYS.

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EXPENSES—contd.

Traffic Expenses.

GAUGE.					NARROW GAUGE.									Progressive number.
Indus Valley.	Punjab Northern.	Dhond and Mandmad.	Patna and Gya.	Nizam's.	South Indian.	Rajputana.	Holkar and Sindia-Neemuch.	Nagpur and Chhat-tisgarh.	Rangoon and Irrawaddy Valley.	Northern Bengal.	Turhoot.	Cawnpore and Ferozkhabad.	Bhavnagar-Gondal.	
0 72	0 82	Worked by the G. I. R. Railway.	1 37	0 96	0 63	0 44	0 72	1 43	0 83	0 80	0 90	1 01	0 61	152a
2 62	1 74		2 29	2 27	2 41	1 30	1 88	2 84	4 18	2 70	3 42	1 63	1 14	153a
0 88	1 31		0 87	0 77	0 41	0 49	0 90	0 86	0 70	0 45	0 86	0 16	0 41	154a
0 87	0 71		0 23	1 07	0 31	0 29	0 49	0 29	0 69	0 52	0 78	0 27	0 35	155a
0 12	0 03		0 05	0 06	0 07	0 04	0 10	0 04	0 05	0 03	0 11	0 04	..	156a
0 80	0 12		0 20	0 31	0 30	0 18	0 51	0 14	0 69	0 14	0 09	0 40	1 45	157a
..	0 01		..	..	..	..	..	..	..	..	..	..	..	158a
0 01	0 01		0 05	0 09	0 02	0 02	0 04	0 04	0 13	0 04	0 04	0 01	0 07	159a
0 28	0 44		0 44	0 46	..	0 21	0 43	1 95	..	..	..	..	0 07	160a
0 01	0 02		..	0 05	0 15	0 01	0 01	0 01	0 03	0 07	..	0 02	0 52	161a
6 31	5 21	..	5 50	6 04	4 30	2 98	5 08	7 60	7 34	4 75	6 20	3 54	4 56	162a
1 58	1 79	Worked by the G. I. R. Railway.	2 02	1 99	1 33	1 05	1 47	2 98	1 46	1 75	1 79	3 59	1 60	152b
5 72	3 77		3 37	4 68	5 12	3 15	3 88	5 94	7 39	5 90	6 79	5 80	2 99	153b
1 94	2 82		1 28	1 58	0 88	1 18	1 85	1 81	1 24	0 98	1 71	0 58	1 07	154b
1 83	1 53		0 34	2 20	0 66	0 71	1 00	0 61	1 23	1 13	1 56	0 98	0 91	155b
0 27	0 07		0 08	0 12	0 14	0 11	0 21	0 08	0 09	0 07	0 22	0 15	..	156b
1 77	0 28		0 29	0 64	0 65	0 43	1 05	0 29	1 23	0 31	0 18	1 41	3 81	157b
..	0 01		..	..	..	..	..	..	..	..	..	0 01	..	158b
0 01	0 01		0 07	0 19	0 05	0 04	0 08	0 09	0 23	0 09	0 08	0 05	0 19	159b
0 62	0 95		0 65	0 94	..	0 50	0 89	4 07	..	..	..	..	1 38	160b
0 04	0 02		..	0 09	0 33	0 03	0 03	0 03	0 06	0 15	..	0 08	0 02	161b
13 78	11 25	..	8 10	12 43	9 16	7 20	10 46	15 90	12 97	10 88	12 33	12 65	11 97	162b
1 54	1 78	..	2 03	1 98	1 32	1 04	1 47	2 98	1 46	1 56	1 50	3 59	1 60	†

Tables E and G.—General Charges

Progressive number.	HEADINGS.	BROAD						
		East Indian.	Great Indian Peninsula.	Sind, Punjab and Delhi.	Madras.	Bombay, Baroda and Central India.	Eastern Bengal.	Ordn and Kohlikhand.
Table E.—General Charges.								
PER TOTAL TRAIN-MILE.								
163a	Home Expenditure (and General Administration), <i>Annas.</i>	0.31	0.18	0.46	0.59	0.55	1.16	0.79
164a	Agent's Office—Salaries and Expenses,	0.28	0.14	0.34	0.36	0.20	1.37	0.47
165a	Audit, Accounts and Pay Offices	0.71	0.48	1.11	1.12	0.92	1.61	0.99
166a	Stores Department Expenses,	0.42	0.14	0.35	0.17	0.72	0.08	0.13
167a	Medical	0.22	0.11	0.14	0.28	0.17	0.42	0.27
168a	Rents and Miscellaneous Expenses,	0.46	0.15	0.28	0.18	0.24	0.91	0.20
169a	Police,	0.28	0.27	0.30	0.30	0.52	0.67	0.32
170a	Advertising,	0.01	0.01	0.03	0.03	0.01	0.15	0.01
171a	Electric Telegraph,	0.75	0.55	0.70	0.63	0.66	1.16	1.08
172a	Other Charges (net),	-0.08	0.04	0.07	0.12	0.09	0.16	0.20
173a	Total General Charges,	3.36	2.07	3.78	3.78	4.08	7.69	4.41
PER CENT. ON TOTAL EARNINGS.								
163b	Home Expenditure, <i>Per cent.</i>	0.34	0.27	0.74	1.09	0.52	1.18	1.33
164b	Agent's Office—Salaries and Expenses,	0.32	0.20	0.56	0.66	0.19	1.41	0.81
165b	Audit, Accounts and Pay Offices	0.80	0.69	1.81	2.07	0.88	1.65	1.68
166b	Stores Department Expenses,	0.47	0.20	0.58	0.32	0.68	0.08	0.22
167b	Medical	0.23	0.16	0.22	0.54	0.16	0.44	0.45
168b	Rents and Miscellaneous Expenses,	0.53	0.23	0.46	0.33	0.23	0.94	0.34
169b	Police,	0.32	0.39	0.49	0.56	0.50	0.69	0.54
170b	Advertising,	0.01	0.01	0.05	0.05	0.01	0.15	0.01
171b	Electric Telegraph,	0.84	0.80	1.13	1.18	0.63	1.20	1.75
172b	Other Charges (net),	-0.09	0.06	0.12	0.21	0.09	0.18	0.25
173b	Total General Charges,	3.77	3.01	6.16	7.01	3.89	7.92	7.48
Table G.—Special and Miscellaneous Expenses.								
PER CENT. ON GROSS EARNINGS.								
174	Law Charges, <i>Per cent.</i>	0.02	-0.03	0.05	0.26	0.01	0.03	0.01
175	Compensation,	0.01	0.03	0.22	0.16	0.08	0.13	..
176	Rates and Taxes,	0.13	0.05	0.05	0.13	0.08	0.33	0.02
177	Payments to other Lines,	0.51	1.81	4.27	0.45	0.64	..	0.61
178	Other Charges (net),	0.06	0.02	0.03	0.04	0.26	0.09	0.07
179	Total Special and Miscellaneous Expenses,	0.73	1.88	4.62	1.04	1.05	0.58	0.71

STATISTICS OF INDIAN RAILWAYS.

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EXPENSES—*concd.*

and Special and Miscellaneous Expenses.

GAUGE.					NARROW GAUGE.									Progressive number.	
Indus Valley.	Punjab Northern.	Dhond and Manmad	Patna and Cya.	Nizam's.	South-Indian.	Rajputana.	Holkar and Sindia-Neemuch.	Nagpur and Chhatnagarh.	Rangoon and Irrawaddy Valley.	Northern Bengal.	Tirhoot.	Cawnpore and Farrukhabad.	Dharwad-Gondal.		
0.09	—0.19	Worked by the G. I. P. Railway.	0.47	..	0.88	0.08	..	0.81	..	0.28	1.11	0.93	0.01	163a	
0.29	0.37		1.42	0.83	0.50	0.22	0.56	1.64	0.78	1.13	0.99	1.35	0.72	164a	
1.13	0.71		1.89	1.24	1.05	0.69	0.83	1.48	1.23	1.77	1.81	1.69	0.90	165a	
0.49	0.18		0.75	0.28	0.27	0.18	0.53	0.22	0.43	0.12	0.36	0.26	0.23	166a	
0.20	0.08		0.08	0.20	0.14	0.14	0.16	..	0.07	0.45	0.21	..	0.21	167a	
0.86	0.69		0.57	0.32	0.27	0.28	0.47	1.14	0.28	0.14	0.51	0.56	0.83	168a	
—0.03	0.05		0.99	169a
0.01	0.04		0.03	0.01	0.02	0.04	0.02	0.01	0.03	0.03	0.02	0.09	170a
0.73	0.62		1.16	0.91	0.67	0.65	0.69	1.56	0.82	1.39	1.25	0.19	1.19	171a	
0.03	0.06		0.10	0.28	0.37	0.07	0.17	0.22	0.02	0.04	0.09	0.08	..	172a	
3.80	2.63	..	6.44	4.06	4.18	2.32	3.43	6.61	3.68	5.33	5.86	5.03	5.17	173a	
0.18	—0.40	Worked by the G. I. P. Railway.	0.68	..	1.33	0.19	..	0.65	..	0.51	1.82	3.29	0.01	163b	
0.57	0.78		2.07	1.68	1.03	0.52	1.14	3.39	1.37	2.10	1.63	4.78	1.88	164b	
2.25	1.51		2.74	2.49	2.18	1.65	1.71	3.06	2.15	3.23	2.16	5.98	2.35	165b	
0.97	0.38		1.08	0.56	0.56	0.42	1.08	0.46	0.76	0.22	0.60	0.92	0.60	166b	
0.42	0.18		0.11	0.41	0.28	0.34	0.33	..	0.13	0.84	0.34	..	0.54	167b	
1.71	1.45		0.84	0.63	0.55	0.69	0.99	2.36	0.49	0.27	0.83	1.97	2.15	168b	
—0.06	0.12		2.57	169b
0.02	0.07		..	0.01	0.06	0.02	0.05	0.08	0.04	0.02	0.06	0.08	0.08	0.24	170b
1.45	1.31		1.69	1.84	1.41	1.55	1.40	3.23	1.44	2.58	2.05	0.67	3.10	171b	
0.06	0.12		0.14	0.56	0.78	0.16	0.36	0.45	0.04	0.08	0.14	0.11	0.01	0.01	172b
7.57	5.52	..	9.35	8.18	8.68	5.54	7.06	13.69	6.45	9.90	9.63	17.80	13.45	173b	
0.03	0.01	Worked by the G. I. P. Railway.	..	..	0.02	..	..	..	..	0.01	..	..	..	174
1.05	1.21		..	0.83	0.07	0.02	0.04	..	0.01	0.23	0.01	..	1.00	175	
..	..		0.12	..	0.11	..	..	..	0.28	..	0.09	..	..	176
7.28	10.13		17.76	3.62	0.03	0.49	..	..	..	..	0.01	..	..	177
0.13	0.08		0.21	0.16	..	0.23	0.15	0.08	0.28	1.03	0.31	..	..	178
8.49	11.43	..	18.09	4.61	0.23	0.74	0.19	0.08	0.57	1.27	0.42	..	1.00	179	

Extract from Tables Printed

Progressive number.	HEADINGS.	BROAD						
		East Indian.	Great Indian Peninsula.	Sind, Punjab and Delhi.	Madras.	Bombay, Haroda and Central India.	Eastern Bengal.	Oudh and Rohilkhand.
FROM APPENDIX I.								
180	Average number of Locomotives on the line, <i>No.</i>	532	433	154	152	98	48	125
181	Average train-mileage hauled per Locomotive per diem, <i>Miles.</i>	49.25	58.00	58.36	40.19	57.75	44.74	37.21
Lbs. coal per train-mile (coal-burning engines)—								
182	Coaching, <i>lbs.</i>	43.22	38.00	40.41	23.68	41.87	39.51	39.97
183	Goods, "							
184	Mixed, "							
Lbs. wood (wood-burning engines)—								
185	Coaching, <i>lbs.</i>	..	..	78.50	84.89	..	..	..
186	Goods, "							
187	Mixed, "							
Average gross weight of trains—								
188	Coaching, <i>Tons.</i>	167.68	124.87	119.22	109.16	141.00	111.63	..
189	Goods, "	376.95	224.09	189.33	239.48	494.00	300.14	..
190	Mixed, "	370.82	..	164.90	200.96	300.00	198.38	..
Average through speed of trains—								
191	Coaching, <i>Miles per hour.</i>	25.00	21.63	20.38	20.59	19.50	21.55	22.50
192	Goods, "	11.25	11.47	12.25	16.61	9.50	14.90	13.50
193	Mixed, "	18.00	14.77	17.06	14.47	13.25	17.00	20.00
FROM APPENDIX II.								
194	Average mileage <i>per diem</i> of coaching vehicles, including brakes, .. <i>Miles.</i>	134,846.38	94,901.31	61,620.30	43,697.92	35,389.18	15,399.43	29,679.50
195	Goods, "	460,699.28	400,895.93	141,276.24	51,967.18	119,741.46	21,899.92	71,304.88
FROM APPENDIX IV.								
Average age of rails—								
196	Steel, <i>Years.</i>	15.0	..	..	16.05	..	0.5	2.0
197	Iron, "							
Proportion renewed per mile of rail—								
198	Steel, <i>Per Mile.</i>	0.02	..	..	0.003	..	0.004	0.004
199	Iron, "							
FROM APPENDIX V.								
Average age of sleepers—								
200	Wood, <i>Years.</i>	12.0	..	16.0	6.05	15.0	8.5	8.5
201	Iron, "							
Percentage of renewals—								
202	Wood, <i>Per cent.</i>	4.09	4.49	2.52	27.42	3.22	2.58	0.72
203	Iron, "							

STATISTICS OF INDIAN RAILWAYS.

IX.

as Appendices to the Analyses.

GAUGE.					NARROW GAUGE.										Progressive number.
Indus Valley.	Punjab Northern.	Dhond and Mandmad.	Patna and Gya.	Nizam's.	South Indian.	Rajputana.	Holkar and Sindia-Nemuch.	Nagpur and Chhat-tasgarh.	Rangoon and Irrawaddy Valley.	Northern Bengal.	Tirhoot.	Cawnpore and Fa-rukhabad.	Bhavnagar-Gondal.		
88	95	Worked by the G. I. P. Railway.	9	10	112	210-55	52	10	23	38	6 65	11	15	180	
67-07	41-75		38-82	72-55	39-00	41-17	39-89	29-93	76-75	40-28	78-82	38-31	61-00	181	
30-99	42-89		50-96	..	29-07	27-77	..	61-98	19-29	30-382	26-56	27-62	37-91	182	
..	..		..	94-16	..	..	63-18	..	..	..	..	..	..	183
..	..		..	..	..	..	..	..	..	..	..	..	..	184
..	..		..	..	..	..	..	..	..	..	..	..	..	185
..	..		..	..	..	..	..	..	..	..	..	..	..	186
..	..		..	..	..	..	..	..	..	..	..	..	..	187
..	188
..	189
207-13	197-22	Worked by the G. I. P. Railway.	40-36	96 49	113-75	52-90	76-16	101-44	119-72	65-55	21-24	83-22	99-30	188	
186 94	..		45 74	146-95	220-80	121-35	111-21	108 77	134-78	145 41	46 58	91-17	104-56	189	
..	..		72 65	169 54	161-10	106 26	113-17	104-80	161 25	104-21	36-92	85-56	107-03	190	
17 55	15-54		17 50	14 50	17-00	15 76	12-92	..	15-00	15-78	17-24	..	..	191
11-60	10-52		10-00	10-03	..	8 9	9-86	..	12-50	10 50	10 56	10-00	20-00	192	
11 60	11-86		17-50	14-18	14 00	9-60	9 86	11-26	12-50	12 00	14-32	12 00	20 00	193	
29,597-46	19,810 97		Worked by the G. I. P. Railway.	3,057-15	6,266-16	26,300-99	49,134-12	17,426-03	1,528-03	14,787 22	11,034-01	3,573-95	4,641-12	6,376-04	194
79,441-83	35,215 38			3,093-10	6,927 78	43,407 54	1,03,453-49	19,021-55	4,573-62	19,021-88	17,571 77	4,997-88	1,751-45	10,157 15	195
..	2-5		Worked by the G. I. P. Railway.	7-47	3-12	0 5	196
3-22	..			2 0	7-5			3 5	1-0	4 5	5-0	5-01	1-0	1-0	1-0	197
..	0-09	..		..	0-005	0-38	0-002	..	..	..	..	..	..	198
00-01	..	0 007		..			0-003	0-002	0-003	0 001	0 002	199
4-43	2 5	Worked by the G. I. P. Railway.	2-3	7-5	6-11	4-78	3-0	1-0	4-0	5 0	4-00	1-0	1 0	200	
1 25	..		2-3	7-5	13-75		5-0	3-50	201
0-10	0-82		..	0 46	1-10	0-87	7-75	0-03	0-048	0-84	0 34	..	0-005	202	
..	..		0-20	0-03	0 11	203

INDIAN RAILWAYS.

STATISTICS OF THEIR WORKING

FOR THE

HALF-YEAR ENDED 31ST DECEMBER, 1881.

PART II.

SUMMARY OF ANALYSES OF WORKING.

(Pages clxxxi to cciii).

Progressive number.	HEADINGS.	BROAD						
		East Indian.	Great Indian Peninsula.	Sind, Punjab and Delhi.	Madras.	Bombay, Baroda and Central India.	Eastern Bengal.	Oudh and Rohilkhand.
No. I.								
DESCRIPTION OF RAILWAY WORKED.								
1	Gauge of Railway,	5' 6"	5' 6"	5' 6"	5' 6"	5' 6"	5' 6"	5' 6"
2	Mean mileage worked, Miles.	1,506.75	(a) 1,446.50	663.51	857.98	(a) 444	(e) 159.91	546.85
3	Number of stations, No.	159	182	84	114	(d) 77	(h) 34	80
4	Total length of the following gradients—							
	(a), $\frac{1}{100}$ and less, Miles.	..	(b) 19.31	..	..	..	..	..
	(b), $\frac{1}{75}$ to $\frac{1}{100}$, "	4.04	(b) 2.36	..	17.00	..	..	..
	(c), $\frac{1}{50}$ to $\frac{1}{75}$, "	12.46	62.09	..	47.50	0.18	..	..
	(d), $\frac{1}{25}$ to $\frac{1}{50}$, "	93.04	491.96	10.40	206.75	1.53	0.55	1.63
	(e), $\frac{1}{10}$ to $\frac{1}{25}$, "	97.54	202.45	24.25	128.75	8.98	0.41	3.56
5	Steepest gradient worked—							
	Length, "	*4.81	(b) 5.84	7.20	0.75	0.18	0.14	0.40
	Inclination, "	$\frac{1}{100}$	$\frac{1}{57}$	$\frac{1}{200}$	$\frac{1}{80}$	$\frac{1}{100}$	$\frac{1}{103.70}$	(j) $\frac{1}{150}$
No. II.								
FINANCIAL RESULTS.								
6	Percentage of net earnings (including steam-boat traffic) on capital outlay, .. Per cent.	3.88	2.43	1.94	0.84	2.06	7.29	1.36
7	Percentage of net earnings on paid up capital, "	..	2.45	1.93	(h) 0.82	(g) 2.01	7.34	1.28
No. III.								
OUTLAY, EARNINGS AND EXPENSES.								
<i>(Exclusive of Steam-boat Service).</i>								
8	Capital outlay per mile open, Rs.	2,49,127	1,78,582	1,67,861	1,29,417	1,37,136	(i) 2,07,327	1,06,868
9	Total earnings per mile open per week, "	576.64	374	267	136.72	324	(j) 744	166.23
10	Total working expenses per mile open per week, "	196.56	208	196	94.12	170	(j) 253	107.85
11	Total earnings per train-mile, "	5.33	3.87	3.40	3.19	4.98	(j) 7.00	3.77
12	Total working expenses per train-mile, "	1.62	2.15	2.50	2.20	2.61	(j) 2.65	2.44
13	Net earnings per train-mile, "	3.51	1.72	0.90	0.99	2.37	(j) 5.24	1.32
14	Cost per 1,000 gross ton-miles moved (freight and dead-weight), "	4.95	9.19	9.07	9.68	8.91	(j) 8.04	7.78
15	Percentage of total working expenses upon total earnings, Per cent.	34.09	55.49	73.41	68.84	52.35	(j) 33.60	64.88
16	Percentage of total working expenses upon total earnings, excluding from both sides of the account the charges for carriage of revenue stores, "	32.29	54.76	72.38	68.41	50.28	(j) 33.54	63.36
<i>(Inclusive of Steam-boat Service).</i>								
17	Percentage of total working expenses on total earnings (for details, see Table No. VII), "	34.13	55.49	74.88	68.84	52.35	(j) 34.60	64.88

(a) Includes 158½ miles for Dhond-Manmad, Khamgaon and Amraoti Lines, and 12½ miles for Mohpani branch opened for all traffic.
 (b) Bhore and Thul Ghauts.
 (c) 81 miles, 1,622 feet sidings in addition.
 (d) Including Carnac Bridge.
 (e) Poradaha Section, 13 miles, on the 5' 6" gauge, worked by Eastern Bengal Railway Co.

(f) On the temporary line from the Benares Cantonment Station to Benares river.
 (g) Excluding ₹31,537 not bearing interest.
 (h) Including Chitpore and Chitpore Junction.
 (i) Eastern Bengal Railway only.
 (j) Includes Poradaha Section of Northern Bengal State Railway.

* Jubbulpore line 5 682, Kurhurbaree Branch 0 9848.
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STATISTICS OF INDIAN RAILWAYS.

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GAUGE.					NARROW GAUGE.										Progressive number.
Indus Valley.	Punjab Northern.	Dhond and Mandmad.	Patna and Gya.	Nizam's.	South Indian.	Rajputana.	Holkar and Sindhia-Neesmuck.	Nagpur and Chhat-tisgarh.	Rangoon and Irrawaddy Valley.	Northern Bengal.	Tirhoot.	Cawnpore and Fa-rukhabad.	Bhavnagar-Gondal.		
5' 6" (k) 659 67 66	(l) 5' 6" 357-75 53	Worked by the Great Indian Peninsula Railway.	5' 6" 57-20 8	5' 6" (o) 120-44 15	3' 3 3/4" (q) 663 (r) 102	3' 3 3/4" (m) 743-77 99	2' 3 3/4" 289 22 36	3' 3 3/4" 62 11	3' 3 3/4" 161 28	(e) 3' 3 3/4" 233 28	3' 3 3/4" 78 84 (n) 12	3' 3 3/4" 86 50 22	3' 3 3/4" 157-50 24	1 2 3 4 5	
0-99 9-20 30-51	14-03 42-11 29-41 48-58 13-40		..	..	..	..	..	..	..	..	..	..	..	..	2-95 0-30 1-66 4-51 23 03
0-99 7 5/8	2-51 4 3/8		0-20 2 3/8	1-14 1 1/8	8 1 1/8	2-61 1 1/8	3-40 1 1/8	1-08 1 3/8	4-90 2 1/8	0-87 1 1/8	1-43 2 1/8	1-78 2 1/8	2-70 3 1/8	5	
0-89	0-21		..	2-68	1-01	1-16	2-10	1-16	0-22	1-28	2-62	1-26	1-42	0-68	6
..	..		..	..	..	1-38	..	..	..	..	..	..	..	..	7
1,14,035 147	1,52,988 165-55		Worked by the Great Indian Peninsula Railway.	64,306 180	1,04,913 113	65,354 107	67,641 182	95,083 127-26	87,991 79	79,464 137-15	80,208 147	19,361 109	36,152 73	38,383 66-16	8 9
108 2-76 2-02 0-74	152-83 2-69 2-48 0-21			113 4-40 2-77 1-63	74 2-87 1-87 1-00	71 2-94 1-96 0-98	119 2-39 1-56 0-83	84-78 2-91 1-94 0-97	71 2-95 2-66 0-29	98-01 3-26 2-33 0-93	70 3-19 1-53 1-66	68-80 2-81 1-77 0-54	53 2-41 1-76 0-65	49-03 2-82 1-89 0-43	10 11 12 13
7-24	13-36			12-46	..	13-19	10-42	14-18	19-98	15-93	9-13	13-31	10-94	13-11	14
73-40	92-31			63-05	65-22	66-62	65-10	66-63	90-05	71-46	46-36	63-05	72-92	81-40	15
73-13	92-11			62-99	64-93	65-68	63-16	66-05	89-70	71-23	45-27	62-71	72-71	81-36	16
74-28	92-31	63-05		65-22	66-62	65-10	66-63	90-05	71-46	46-44	66-63	72-92	81-40	17	

(k) Includes 6-57 miles of Foreign Lines worked by the State.
 (l) The gauge of the Salt Branch Line is 3' 3 3/4".
 (m) Including Ganges bank.
 (n) 1-62 miles on the 5' 6" gauge.

(o) The length of line actually constructed is 117-10 miles; the additional 3-34 miles represents the distance run over twice by each train.
 (p) Excluding £10,548 Capital not bearing interest.
 (q) Includes 8 miles of the Pondicherry Railway.
 (r) " 2 stations of the ditto.

Progressive number.	HEADINGS.	BROAD						
		East Indian.	Great Indian Peninsula.	Sind, Punjab and Delhi.	Madras.	Bombay, Baroda and Central India.	Eastern Bengal.	Oudh and Rohilkhand.
No. IV.								
DIVISION OF EXPENDITURE BETWEEN COACHING AND GOODS TRAFFIC.								
18	Total Working Expenses for both coaching and goods traffic excluding steam-boat expenses, and after deducting telegraph and sundry receipts and leaving only the balance of payments to other lines for mileage, &c., <i>Rs.</i>	72,52,318	76,02,982	31,60,501	20,54,396	19,12,952	10,93,040	14,04,198
Proportions, dividing expenditure in ratio of gross ton mileage (freight and dead-load).								
19	Coaching, <i>Rs.</i>	14,40,454	15,79,889	11,34,654	7,72,103	7,43,276	2,46,862	4,85,882
20	Goods, <i>Rs.</i>	58,11,864	60,23,093	20,25,847	12,82,293	11,69,676	8,46,178	9,18,316
No. V.								
COACHING TRAFFIC.								
GROSS RECEIPTS AND TRAIN-MILEAGE—								
21	Receipts from coaching traffic, .. <i>Rs.</i>	57,69,319	27,99,446	15,83,290	12,66,791	15,72,641	8,21,528	9,74,346
22	Coaching train miles run, .. <i>No.</i>	1,302,724.50	1,175,872	581,596	456,086	(a) 414,970	154,205	232,213
23	Average coaching receipts per train-mile, <i>Rs.</i>	4.43	2.38	2.72	2.78	3.79	5.32	4.20
UNITS AND UNIT-MILEAGE—								
Number of units carried one mile—								
24	1st class, <i>Unit-miles.</i>	2,904,515	2,163,407	1,318,874	1,042,737	954,185	542,856	} 840,400
25	2nd „ „	11,429,816	9,189,092	4,494,463	2,744,971	3,900,102	1,123,121	
26	3rd or intermediate class, „	11,532,783	21,251,005	449,445	..	16,261,377	8,385,027	
27	4th or lowest class, „	282,667,314	120,299,490	96,142,719	92,303,152	78,335,266	33,945,734	67,553,522
28	Total passenger unit-mileage, „	308,534,428	152,902,994	102,405,501	96,090,860	99,450,930	43,996,738	68,393,922
29	Other coaching traffic, .. <i>Ton-miles.</i>	3,604,092	1,398,687	920,645	737,657	988,807	273,678	257,391
Average sum received for carrying a unit one mile—								
30	1st class, <i>Pies.</i>	15.32	14.80	10.46	15.40	10.29	10.55	} 9.00
31	2nd „ „	5.26	5.43	3.92	5.19	4.85	5.05	
32	3rd or intermediate class, „	3.98	3.88	4.00	..	3.02	3.79	
33	4th or lowest class, „	2.98	2.48	2.43	2.00	2.45	2.97	2.51
34	Average for all classes, „	3.22	3.03	2.61	2.23	2.71	3.27	2.59
35	Other coaching traffic per ton-mile, „	32.09	53.36	39.87	38.97	32.73	50.36	39.14
Average number of units in a train—								
36	1st class, <i>No.</i>	2.23	1.84	2.27	2.29	2.30	3.52	} 3.62
37	2nd „ „	8.78	7.81	7.73	6.02	9.40	7.28	
38	3rd or intermediate class, „	8.85	18.07	0.77	..	113.52	54.38	
39	4th or lowest class, „	216.98	102.31	165.30	202.38	288.29	220.13	290.91
40	Total passenger units, „	236.84	130.03	176.07	210.69	239.66	235.31	294.53
41	Other coaching traffic, <i>Tons.</i>	2.77	1.19	1.58	2.62	2.38	1.71	1.11

(a) Includes 143,244 miles run by mail trains.

STATISTICS OF INDIAN RAILWAYS.

clxxxv

GAUGE.					NARROW GAUGE.									Progressive number.
Indus Valley.	Punjab Northern.	Dhond and Manna.	Patna and Gya.	Nizam's.	South Indian.	Rajputana.	Holkar and Sindia-Nemuch.	Nagpur and Chhat-tisgarh.	Rangoon and Irrawaddy Valley.	Northern Bengal.	Tirhoot.	Cawnpore and Ferozkhabad.	Bhavnagar-Gondal.	
17,61,389	13,48,859	..	1,65,666	2,25,527	11,66,167	22,42,741	6,26,770	1,12,243	4,02,123	4,09,358	1,29,946	1,13,514	2,19,044	18
4,22,931	5,84,923	..	84,509	1,05,703	4,53,207	7,49,829	2,94,058	39,135	2,12,248	1,24,355	55,368	69,317	93,626	19
13,25,458	7,63,936	..	81,157	1,19,824	7,12,960	14,92,912	3,32,712	73,108	1,89,875	2,85,003	74,578	49,197	1,25,418	20
6,06,573	6,34,947	..	1,90,646	1,37,256	10,18,724	11,86,271	3,73,064	44,373	3,49,574	2,69,888	1,06,983	79,343	1,31,583	21
258,832	239,972	..	30,129	58,846	238,079	574,942	165,747	15,785	96,123	102,004	34,243	42,563	54,814	22
2.34	2.65	..	6.33	2.33	4.27	2.06	2.25	2.81	3.64	2.65	3.12	1.86	3.31	23
298,451	302,388		37,710	106,259	230,118	747,709	126,387	16,780	77,414	267,824	65,410	17,219	21,235	24
1,126,451	636,661		55,684	499,147	904,731	1,322,744	4,86,687	89,215	267,336	446,445	70,947	68,446	116,975	25
..	32,538,771		..	..	..	5,076,427	667,681	..	..	798,967	..	..	..	26
39,072,384	10,323,732		11,509,613	9,413,940	71,945,268	84,622,255	29,186,836	3,598,630	20,791,996	13,938,269	6,868,871	6,854,565	13,227,572	27
40,497,286	43,801,552		11,603,007	10,019,346	73,080,117	91,769,135	30,467,591	3,704,675	21,136,746	15,451,505	7,005,228	6,940,230	13,365,782	28
576,057	203,491		16,092	67,793	124,722	593,165	182,522	6,330	48,396	89,070	24,494	20,597	30,765	29
10.51	12	Worked by the Great Indian Peninsula Railway.	18.00	14.30	16.62	11.47	11.28	14.67	14.70	17.69	18.00	14.22	10.77	30
3.87	8		9.00	4.62	5.22	6.45	4.65	6.34	6.36	7.80	9.00	4.99	5.65	31
..	2.50		..	..	..	3.12	3.46	..	..	4.50	..	..	..	32
2.24	2		3.00	2.02	2.49	2.00	2.00	1.99	2.98	2.50	2.50	2.00	2.01	33
2.34	2.78		3.08	2.28	2.57	2.20	2.11	2.15	3.06	3.02	2.71	2.06	2.06	34
37.39	57.05		55.65	51.89	59.79	43.09	39.76	87.10	48.80	57.78	63.92	45.58	49.21	35
1.15	1.26		1.25	1.81	0.96	1.30	0.76	1.06	0.80	2.63	1.91	0.40	0.39	36
4.35	2.65		1.85	8.48	3.80	2.30	2.94	5.65	2.78	4.38	2.07	1.61	2.13	37
..	135.60		..	..	..	8.83	4.03	..	..	7.83	..	..	..	38
150.96	43.02		382.01	159.97	302.19	147.18	176.09	227.98	216.31	136.64	200.59	161.04	241.32	39
156.46	182.53		385.11	170.26	306.95	159.61	183.82	234.69	219.89	151.48	204.57	163.05	243.84	40
2.23	0.85	0.53	1.15	0.52	1.03	1.10	0.40	0.50	0.87	0.72	0.48	0.56	41	

Progressive number.	HEADINGS.	BROAD						
		East Indian.	Great Indian Peninsula.	Sind, Punjab and Delhi.	Madras.	Bombay, Baroda and Central India.	Eastern Bengal.	Ordn and Rohilkhand.
	No. V.—contd.							
	COACHING TRAFFIC—contd.							
	VEHICLES AND VEHICLE-MILEAGE—							
	Number of coaching vehicles hauled one mile—							
42	1st class, <i>Vehicle-miles.</i>	2,667,187	2,034,999	946,592	749,122	577,796	321,484	} 858,553
43	2nd „ „	2,727,235	2,240,712	897,180	1,090,750	884,888	216,010	
44	3rd or intermediate class, „	1,460,252	4,132,829	497,650	} 3,471,948	} 4,218,449	659,879	..
45	4th or lowest class, „	12,817,496	4,636,293	5,735,261			881,336	3,958,499
46	Other vehicles, „	2,671,678	1,806,176	1,686,654	572,227	594,928	275,611	477,867
47	Brake-vans, „	2,447,811	2,509,411	1,321,348	603,952	582,852	292,398	329,965
48	Total,	24,791,659	17,360,420	11,084,685	6,487,999	6,858,913	2,646,718	5,624,384
	Average number of vehicles in a coaching train—							
49	1st class, <i>No.</i>	2.05	1.73	1.63	1.64	1.89	2.08	} 3.70
50	2nd „ „	2.09	1.91	1.54	2.39	2.13	1.40	
51	3rd or intermediate class, „	1.12	3.51	0.86	} 7.61	} 10.17	4.28	..
52	4th or lowest class, „	9.84	3.94	9.86			5.71	17.05
53	Other vehicles, „	2.05	1.54	2.90	1.26	1.43	1.79	2.05
54	Brake-vans, „	1.88	2.13	2.27	1.33	1.41	1.90	1.42
55	Total,	19.03	14.76	19.06	14.23	16.53	17.16	24.22
	Average earnings per coaching vehicle per mile—							
56	1st class, <i>Per.</i>	16.68	15.74	14.57	21.44	16.99	17.82	} 8.81
57	2nd „ „	22.05	22.27	19.65	13.07	21.36	26.25	
58	3rd or intermediate class, „	31.45	19.95	3.77	} 53.04	} 57.10	48.19	..
59	4th or lowest class, „	65.65	64.38	40.79			114.31	44.71
60	Other vehicles, „	43.29	41.32	22.36	50.23	54.40	50.01	21.10
	Carrying capacity hauled one mile (excluding brakes)—							
61	1st class, <i>Seats.</i>	42,644,273	56,899,549	13,432,868	10,005,572	10,576,280	6,250,646	} 7,726,977
62	2nd „ „	57,283,756	82,202,196	23,089,404	39,372,775	32,913,987	6,821,429	
63	3rd or intermediate class, „	70,311,133	165,270,150	15,924,800	} 169,755,017	} 263,054,039	46,689,561	..
64	4th or lowest class, „	747,584,137	231,814,650	309,704,092			52,119,250	237,509,940
65	Other vehicles, <i>Tons.</i>	18,582,570	8,710,794	5,059,962	3,491,054	2,546,292	748,668	2,960,315
	Percentage of freight upon capacity hauled—							
66	1st class, <i>Per cent.</i>	6.51	3.18	9.82	10.42	9.02	8.63	} 10.88
67	2nd „ „	19.95	11.18	19.47	6.97	11.85	16.47	
68	3rd or intermediate class, „	16.40	12.86	2.82	} 54.37	} 35.96	17.96	..
69	4th or lowest class, „	37.31	51.89	31.04			65.32	28.44
70	Other vehicles, „	19.39	16.06	18.19	21.13	38.83	36.55	8.69
	WEIGHT OF TRAIN AND TON-MILEAGE—							
	Gross ton-mileage of all coaching trains—							
71	Freight, <i>Ton-miles.</i>	22,460,934	10,843,185	7,207,619	6,099,718	7,072,032	2,957,663	4,394,642
72	Dead weight, „	268,631,184	161,124,459	117,886,010	73,116,027	76,386,636	27,737,547	58,490,091
73	Total,	291,092,118	171,967,644	125,093,629	79,715,745	83,458,668	30,695,210	62,884,733
	Average weight of a coaching train—							
74	Freight, <i>Tons.</i>	17.24	9.22	12.39	14.47	17.04	19.18	18.93
75	Dead-weight, „	206.21	137.03	202.70	160.31	184.08	179.87	251.88
76	Total,	223.45	146.25	215.09	174.78	201.12	199.05	270.81

STATISTICS OF INDIAN RAILWAYS.

G.E.		NARROW GAUGE.												Progressive number.
INDUS VALLEY.	Punjab Northern.	Dhond and Maunad	Patna and Gya.	Nizam's.	South Indian.	Rajputana.	Holkar and Sindia-Neemuch.	Nagpur and Chhat-tisgarh.	Bangoon and Irra-waddy Valley.	Northern Bengal.	Tirhoot.	Cawnpore and Fe-rukhabad.	Bhavnagar-Gondal.	
136,983	280,496		45,213	101,134	355,219	951,436	262,578	23,660	125,385	226,785	67,471	67,220	51,103	42
163,319	259,756		45,306	135,199	431,833	805,706	247,735	29,774	205,030	169,110	58,153	64,710	76,033	43
..	2,032,114		..	..	..	..	336,245	..	..	227,054	..	..	..	44
109,033	..		446,623	541,304	3,470,096	6,321,931	1,724,557	226,541	1,349,769	945,012	337,739	760,108	763,254	45
386,443	165,815		45,504	139,365	376,800	881,095	153,672	7,966	199,898	418,024	96,427	102,096	48,068	46
367,865	747,447		11,179	181,636	276,284	1,325,598	435,724	25,443	135,681	..	29,695	56,652	115,594	47
963,643	3,485,628		593,830	1,098,638	4,910,282	10,285,760	3,165,511	313,384	2,015,763	1,985,985	589,485	1,050,786	1,054,052	48
1.69	1 17		1.50	1 72	1.49	1 65	1.58	1 50	1 31	2.22	1.97	1 57	0.93	49
1.79	1.08		1.50	2 30	1.81	1.40	1 49	1 89	2 13	1.66	1 70	1.52	1.39	50
..	8 47		..	..	..	..	2.03	..	..	2.23	..	..	..	51
11.63	..		14.82	9.20	14.57	11.00	10.41	14.35	14.04	9.26	9.86	17 86	13 92	52
2 65	0.69		1 51	2.37	1 58	1 53	0 96	0 50	2 08	4 10	2 31	2.40	0.88	53
1.42	3 11		0 37	3 08	1.16	2.31	2 63	1 61	1 41	..	0 87	1.33	2 11	54
19.18	14 52		19.70	18 67	20 62	17 89	19 10	19 85	20 97	19 47	17 21	24 68	19 23	55
7.18	13 60		15 01	15.03	10.76	9 01	5 43	10 40	9 08	20 89	17 35	3.64	5 37	56
9.42	21.21		11.06	17 07	10.93	10 60	9 14	19.01	8 29	20 60	10.90	5 27	10 44	57
..	49 89		..	..	..	..	6 87	..	..	15 83	..	..	..	58
29.05	..		77.31	35 11	51.75	29 28	33.78	31 59	45.87	36 85	50.84	18 04	41 90	59
31 37	70.00		19.68	25 24	19.79	29.01	45 74	69 21	11 81	12 31	16.24	8 80	37 79	60
169,117	2,312,551		542,556	1,242,100	6,257,424	9,398,963	2,577,117	269,607	1,210,338	1,199,238	538,625	537,760	511,030	61
682,532	2,573,843		543,672	3,244,760	15,395,016	12,351,367	4,031,394	373,308	4,157,336	1,196,458	926,936	1,035,360	1,824,792	62
..	88,118,080		..	..	..	..	10,759,840	..	..	4,541,080	..	..	..	63
615,320	..		16,995,031	25,837,733	139,239,060	195,795,957	55,184,820	7,967,447	50,130,420	32,226,016	13,032,054	24,323,456	30,530,160	64
476,244	713,367		165,438	449,328	1,903,983	3,116,077	319,980	35,382	775,061	1,181,429	214,833	204,192	153,013	65
7.16	13 07		6 95	8 55	3 67	7.96	4 90	6.22	6.40	22 33	12 14	3 20	4.16	66
12.97	24.73		10.24	15.38	5 87	10.71	12 07	23 90	6 43	37 31	7 65	6 61	6.41	67
..	48 64		..	..	..	..	6.21	..	..	17.59	..	..	..	68
27 02	..		67.72	36 43	51.67	45 81	52 89	45.17	41 48	43 25	52 71	28 81	43.33	69
10.52	28 52		9.73	15 08	6 55	19 04	57 04	17.89	6.24	7 54	11.40	10 08	19.47	70
040,361	2,856,413		714,895	683,187	4,536,828	6,155,676	2,025,367	231,066	1,325,044	1,035,802	448,843	439,068	835,901	71
366,597	40,904,377		6,068,502	10,983,264	32,119,011	65,792,975	19,075,967	1,732,444	11,997,612	12,580,743	3,710,164	5,895,693	6,306,240	72
406,958	43,760,490		6,783,397	11,666,451	36,655,839	71,948,651	21,101,334	1,963,510	13,322,656	13,616,545	4,159,007	6,334,761	7,142,141	73
11 75	11 90		23 73	11 61	19.05	10 71	12.22	14 64	13 78	10.15	13 11	10.31	15.25	74
213 01	170 45		201 42	186.64	134.91	114 43	115 09	109 75	124.82	123 34	108.35	138 52	175 05	75
225 66	182 35		225.15	198.25	153 96	125.14	127.31	124.89	138 60	133 49	121.46	148.83	130 30	76

Worked by the Great Indian Peninsula Railway.

Worked by the G. I. P. Railway.

Progressive number.	HEADINGS.	BROAD							
		East Indian.	Great Indian Peninsula.	Sind, Punjab and Delhi.	Madras.	Bombay, Baroda and Central India.	Eastern Bengal.	Oudh and Rohilkhand.	
No. V—concl'd.									
COACHING TRAFFIC—concl'd.									
COST OF WORKING AND PROFIT—									
77	Average cost of hauling a coaching train one mile,	Rs.	1-10	1-34	1-95	1-69	1-79	1-60	2-09
78	Average cost of hauling a coaching vehicle with its load one mile,	Pies.	12-38	20-42	19-65	25-19	22-74	20-13	17-62
Average cost of hauling a coaching unit one mile—									
79	Per passenger-unit,	"	0-77	1-45	1-80	1-39	1-31	0-86	1-28
80	Other traffic per ton,	"	8-30	57-86	36-54	19-61	13-07	15-45	22-49
81	Average profit on working a coaching train one mile,	Rs.	3-33	1-04	0-77	1-09	2-00	3-72	2-11
Average profit on working a coaching vehicle one mile—									
82	1st class,	Pies.	4-30	-4-68	-5-08	-3-75	-5-75	-2-31	-3-81
83	2nd "	"	9-67	1-85	..	-12-12	-1-38	6-12	..
84	3rd or Intermediate class,	"	19-06	-0-47	-15-88	..	..	28-06	..
85	4th or Lowest "	"	53-27	43-96	21-14	27-85	34-36	94-18	27-09
86	Other vehicles,	"	30-91	20-90	2-71	25-04	31-66	29-88	3-48
Average profit on working a coaching unit one mile—									
87	Per passenger-unit,	"	2-45	1-58	0-81	0-84	1-40	2-41	1-81
88	Other traffic per ton,	"	23-79	-4-50	3-33	19-36	19-66	34-91	16-65
No. VI.									
GOODS TRAFFIC.									
GROSS RECEIPTS AND TRAIN-MILEAGE—									
89	Receipts from goods traffic,	Rs.	1,62,37,963	1,10,63,754	26,77,179	17,31,474	20,92,815	25,19,387	11,81,697
90	Goods train-miles run,	No.	2,936,318 75	2,457,252-75	769,564	484,898	336,869	274,454	395,468
91	Average goods receipts per train-mile,	Rs.	5 53	4 50	3 48	3-57	6-21	9 17	2-99
UNITS AND UNIT-MILEAGE—									
92	Tons of goods carried one mile,	Ton-miles.	509,670,832-92	238,335,797	58,112,687	36,417,670	44,434,533	38,528,853	41,417,731
93	Average sum received for carrying a ton one mile,	Pies.	6-12	8-90	8-84	9-13	9-04	12-55	5-48
94	Average number of tons in a train,	Tons.	173 57	96-99	75 51	75 10	131-90	140 38	104-73
VEHICLES AND VEHICLE-MILEAGE—									
Number of goods vehicles hauled one mile—									
95	Loaded,	Vehicle-miles.	63,905,339	33,867,964	12,314,734	7,984,832	9,438,063	5,435,347	6,322,876
96	Empty,	"	24,065,328	16,453,002	6,902,592	1,801,239	2,545,238	2,756,440	3,046,237
97	Brake-vans,	"	3,465,981	4,683,238	710,163	1,278,289	236,567	237,902	486,996
98	Total,	"	91,436,648	55,004,204	19,927,489	11,064,360	12,219,868	8,429,689	10,456,099
Average number of vehicles on a goods train—									
99	Freight vehicles,	No.	29 96	20-48	24 97	20-18	35 57	29 85	25 21
100	Brake-vans,	"	1-18	1-91	0-92	2-64	0-70	0-86	1-23
101	Total,	"	31-14	22-39	25-89	22-82	36-27	30-71	26-44
102	Average earnings per goods vehicle per mile (excluding brakes),	Pies.	35-44	42-21	26-74	33-97	33-53	59-05	22-76
103	Carrying capacity hauled one mile (excluding brakes),	Tons.	830,321,157	441,683,758	157,911,823	80,191,675	100,343,378	78,684,402	98,670,278
104	Percentage of freight upon capacity hauled,	Per cent.	61-38	53-96	36-80	45-41	44-28	48-96	41-98
105	Average load of a goods vehicle, including both loaded and empty,	Tons.	5-79	4-74	3-02	3-72	3-71	4-70	4-16
106	Average load of a loaded goods vehicle,	"	7-98	7-04	4-72	4-56	4-71	7-09	5-98

STATISTICS OF INDIAN RAILWAYS.

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GGE.		NARROW GAUGE.												Progressive number.
Indus Valley.	Punjab Northern.	Dhond and Mandmad.	Patna and Gya.	Nizam's.	South Indian.	Rajputana.	Holkar and Sindia-Neemuch.	Nagpur and Chhat-tisgarh.	Rangoon and Irrawaddy Valley.	Northern Bengal.	Tirhoot.	Cawnpore and Fa-rnkhabad.	Bhavnagar-Gondal.	
1 63	2 43		2 80	1 80	1 90	1 30	1 77	2 48	2 21	1 22	1 62	1 63	1 71	77
17 67	41 01		27 85	22 13	18 77	16 07	20 68	26 10	21 68	12 02	18 99	13 39	21 43	78
1 80	2 47		1 80	1 74	1 10	1 42	1 73	1 96	1 74	1 27	1 27	1 73	1 28	79
14 46	19 03		70 31	41 62	51 17	23 75	19 83	39 25	82 46	47 19	69 09	62 31	27 55	80
0 71	0 22		3 53	0 53	2 37	0 76	0 48	0 33	1 43	1 43	1 50	0 23	1 60	81
-10 49	-27 41	Worked by the G. I. P. Railway.	-12 84	-7 10	-8 01	1 7 06	-15 25	-15 70	-12 60	8 87	-1 64	-9 75	-16 06	82
-8 25	-19 80		-16 78	-5 06	-7 84	-5 47	-11 54	-7 09	-13 39	8 58	-8 09	-6 12	-10 99	83
11 38	8 88		49 46	12 98	32 97	13 21	-13 81	5 49	24 19	3 81	31 85	4 65	26 79	84
13 70	28 99		-8 17	3 11	1 01	12 94	25 06	43 11	-9 87	24 83	31 85	4 59	16 36	85
0 54	0 31		1 78	0 54	1 47	0 78	0 38	0 19	1 32	1 75	1 44	0 33	0 78	87
22 93	38 02		-14 66	10 27	8 61	19 34	19 93	47 85	-33 66	10 59	-5 17	-16 73	21 66	88
18,21,082	8,32,226		73,643	2,12,974	7,62,885	22,85,860	5,73,099	79,958	2,16,381	6,02,460	1,05,607	83,675	83,422	89
662,954	239,052		30,544	65,997	388,133	899,247	163,074	27,271	79,667	176,581	45,308	25,687	63,162	90
2 75	3 48		2 41	3 22	1 96	3 54	3 51	2 93	2 71	3 41	2 53	3 26	1 40	91
54,951,260	12,960,028		1,673,939	3,789,115	19,691,520	52,464,574	7,737,012	1,079,268	4,383,586	9,791,344	2,044,393	1,679,349	3,121,945	92
6 36	12 33	8 45	10 71	7 43	8 37	14 22	14 22	9 48	11 81	9 92	9 57	5 41	93	
82 89	54 21	54 80	57 40	50 73	58 34	46 83	39 58	55 02	55 45	45 13	65 38	49 43	94	
8,415,630	2,777,781	441,187	604,690	5,358,159	13,801,046	2,167,137	319,812	1,266,871	3,524,775	622,035	499,420	880,519	95	
6,577,038	1,745,338	91,825	407,216	1,881,287	5,257,246	660,256	198,181	389,180	1,234,296	198,753	161,719	657,448	96	
756,309	373,290	18,870	68,110	171,738	720,131	202,498	45,911	29,340	3,866	16,026	45,444	56,311	97	
15,748,977	4,896,409	551,882	1,080,016	7,411,184	19,778,423	3,029,891	563,904	1,685,391	4,762,937	836,314	706,588	1,594,273	98	
22 62	18 92	17 45	15 33	18 65	21 19	17 34	18 99	20 79	26 95	18 12	25 73	24 35	99	
1 14	1 56	0 62	1 03	0 44	0 80	1 24	1 68	0 37	0 02	0 35	1 77	0 89	100	
23 76	20 48	18 07	16 36	19 09	21 99	18 08	20 67	21 16	26 97	18 47	27 50	25 24	101	
23 32	35 33	26 53	40 41	20 23	23 03	38 92	29 64	25 09	24 31	24 70	24 30	11 04	102	
128,042,215	40,449,962	3,151,178	8,477,752	41,604,874	92,622,002	13,454,659	2,590,461	8,230,255	21,773,226	4,019,621	3,299,030	5,636,677	103	
42 92	32 04	53 12	44 69	47 32	56 64	57 50	41 66	52 94	44 97	50 87	50 90	55 39	104	
3 67	2 86	3 14	3 74	2 72	2 75	2 74	2 08	2 65	2 06	2 49	2 54	2 03	105	
6 53	4 66	3 79	6 27	3 67	3 80	3 57	3 37	3 46	2 73	3 29	3 36	3 54	106	

Progressive number.	HEADINGS.	BROAD						
		East Indian.	Great Indian Peninsula.	Sind, Punjab and Delhi.	Madras.	Bombay, Baroda and Central India	Eastern Bengal.	Oriss and Rohil-khand.
No. VI—contd.								
GOODS TRAFFIC—contd.								
WEIGHT OF TRAIN AND TON-MILEAGE—								
Gross ton-mileage of all goods trains—								
107	Freight, Tons.	509,670,832.92	238,335,797	58,112,687	36,417,670	44,434,533	38,528,853	11,417,731
108	Dead-weight, "	664,810,739	417,265,466	165,232,642	95,972,613	86,902,460	66,686,426	77,434,254
109	Total, "	1,174,481,571.92	655,601,263	223,345,329	132,390,283	131,336,993	105,215,279	118,851,985
Average weight of a goods train—								
110	Freight, "	173.57	96.99	75.51	75.10	131.90	140.38	104.73
111	Dead-weight, "	226.41	169.81	214.71	197.93	257.97	242.98	195.81
112	Total, "	399.98	266.80	290.22	273.03	389.87	383.36	300.54
COST OF WORKING AND PROFIT—								
113	Average cost of hauling a goods train one mile, Rs.	1.98	2.45	2.63	2.64	3.47	3.08	2.32
114	Average cost of hauling a goods vehicle with its load one mile, Pies.	12.68	23.98	20.24	25.16	18.74	19.83	17.69
115	Average cost of hauling a goods unit (viz., one ton) one mile, "	2.19	4.85	6.69	6.76	5.05	4.22	4.26
116	Average profit on working a goods train one mile, Rs.	3.55	2.05	0.85	0.93	2.74	6.09	0.67
117	Average profit on working a goods vehicle with its load one mile, Pies.	22.76	19.23	6.50	8.81	14.79	39.22	5.07
118	Average profit on working a goods unit (viz., one ton) one mile, "	3.93	4.05	2.15	2.37	3.99	8.33	1.22
No. VII.								
DETAILED PERCENTAGES OF EARNINGS AND EXPENDITURE.								
Percentage to Total Earnings—								
119	Coaching Traffic, Per cent.	25.52	19.90	34.10	41.08	42.02	21.68	41.22
120	Goods Traffic, "	71.84	78.66	57.67	56.15	55.93	66.50	50.00
121	Sundries including Telegraph, "	2.58	1.44	7.37	2.77	2.05	1.21	6.78
122	Steam-boat Earnings, "	0.06	..	0.86	..	..	10.61	..
	Total, "	100	100	100	100	100	100	100
Percentage of Working Expenses upon Total Earnings.								
123	Maintenance, Per cent.	10.37	13.67	16.57	20.91	13.07	4.37	15.09
124	Locomotive Expenses, "	9.74	20.91	25.81	21.29	17.63	9.64	20.18
125	Carriage and Wagon Expenses, "	3.25	7.72	8.26	7.62	6.33	2.91	6.82
126	Traffic Expenses, "	5.87	7.41	11.31	10.69	7.82	8.05	11.11
127	General Charges, "	3.84	3.88	7.18	7.26	6.42	4.07	8.31
128	Miscellaneous Expenses, "	1.00	1.90	3.65	1.07	1.08	4.57	3.29
129	Steam-boat Expenses, "	0.06	..	2.10	..	..	0.99	..
130	Total Working Expenses, "	34.13	55.49	74.88	68.84	52.35	34.60	64.88

STATISTICS OF INDIAN RAILWAYS.

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GAUGE.			NARROW GAUGE.											Progressive number.
Indus Valley.	Punjab Northern.	Dhond and Mand.	Patna and Gya.	Nizam's.	South Indian.	Rajputana.	Holkar and Sindia-Neemuch.	Nagpur and Chhat-tisgarh.	Rangoon and Irrawaddy Valley.	Northern Bengal.	Tirhoot.	Cawnpore and Fa-rukhabad.	Bhavnagar-Gondal.	
54,951,260	12,960,028	Worked by the G. I. P. Ry.	1,673,939	3,789,115	19,691,520	52,464,574	7,737,012	1,079,268	4,383,586	9,791,844	2,044,938	1,679,349	3,121,945	107
128,509,544	44,193,139		4,840,380	9,435,981	37,973,347	90,785,326	16,193,129	2,588,836	7,594,731	31,415,170	3,556,981	2,316,743	6,445,339	108
183,460,804	57,153,167		6,514,319	13,225,096	57,664,867	143,249,900	23,875,134	3,668,104	11,918,317	31,207,014	5,601,919	4,496,092	9,567,284	109
82 89	54 21	Worked by the G. I. P. Ry.	54 80	57 41	50 73	53 34	47 44	39 58	55 02	55 45	45 13	65 38	49 43	110
193 84	134 87		158 47	142 98	97 33	100 96	98 96	94 93	94 58	121 28	78 51	109 66	102 04	111
276 73	239 08		213 27	200 39	148 56	159 30	146 40	134 51	149 60	176 73	123 64	175 04	151 47	112
2 00	3 19	Worked by the G. I. P. Railway.	2 66	1 62	1 33	1 66	2 04	2 68	2 38	1 61	1 65	1 91	2 04	113
17 01	32 43		29 23	22 73	18 90	15 04	22 59	27 10	22 01	11 50	17 44	14 29	16 06	114
4 64	11 32		9 31	6 07	6 95	5 46	8 26	13 01	8 32	5 59	7 00	5 62	7 91	115
0 75	0 29		0 25	1 40	0 12	0 88	1 47	0 25	0 33	1 80	0 68	1 35	0 64	116
6 31	2 90		2 70	17 68	1 32	7 99	16 33	2 54	3 08	12 81	7 26	10 01	5 02	117
1 72	1 01	0 86	4 64	0 48	2 91	5 96	1 21	1 16	6 22	2 92	3 95	2 50	118	
22 69	41 23	Worked by the G. I. P. Railway.	71 41	38 28	55 25	33 07	38 98	34 93	60 89	26 32	39 37	48 29	66 26	119
68 13	54 05		27 59	59 40	41 37	64 88	59 89	62 96	37 69	58 74	38 86	50 92	32 27	120
4 30	4 72		1 00	2 32	3 38	1 45	1 13	2 11	1 42	4 50	4 08	0 79	0 74	121
4 88	..		..	..	..	..	..	..	..	10 44	17 89	..	0 73	122
100	100	..	100	100	100	100	100	100	100	100	100	100	100	
12 51	15 73	Worked by the G. I. P. Railway.	6 54	10 39	17 75	15 00	17 56	19 93	17 73	10 00	13 84	16 78	17 89	123
29 13	45 80		16 15	18 60	23 74	30 40	24 12	25 03	20 49	13 68	14 10	18 27	25 58	124
3 06	4 82		3 18	10 12	6 54	4 37	5 45	7 97	4 72	2 09	2 75	1 11	4 14	125
10 19	13 39		8 73	13 84	9 23	8 44	11 44	19 52	16 36	7 18	11 30	11 65	13 88	126
7 60	7 99		7 62	8 05	8 43	5 87	7 46	17 34	9 82	7 73	9 56	24 72	19 60	127
7 33	4 58		20 83	4 22	0 93	1 02	0 60	0 26	2 34	0 84	0 34	0 39	0 31	128
4 46	..		..	..	..	..	..	..	..	4 92	14 74	..	..	129
74 28	92 31		63 06	65 22	66 62	65 10	66 63	90 05	71 46	46 44	66 63	72 92	81 40	130

Table A—Maintenance of Way,

Progressive number.	HEADINGS.	BROAD						
		East Indian.	Great Indian Penin- sula.	Sind, Punjab and Delhi.	Madras.	Bombay, Baroda and Central India.	Eastern Bengal.	Oriss and Kohil- khand.
PER MILE OF LINE MAINTAINED.								
131a	General Superintendence (including office expenses), <i>Rs.</i>	212-74	151-79	190-34	163-09	179-73	193-61	170-21
132a	Maintenance and Renewal of Permanent-way, "	1,160-82	733-08	449-11	407-96	586-16	672-02	185-51
133a	Repairs of Bridges, &c., "	61-46	165-87	188-64	60-14	133-06	79-91	159-90
134a	Conservancy of Rivers, .. .. . "	..	..	46-90	..	..	..	..
135a	Repairs of Stations and Buildings, "	108-19	85-94	148-33	59-33	79-09	103-07	60-52
136a	Other Charges (net), "	11-93	201-03	135-94	60-84	121-96	-92-12	75-89
137a	Total Maintenance, &c., "	1,555-14	1,328-71	1,159-26	751-36	1,105-00	956-49	652-03
PER MILE OF TRACK, INCLUDING SIDINGS.								
131b	General Superintendence (including office expenses), <i>Rs.</i>	142-47	110-21	158-50	140-36	145-57	154-35	148-28
132b	Maintenance and Renewal of Permanent-way, "	777-36	532-25	374-95	351-08	474-80	535-76	161-60
133b	Repairs of Bridges, &c., "	41-15	113-90	157-49	51-75	111-82	63-71	139-29
134b	Conservancy of Rivers, .. .. . "	..	..	39-15	..	..	..	..
135b	Repairs of Stations and Buildings, "	72-45	62-39	123-84	51-06	64-07	82-17	52-72
136b	Other Charges (net), "	8-00	145-95	113-49	52-36	98-78	-73-44	66-11
137b	Total Maintenance, &c., "	1,041-43	964-71	967-32	646-61	895-04	762-55	568-00
PER TOTAL TRAIN-MILE.								
131c	General Superintendence (including office expenses), <i>Annas.</i>	1-21	0-96	1-49	2-32	1-69	1-25	2-37
132c	Maintenance and Renewal of Permanent-way, "	6-60	4-67	3-53	5-81	5-52	4-34	2-59
133c	Repairs of Bridges, &c., "	0-35	1-00	1-48	0-86	1-30	0-52	2-23
134c	Conservancy of Rivers, .. .. . "	..	..	0-37	..	..	..	..
135c	Repairs of Stations and Buildings, "	0-62	0-55	1-17	0-84	0-75	0-66	0-84
136c	Other Charges (net), "	0-06	1-28	1-07	0-86	1-15	-0-60	1-05
137c	Total Maintenance, &c., "	8-84	8-46	9-11	10-69	10-41	6-17	9-08
PER 1,000 GROSS TON-MILES.								
131d	General Superintendence (including office expenses); <i>Rs.</i>	0-22	0-27	0-36	0-66	0-37	0-24	0-51
132d	Maintenance and Renewal of Permanent-way, "	1-19	1-28	0-86	1-65	1-21	0-85	0-56
133d	Repairs of Bridges, &c., "	0-06	0-27	0-36	0-24	0-29	0-09	0-48
134d	Conservancy of Rivers, .. .. . "	..	..	0-09	..	..	..	..
135d	Repairs of Stations and Buildings, "	0-11	0-15	0-28	0-24	0-16	0-16	0-18
136d	Other Charges (net), "	0-02	0-35	0-26	0-25	0-25	-0-12	0-23
137d	Total Maintenance, &c., "	1-60	2-32	2-21	3-04	2-28	1-22	1-96

STATISTICS OF INDIAN RAILWAYS.

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EXPENSES.

Works and Stations.

GAUGE.					NARROW GAUGE.										Progressive number.
Indus Valley.	Punjab Northern.	Dhond and Mand.	Patna and Gya.	Nizam's.	South Indian.	Rajputana.	Holkar and Sindis-Neemuch.	Nagpur and Chhat-tisgarh.	Rangoon and Irrawaddy Valley.	Northern Bengal.	Tirhoot.	Cawnpore and Fa-rukhabad.	Bhavnagar-Gondal.		
165-44	184-12	Worked by the G. I. P. Railway.	134-41	71-32	123-95	141-85	65-32	87-93	117-48	125-44	73-59	89-07	67-20	131a	
234-96	328-40		122-26	218-52	258-93	372-04	401-31	239-68	399-00	235-75	214-82	148-56	181-64	132a	
31-93	50-13		15-21	7-62	35-67	62-76	30-77	4-65	38-78	13-05	69-14	23-01	..	133a	
..	15-70		..	..	..	2-59	..	..	..	..	..	..	..	..	134a
53-91	57-54		12-14	12-07	18-18	55-51	17-23	8-74	30-14	38-14	56-01	27-05	0-06	0-06	135a
25-74	41-23		21-36	8-49	73-64	93-51	66-28	69-33	46-75	27-59	63-39	31-08	3-84	3-84	136a
511-98	677-13	..	305-38	318-02	510-37	727-76	580-91	460-33	632-15	439-97	476-95	318-77	252-74	137a	
152-80	165-78	Worked by the G. I. P. Railway.	122-19	65-37	113-02	126-22	59-57	81-28	98-15	112-52	63-02	80-47	59-34	131b	
217-00	295-68		111-14	202-14	236-10	332-23	365-97	267-77	333-33	211-45	183-95	134-22	160-36	132b	
29-49	45-14		13-82	7-05	32-53	56-05	28-06	4-29	32-40	11-70	59-20	20-79	..	133b	
..	14-13		..	..	..	2-31	..	..	..	..	..	..	..	..	134b
49-78	51-81		11-03	11-16	16-58	49-57	15-71	8-08	25-18	34-21	47-36	24-44	0-05	0-05	135b
23-78	37-13		19-42	7-86	67-14	83-49	60-44	64-09	39-04	24-75	54-29	28-07	3-38	3-38	136b
472-85	609-67	..	277-60	294-18	465-37	649-87	529-75	425-51	528-10	394-63	408-42	287-99	223-13	137b	
1-88	2-11	Worked by the G. I. P. Railway.	2-03	1-07	2-03	1-12	0-92	1-80	1-72	1-68	1-16	1-80	1-77	131c	
2-66	3-76		1-84	3-28	4-24	2-93	5-65	5-92	5-85	3-16	3-41	3-02	4-78	132c	
0-36	0-57		0-23	0-11	0-58	0-49	0-43	0-10	0-56	0-17	1-10	0-46	..	133c	
..	0-18		..	..	..	0-02	..	..	..	..	..	..	..	..	134c
0-61	0-66		0-18	0-18	0-30	0-43	0-25	0-17	0-44	0-51	0-89	0-55	..	..	135c
0-29	0-47		0-33	0-13	1-21	0-74	0-93	1-42	0-69	0-37	1-00	0-63	0-10	0-10	136c
5-80	7-75		..	4-61	4-77	8-36	5-73	8-18	9-41	9-26	5-89	7-56	6-46	6-65	137c
0-45	0-65	Worked by the G. I. P. Railway.	0-57	0-33	0-84	0-48	0-42	0-86	0-75	0-65	0-59	0-71	0-78	131d	
0-63	1-17		0-52	1-03	1-76	1-25	2-58	2-83	2-54	1-23	1-74	1-19	2-11	132d	
0-09	0-17		0-07	0-03	0-24	0-21	0-20	0-04	0-25	0-07	0-56	0-19	..	..	133d
..	0-06		..	..	..	0-01	..	..	..	..	..	..	..	..	134d
0-14	0-20		0-05	0-06	0-12	0-19	0-11	0-09	0-19	0-20	0-45	0-22	..	..	135d
0-07	0-15		0-10	0-05	0-51	0-32	0-43	0-67	0-30	0-14	0-51	0-24	0-04	0-04	136d
1-38	2-40		..	1-31	1-50	3-47	2-46	3-74	4-50	4-03	2-29	3-85	2-55	2-93	137d

Table B—Locomotive

Progressive number.	HEADINGS.	BROAD						
		East Indian.	Great Indian Peninsula.	Sind, Punjab and Delh.	Madras.	Bombay, Baroda and Central India.	Eastern Bengal.	Oudh and Rohilkhand.
†	Average price of fuel per ton in terms of { coal, .. Rs. .. wood, .. "	4 57	14.75	21.17	..	17 23	8 75	12.86
		..	..	..	4 93	..	..	..
	PER TOTAL TRAIN-MILE.							
138a	General Superintendence (including office expenses),	1.00	0.72	0.98	0.88	0.98	1.17	1.23
139a	Running Expenses,	2.02	2.89	2.35	2.29	2.71	2.56	1.73
140a	Fuel, †	0.64	4.66	5.38	3.30	5.27	3.47	4.95
141a	Water,	0.13	0.28	0.17	0.17	0.33	0.21	0.17
142a	Oil, tallow, and other stores,	0.33	0.39	0.37	0.22	0.26	0.38	0.37
143a	Maintenance and Renewal of Locomotives and Machinery,	3.92	2.52	2.50	3.43	1.85	5.18	2.01
144a	Other Charges (net),	0.28	1.49	2.44	0.59	2.64	0.66	1.70
145a	Total Locomotive Expenses,	8.32	12.95	14.19	10.88	14.04	13.63	12.18
†	Fuel consumed in terms of { coal, .. lbs. .. wood, .. "	50 53	43 72	35 58	..	42 84	55 48	53 94
		..	..	..	93.70	..	..	..
	PER ENGINE MILE.							
138b	General Superintendence (including office expenses),	0.88	0.66	0.86	0.77	0.89	0.95	1.05
139b	Running Expenses,	1.79	2.67	2.06	2.00	2.45	2.08	1.46
140b	Fuel, †	0.56	4.29	4.73	2.87	4.76	2.82	4.22
141b	Water,	0.11	0.25	0.15	0.15	0.30	0.17	0.15
142b	Oil, tallow, and other stores,	0.29	0.36	0.32	0.19	0.23	0.31	0.31
143b	Maintenance and Renewal of Locomotives and Machinery,	3.46	2.32	2.20	2.99	1.67	4.21	1.71
144b	Other Charges (net),	0.25	1.37	2.15	0.51	2.38	0.53	1.45
145b	Total Locomotive Expenses,	7.34	11.92	12.47	9.48	12.68	11.08	10.36
†	Fuel consumed in terms of { coal, .. lbs. .. wood, .. "	44.60	40.27	31.29	..	38.69	45.26	45.95
		..	..	..	81.59	..	..	..
	PER 1,000 GROSS TON-MILES.							
138c	General Superintendence (including office expenses),	0.19	0.20	0.24	0.25	0.22	0.23	0.26
139c	Running Expenses,	0.36	0.79	0.57	0.65	0.59	0.51	0.37
140c	Fuel, †	0.12	1.28	1.31	0.94	1.15	0.68	1.07
141c	Water,	0.02	0.08	0.04	0.05	0.07	0.04	0.04
142c	Oil, tallow, and other stores,	0.06	0.10	0.09	0.06	0.06	0.07	0.08
143c	Maintenance and Renewal of Locomotives and Machinery,	0.71	0.69	0.60	0.97	0.40	1.02	0.43
144c	Other Charges (net),	0.05	0.41	0.59	0.17	0.58	0.13	0.87
145c	Total Locomotive Expenses,	1.51	3.55	3.44	3.09	3.07	2.69	2.62
†	Fuel consumed in terms of { coal, .. lbs. .. wood, .. "	146.15	191.94	138.10	..	149.87	174.91	186.29
		..	..	..	426.14	..	..	..

STATISTICS OF INDIAN RAILWAYS.

CXCV.

EXPENSES—contd.

Expenses.

GAUGE.					NARROW GAUGE.										Progressive number.
Indus Valley.	Punjab Northern.	Dhond and Mandmad.	Patna and Gya.	Nizam's.	South Indian.	Rajputana.	Holkar and Sindhia-Neemuch.	Nagpur and Chhat-tusgarh.	Rangoon and Irrawaddy Valley.	Northern Bengal.	Tirhoot.	Cawnpore and Fa-rukhabad.	Bhavnagar-Gondal.		
29.06	35.00	..	12.60	..	17.50	19.42	..	8.99	..	11.88	11.94	16.79	20.30	†	
..	..	..	..	5.24	..	..	9.28	..	5.43	..	..	..	..	..
1.04	1.58	Worked by the G. I. R. Railway.	0.98	0.61	0.95	0.85	1.22	2.01	1.56	0.93	0.72	1.42	1.25	138a	
2.61	3.95		2.57	2.12	1.91	2.40	3.02	2.95	3.37	1.94	2.38	0.51	2.82	139a	
6.30	12.45		4.64	3.39	3.79	4.08	4.25	3.52	2.35	2.83	2.59	3.85	4.26	140a	
0.67	0.71		0.45	0.49	6.21	0.22	0.39	0.55	0.20	0.16	0.16	0.15	0.36	0.36	141a
0.41	0.53		0.42	0.35	0.23	0.28	0.40	0.78	0.39	0.45	0.34	0.31	0.38	0.38	142a
2.17	2.30	2.27	1.22	3.38	2.31	1.69	1.77	2.61	0.82	1.50	0.61	0.38	0.38	143a	
0.32	1.03	0.03	0.36	0.72	1.49	0.26	0.23	0.22	0.93	0.02	0.12	0.06	0.06	144a	
13.52	22.55	..	11.36	8.54	11.19	11.78	11.23	11.81	10.70	8.06	7.71	6.97	9.51	145a	
30.35	49.83	..	51.55	..	30.33	29.33	..	54.77	..	33.33	30.37	32.08	29.37	†	
..	..	..	..	91.13	..	..	64.12	..	59.99	..	..	..	..	..
0.90	1.38	Worked by the G. I. R. Railway.	0.88	0.61	0.76	0.77	1.06	1.92	1.30	0.83	0.58	1.34	1.21	138b	
2.26	3.45		2.30	2.08	1.53	2.18	2.63	2.83	2.82	1.74	1.94	0.49	2.74	139b	
5.46	10.86		4.15	3.33	3.04	3.70	3.70	3.36	1.97	2.54	2.11	3.63	4.16	140b	
0.58	0.61		0.40	0.47	0.17	0.20	0.34	0.53	0.17	0.14	0.13	0.15	0.35	141b	
0.36	0.46		0.38	0.34	0.19	0.25	0.35	0.75	0.33	0.41	0.27	0.29	0.37	142b	
1.88	2.00	2.03	1.19	2.70	2.10	1.47	1.68	2.13	0.73	1.22	0.58	0.38	0.38	143b	
0.28	0.90	0.03	0.36	0.57	1.36	0.22	0.22	0.19	0.83	0.02	0.11	0.06	0.06	144b	
11.72	19.66	..	10.17	8.38	8.96	10.70	9.77	11.29	8.96	7.22	6.27	6.58	9.28	145b	
26.31	43.45	..	46.14	..	24.32	26.69	..	52.35	..	29.92	24.71	30.28	23.65	†	
..	..	..	..	89.39	..	..	55.80	..	50.26	..	..	..	..	..
0.25	0.49	Worked by the G. I. R. Railway.	0.28	0.19	0.39	0.37	0.56	0.96	0.63	0.36	0.37	0.55	0.56	138c	
0.62	1.22		0.73	0.67	0.79	1.03	1.38	1.42	1.47	0.75	1.21	0.20	1.24	139c	
1.50	3.86		1.32	1.06	1.57	1.74	1.94	1.68	1.02	1.10	1.32	1.52	1.88	140c	
0.16	0.22		0.13	0.15	0.09	0.09	0.18	0.26	0.09	0.06	0.08	0.06	0.16	141c	
0.10	0.17		0.12	0.11	0.10	0.12	0.18	0.37	0.17	0.18	0.17	0.12	0.17	142c	
0.51	0.71	0.65	0.38	1.40	1.00	0.77	0.84	1.13	0.32	0.76	0.25	0.17	143c		
0.08	0.31	0.01	0.11	0.29	0.63	0.12	0.11	0.09	0.36	0.01	0.05	0.02	144c		
3.22	6.98	..	3.24	2.67	4.64	5.04	5.13	5.64	4.65	3.13	3.92	2.75	4.20	145c	
115.68	247.01	..	235.11	..	201.70	201.27	..	418.77	..	207.44	247.53	202.19	207.38	†	
..	..	..	..	0.46	..	..	468.79	..	417.86	..	..	..	..	..

Table C.—Carriage

Progressive number.	HEADINGS.	BROAD						
		East Indian.	Great Indian Peninsula.	Sind, Punjab and Delhi.	Madras.	Bombay, Haroda and Central India.	Eastern Bengal.	Oudh and Rohilkhand.
	PER TOTAL TRAIN-MILE.							
146a	General Superintendence (including office expenses), <i>Annas.</i>	0.27	0.21	0.26	0.29	0.36	0.45	0.28
147a	Repairs and Renewals of Coaching Vehicles, "	0.75	1.25	1.01	1.86	1.39	1.78	1.73
148a	" " of Goods Vehicles, "	1.61	2.72	2.17	1.19	2.77	1.47	1.54
149a	Cleaning and Oiling, "	0.16	0.37	0.45	0.44	0.28	0.30	0.45
150a	Other Charges (net), "	-0.01	0.22	0.65	0.12	0.24	0.08	0.10
151a	Total Carriage and Wagon Expenses, "	2.78	4.77	4.54	3.90	5.04	4.08	4.10
	PER 1,000 VEHICLE MILES RUN BY HOME VEHICLES.							
146b	General Superintendence (including office expenses), <i>Rs.</i>	0.61	(b) 0.65	0.59	1.03	0.84	1.11	0.51
147b	Repairs and Renewals of Coaching Vehicles (a), "	7.95	3.94	7.75	14.46	9.49	18.60	11.79
148b	Repairs and Renewals of Goods Vehicles (a), "	4.70	8.54	7.18	7.89	9.66	4.62	3.83
149b	Cleaning and Oiling, "	0.36	1.16	1.05	1.59	0.66	0.73	0.81
150b	Other Charges (net), "	-0.01	0.70	1.49	0.42	0.55	0.21	0.18
151b	Total Carriage and Wagon Expenses, "	6.37	14.99	10.49	13.96	11.65	25.27	7.46

(a) These two items are calculated respectively upon the coaching and goods vehicle mileage.
 (b) The calculations are made per 1,000 vehicle miles on home line.

STATISTICS OF INDIAN RAILWAYS.

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EXPENSES—contd.

and Wagon Expenses.

GAUGE.					NARROW GAUGE.									Progressive number.
Indus Valley.	Punjab Northern.	Dhond and Mandmad.	Patna and Gya.	Nizam's.	South Indian.	Rajputana.	Holkar and Sindha-Neemach.	Nagpur and Chhat-tisgarh.	Rangoon and Irra-waddy Valley.	Northern Bengal.	Tirhoot.	Cawnpore and Fa-rakhabad.	Bhavnagar-Gondal.	
0.17	0.16	Worked by the G. I. P. Railway.	0.32	0.19	0.22	0.16	0.24	1.18	0.45	0.41	0.24	0.06	0.42	146a
0.35	0.32		0.68	1.01	0.67	0.64	1.01	0.25	1.14	0.33	0.19	0.19	0.22	147a
0.55	1.34		0.84	3.16	1.71	0.60	0.95	1.81	0.52	0.18	0.55	0.10	0.18	148a
0.33	0.41		0.31	0.23	0.33	0.25	0.22	0.52	0.31	0.21	0.24	0.14	0.72	149a
0.02	0.14		0.09	0.01	0.15	0.02	0.12	..	0.05	0.10	0.29	..	..	150a
1.42	2.37	..	2.24	4.65	3.08	1.76	2.54	3.76	2.47	1.23	1.51	0.49	1.54	151a
0.68	0.64	Worked by the G. I. P. Railway.	1.24	0.87	0.69	0.50	0.78	3.58	1.33	1.06	0.83	0.14	2.25	146b
3.66	2.78		4.39	7.14	5.36	5.75	6.26	1.79	6.13	2.67	1.56	0.77	1.22	147b
3.47	9.22		7.65	39.43	9.02	2.77	7.00	9.44	3.46	0.70	3.32	0.55	1.03	148b
1.31	1.60		1.16	1.23	1.04	0.74	0.73	1.60	0.91	0.53	0.83	0.34	3.97	149b
0.08	0.55		0.35	0.05	0.48	0.08	0.39	0.01	0.14	0.26	1.01	..	..	150b
5.61	9.14	..	8.49	48.77	16.59	5.36	8.41	11.47	7.32	3.18	5.24	1.19	8.47	151b

all other items in the table being calculated upon the aggregate of both coaching and goods vehicle mileage.

Table D.—

Progressive number.	HEADINGS.	BROAD						
		East Indian	Great Indian Peninsula.	Sind, Punjab and Delhi.	Madras.	Bombay, Baroda and Central India.	Eastern Bengal.	Oudh and Rohilkhand.
	PER TOTAL TRAIN-MILE.							
152a	General Superintendence (including office expenses), <i>Annas.</i>	0.63	0.54	1.04	0.98	0.90	1.44	0.88
153a	Station Staff, "	2.90	1.97	2.64	2.65	3.64	7.71	3.69
154a	Train Staff, "	0.90	1.26	1.08	0.57	0.51	0.94	0.81
155a	Fuel, Lightung, Water and General Stores, "	0.28	0.36	0.67	0.76	0.69	0.89	0.49
156a	Clothing, "	0.05	0.13	0.04	0.06	0.11	0.08	0.11
157a	Printing, Stationery and Tickets, "	0.22	0.14	0.43	0.33	0.31	0.29	0.30
158a	Charges for delivery and collection of goods, &c., "	..	0.01	0.02	..	0.05	..	0.01
159a	Miscellaneous Expenses, "	0.08	0.03	0.01	0.05	0.02	0.01	0.02
160a	Payments to other lines, "	..	0.10	0.19	..	..	..	0.34
161a	Other charges (net), "	-0.06	0.05	0.09	0.07	..	0.01	0.04
162a	Total traffic expenses, "	5.00	4.59	6.21	5.47	6.23	11.37	6.69
	PER CENT. ON TRAFFIC EARNINGS. <i>(Abstracts H. and I. of Revenue Accounts).</i>							
152b	General Superintendence (including office expenses), † <i>Per cent.</i>	0.76	0.89	2.07	1.96	1.16	1.15	1.61
153b	Station Staff, "	3.50	3.22	5.23	5.32	4.67	6.19	6.73
154b	Train Staff, "	1.08	2.06	2.14	1.15	0.65	0.75	1.47
155b	Fuel, Lightung, Water and General Stores, "	0.34	0.59	1.32	1.53	0.89	0.72	0.89
156b	Clothing, "	0.06	0.21	0.08	0.12	0.14	0.07	0.20
157b	Printing, Stationery and Tickets, "	0.26	0.24	0.86	0.67	0.39	0.24	0.55
158b	Charges for delivery and collection of goods, &c., "	..	0.01	0.04	..	0.06	..	0.02
159b	Miscellaneous Expenses, "	0.10	0.05	0.03	0.11	0.03	0.01	0.02
160b	Payments to other lines, "	..	0.17	0.38	..	..	..	0.62
161b	Other charges (net), "	-0.07	0.08	0.17	0.14	..	..	0.07
162b	Total traffic expenses, "	6.03	7.52	12.32	11.00	7.99	9.13	12.18
†	General Superintendence per cent. on traffic earnings (including steam-boat) .. <i>Per cent.</i>	0.76	0.89	2.06	1.96	1.16	1.16	1.61

STATISTICS OF INDIAN RAILWAYS.

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EXPENSES—*contd.*

Traffic Expenses.

GAUGE.					NARROW GAUGE.									Progressive number.
Indus Valley.	Punjab Northern.	Dhond and Mand.	Palsa and Gya.	Nizam's.	South Indian.	Rajputana.	Holkar and Sindia-Neemuch.	Nagpur and Chhat-tisgarh.	Rangoon and Irrawaddy Valley.	Northern Bengal.	Tirhoot.	Cawnpore and Farukhabad.	Bhavnagar-Gondal.	
0.72	1.22	Worked by the G. I. P. Railway.	1.46	1.21	0.65	0.49	0.67	1.92	1.42	0.69	1.10	1.23	0.95	152a
2.00	2.30		2.14	2.33	2.44	1.37	1.99	2.84	4.84	2.44	3.38	1.87	1.48	153a
0.81	1.31		0.82	0.77	0.42	0.47	0.98	0.83	1.05	0.39	0.81	0.16	0.51	154a
0.65	0.57		0.23	1.07	0.28	0.42	0.54	0.52	0.54	0.48	0.65	0.33	0.26	155a
0.05	0.56		0.05	0.01	0.15	0.08	0.15	0.03	0.12	0.03	0.11	0.03	0.01	156a
0.16	0.12		0.12	0.31	0.26	0.17	0.49	0.14	0.37	0.14	0.08	0.32	1.61	157a
0.02	..		..	..	0.01	..	..	..	..	..	..	..	..	158a
0.03	0.03		0.05	0.11	0.02	0.01	0.02	0.07	0.19	0.05	0.04	0.03	0.05	159a
0.24	0.37		1.27	0.50	..	0.21	0.47	2.84	..	..	..	0.01	0.27	160a
0.05	0.11		..	0.05	0.12	0.01	0.01	0.02	0.02	0.01	..	..	0.02	161a
4.73	6.59	..	6.14	6.36	4.35	3.24	5.32	9.21	8.55	4.23	6.17	4.48	5.16	162a
1.72	2.61	Worked by the G. I. P. Railway.	2.10	2.72	1.42	1.31	1.46	4.16	2.76	1.38	2.57	3.22	2.59	162b
4.74	4.90		3.07	5.19	5.35	3.64	4.32	6.14	9.38	4.87	7.91	4.90	4.04	163b
1.92	2.80		1.19	1.71	0.91	1.23	2.12	1.80	2.04	0.78	1.90	0.42	1.39	164b
1.55	1.21		0.33	2.39	0.61	1.12	1.13	1.14	1.04	0.96	1.52	2.19	0.72	165b
0.11	1.17		0.07	..	0.34	0.21	0.32	0.06	0.24	0.06	0.26	0.09	0.02	166b
0.38	0.25		0.18	0.69	0.57	0.44	1.07	0.30	0.72	0.28	0.19	0.33	4.40	167b
0.04	..		..	..	0.02	..	..	..	..	..	..	..	..	168b
0.07	0.07		0.06	0.25	0.06	0.02	0.05	0.14	0.37	0.10	0.10	0.06	0.14	169b
0.57	0.80		1.83	1.11	..	0.55	1.02	6.15	..	..	..	0.03	0.73	160b
0.12	0.24		..	0.12	0.26	0.04	0.03	0.05	0.04	0.01	..	..	0.05	161b
11.22	14.05	..	8.82	14.18	9.54	8.59	11.57	19.94	16.59	8.44	14.45	11.74	14.08	162b
1.79	2.61	..	2.10	2.71	1.42	1.31	1.47	4.15	2.76	1.23	2.09	3.22	2.60	†

Progressive number.	HEADINGS.	BROAD						
		East Indian.	Great Indian Peninsula.	Sind, Panjab and Delhi.	Madras.	Bombay, Baroda and Central India.	Eastern Bengal.	Oudh and Rohilkhand.
Table E.—General Charges.								
PER TOTAL TRAIN-MILE.								
163a	Home Expenditure (and General Administration), <i>Annas.</i>	0-28	0-23	0-48	0-58	0-70	0-83	1-00
164a	Agent's Office—Salaries and Expenses,	0-28	0-17	0-36	0-35	0-30	1-14	0-55
165a	Audit, Accounts and Pay Offices	0-69	0-55	1-14	1-11	1-18	1-14	1-11
166a	Stores Department Expenses,	0-42	0-18	0-38	0-17	0-74	0-05	0-13
167a	Medical	0-20	0-12	0-14	0-26	0-21	0-33	0-30
168a	Rents and Miscellaneous Expenses,	0-44	0-16	0-28	0-16	0-34	0-69	0-17
169a	Police,	0-27	0-30	0-31	0-29	0-67	0-52	0-85
170a	Advertising,	0-01	0-01	0-02	0-03	0-01	0-10	..
171a	Electric Telegraph,	0-74	0-63	0-77	0-65	0-85	0-86	1-15
172a	Other Charges (net),	-0-06	0-05	0-07	0-11	0-12	0-10	0-29
173a	Total General Charges,	3-27	2-40	3-95	3-71	5-12	5-76	5-05
PER CENT. ON TOTAL EARNINGS.								
163b	Home Expenditure, <i>Per cent.</i>	0-32	0-37	0-88	1-15	0-88	0-59	1-65
164b	Agent's Office—Salaries and Expenses,	0-33	0-28	0-67	0-69	0-38	0-81	0-91
165b	Audit, Accounts and Pay Offices	0-80	0-88	2-07	2-17	1-49	0-81	1-85
166b	Stores Department Expenses,	0-50	0-29	0-68	0-34	0-93	0-03	0-23
167b	Medical	0-24	0-20	0-26	0-52	0-25	0-23	0-50
168b	Rents and Miscellaneous Expenses,	0-52	0-26	0-50	0-31	0-42	0-49	0-28
169b	Police,	0-31	0-48	0-56	0-55	0-83	0-37	0-58
170b	Advertising,	0-01	0-02	0-03	0-06	0-02	0-07	..
171b	Electric Telegraph,	0-87	1-02	1-39	1-26	1-07	0-60	1-90
172b	Other Charges (net),	-0-06	0-08	0-14	0-21	0-15	0-08	0-48
173b	Total General Charges,	3-84	3-88	7-18	7-26	6-42	4-08	8-38
Table G.—Special and Miscellaneous Expenses.								
PER CENT. ON GROSS EARNINGS.								
174	Law Charges, <i>Per cent.</i>	0-02	-0-02	0-04	0-07	0-04	0-05	-0-04
175	Compensation,	0-01	0-03	0-20	0-03	0-07	0-74	0-01
176	Rates and Taxes,	0-12	0-06	0-07	0-34	0-14	0-15	0-01
177	Payments to other Lines,	0-79	1-74	3-28	0-58	0-54	0-01	1-09
178	Other Charges (net),	0-06	0-05	0-06	0-05	0-29	0-04	2-22
179	Total Special and Miscellaneous Expenses,	1-00	1-90	3-65	-1-07	1-08	0-99	3-29

STATISTICS OF INDIAN RAILWAYS.

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EXPENSES—concl'd.

and Special and Miscellaneous Expenses.

GAUGE.					NARROW GAUGE.										Progressive number.
Indus Valley.	Punjab Northern.	Dhond and Manmad.	Patna and Gya.	Nizam's.	South-Indian.	Rajputana.	Holkar and Sindia-Neemuch.	Nagpur and Chhat-tasgarh.	Bangcon and Irra-waddy Valley.	Northern Bengal.	Tirhoot.	Cawnpore and Fa-rukhabad.	Dharyagar-Gondal.		
..	-0.01	Worked by the G. I. P. Railway.	0.51	..	0.81	..	..	..	..	..	0.58	1.99	..	163a
0.34	0.46		0.99	0.76	0.51	0.27	0.56	2.94	0.91	1.08	0.75	1.45	0.79	164a	
1.13	1.28		1.70	1.22	1.09	0.74	0.99	2.18	1.47	1.60	1.30	1.93	1.44	165a	
0.16	0.45		0.64	0.33	0.27	0.17	0.36	0.48	0.69	0.08	0.33	0.26	0.25	166a	
0.19	0.16		0.07	0.20	0.14	0.14	0.17	0.01	0.11	0.39	0.26	0.03	0.24	167a	
0.54	0.84		0.40	0.28	0.28	0.21	0.31	1.10	0.40	0.13	0.42	0.93	1.10	168a	
0.01	0.04		..	..	..	..	..	..	..	..	..	..	1.47	169a
0.01	0.01		0.03	0.03	0.02	0.01	..	0.02	0.05	0.01	0.09	0.02	0.02	170a	
1.14	0.70		1.01	0.87	0.66	0.65	1.08	1.45	1.49	1.26	1.41	2.91	1.98	171a	
0.01	..		0.01	0.01	0.19	0.05	..	..	0.01	0.01	0.08	..	..	172a
3.53	3.93	..	5.36	3.70	3.97	2.25	3.47	8.18	5.13	4.56	5.22	9.52	7.29	173a	
..	-0.01	Worked by the G. I. P. Railway.	0.72	..	1.71	..	..	..	..	..	1.06	5.16	..	163b
0.74	0.93		1.40	1.64	1.07	0.72	1.21	6.24	1.75	1.84	1.37	3.78	2.11	164b	
2.42	2.59		2.42	2.63	2.31	1.94	2.11	4.57	2.31	2.71	2.38	5.00	3.88	165b	
0.35	0.92		0.91	0.74	0.58	0.44	0.77	1.02	1.32	0.13	0.60	0.69	0.67	166b	
0.41	0.32		0.10	0.45	0.29	0.36	0.38	0.02	0.22	0.66	0.48	0.08	0.65	167b	
1.17	1.72		0.56	0.62	0.69	0.54	0.67	2.36	0.76	0.22	0.77	2.39	2.96	168b	
0.01	0.08		..	..	..	..	..	..	..	..	..	..	3.95	169b
0.02	0.03		0.05	0.06	0.05	0.03	..	0.05	0.10	0.02	0.16	0.05	0.05	170b	
2.46	1.42		1.43	1.90	1.41	1.70	2.32	3.07	2.85	2.14	2.59	7.56	5.32	171b	
0.02	-0.01		0.02	0.01	0.42	0.14	..	..	0.01	0.01	0.15	..	0.01	172b
7.60	7.99	..	7.61	8.05	8.43	5.89	7.46	17.33	9.82	7.73	9.56	24.71	19.60	173b	
0.01	..	Worked by the G. I. P. Railway.	0.08	..	0.08	..	..	..	0.02	..	0.01	..	..	174
0.48	1.73		..	0.17	0.42	0.07	..	0.05	0.03	0.08	0.01	0.04	0.22	175	
..	..		0.04	..	0.41	..	..	..	1.02	0.01	0.07	..	..	176
6.70	2.80		20.15	3.63	0.02	0.36	0.42	..	..	..	..	..	..	177
0.14	0.05		0.56	0.42	..	0.60	0.18	0.21	1.27	0.75	0.25	0.34	0.09	178	
7.33	4.58	..	20.83	4.22	0.93	1.03	0.60	0.26	2.34	0.84	0.34	0.33	0.31	179	

Progressive number.	HEADINGS.	BROAD						
		East Indian.	Great Indian Peninsula.	Sind, Punjab and Delhi.	Madras.	Bombay, Baroda and Central India.	Eastern Bengal.	Oudh and Rohilkhand.
FROM APPENDIX I.								
180	Average number of Locomotives on the line, <i>No.</i>	505	438	154	152	98	(b) 48	(a) 125
181	Average train-mileage hauled per Locomotive per diem, <i>Miles.</i>	51.75	49	54.22	39.60	46	59.72	33.37
lbs. coal per train-mile (coal-burning engines)—								
182	Coaching, <i>lbs.</i>	50.53	40	39.09	22.86	39.14	45.00	45.95
183	Goods, "							
184	Mixed, "							
lbs. wood (wood-burning engines)—								
185	Coaching, <i>lbs.</i>	..	..	74.15	83.76	..	0.07	..
186	Goods, "							
187	Mixed, "							
Average gross weight of trains—								
188	Coaching, <i>Tons.</i>	164.80	146.16	221.70	102.42	134.00	105.98	†
189	Goods, "	370.12	226.80	300.60	213.35	356.00	341.68	†
190	Mixed, "	258.57	..	271.50	205.64	230.00	204.11	†
Average through speed of trains—								
191	Coaching, <i>Miles per hour.</i>	25.40	21.68	17.83	20.59	19.50	21.00	22.50
192	Goods, "	11.50	11.25	11.53	16.61	9.50	15.00	13.50
193	Mixed, "	17.46	14.11	15.34	14.47	13.25	16.75	20.00
FROM APPENDIX II.								
194	Average mileage <i>per diem</i> of coaching vehicles, including brakes, <i>Miles.</i>	1,34,261.05	94,350.11	60,330.72	42,167.82	37,279.29	1,39,932.72	31,112.34
195	Goods, "	496,329.47	298,935.89	108,953.31	53,260.08	66,412.32	46,353.33	56,523.54
FROM APPENDIX IV.								
Average age of rails—								
196	Steel, <i>Years.</i>	15.72	*..	15.12	16.44	15.46	16.73	9.04
197	Iron, "							
Proportion renewed per mile of rail—								
198	Steel, <i>Per Mile.</i>	0.01	0.013	0.0078	0.006	0.0107	0.005	0.004
199	Iron, "							
FROM APPENDIX V.								
Average age of sleepers—								
200	Wood, <i>Years.</i>	11.75	*..	12.88	6.21	14.91	8.19	..
201	Iron, "							
Percentage of renewals—								
202	Wood, <i>Per cent.</i>	5.62	5.80	1.63	32.52	4.137	1.64	0.982
203	Iron, "							

(a) Calculation based on 120 Locomotive Engines.

(b) Exclusive of 5 Engines erected as a reserve stock.

* Information not furnished.

† Cannot be given in detail with weight of loads.

STATISTICS OF INDIAN RAILWAYS.

IX.

as Appendices to the Analyses.

GAUGE.					NARROW GAUGE.										Progressive number.
Indus Valley.	Punjab Northern.	Dhond and Mand.	Patna and Gya.	Nizam's.	South Indian.	Rajputana.	Holkar and Sindia-Nemuch.	Nagpur and Chhatnagarh.	Bangoon and Irrawaddy Valley.	Northern Bengal.	Tinhoot.	Cawnpore and Faizkhabad.	Dhawnagar-Gondal.		
97	89	Worked by the G. I. P. Railway.	6	10	118	216	51	12	24	36	14	10	20	180	
59.58	34.95		61.40	112.05	36	40.84	40.17	20.40	48.04	46.92	37.96	39.30	32.87	181	
28.34	43.45		46.14	..	30.38	26.69	..	52.35	..	29.92	24.71	30.28	28.63	182	
85.02	..		..	89.39	..	..	56.26	..	50.26	..	..	..	..	183
178.51	182.35		..	13.82	150.05	99.04	69.85	68.94	115.20	110.60	94.17	15.32	123.71	111.44	184
218.51	239.08		106.33	137.95	136.39	131.83	109.10	163.63	186.58	166.97	105.29	149.91	124.27	185	
199.13	..		273.39	154.09	177.62	100.18	104.80	136.08	131.92	124.95	99.62	133.57	92.72	186	
17.55	..		17.50	14.50	17 Mail trans. 14 Mixed trans.	15.88	12.92	10.15	15.00	15.70	17.24	187
11.60	(d)10.73		10.00	10.03		9.04	9.86		12.50	11.34	10.56	10.00	20.00	191	
11.60	(e)11.73		17.50	14.18		11.69	9.86		12.50	13.00	14.32	12.00	20.00	192	
29,963.46	19,323.51		..	3,196.64	5,942.22	26,627.64	55,730.04	18,286.81	1,986.41	11,115.18	11,787.07	3,290.42	5,959.94	5,728.54	194
82,605.12	26,610.92		..	3,034.69	5,898.28	40,370.35	107,781.36	15,444.25	2,815.18	9,019.49	24,891.32	4,473.22	3,593.15	8,664.55	195
3.72	3.00		..	2.50	8.00	7.94	3.50	3.50	1.50	4.50	5.49	5.96	1.25	1.42	196
0.008	0.003		0.0128	0.0033	0.003	0.005	0.001	0.003	0.002	0.0015	197
(c) 4.93	3.00		..	2.49	8.00	6.65	5.00	3.50	1.50	4.50	5.43	1.49	198
1.75	..	..	2.50	8.00	14.25	..		..	..	5.50	0.50	..	..	200
0.12	0.12	..	..	0.588	0.61	0.28	2.50	0.36	0.008	1.39	..	0.017	0.22	201
0.06	..	..	0.35	0.039	..		..	..	..	0.02	..	..	..	202

(c) Longitudinal sal sleepers 10" x 5" - 1.75.

(d) Salt Branch Line - 13.00.

(e) " " " - 11.70.

SUPPLEMENT TO PART II OF THE STATISTICS OF INDIAN RAILWAYS.

GENERAL RESULTS OF THE WORKING
OF THE PRINCIPAL
INDIAN RAILWAYS
DURING THE YEARS 1877 TO 1881.

(Pages ccv to ccxvii).

Statement showing the general results of working

No.	RAILWAYS.	MEAN LENGTH OF LINE OPEN—MILES.						
		1877.	1878.	1879.	1880.	1881.	1877.	1878.
		1	East Indian,	1,506	1,507	1,507	1,507	1,507	1,07,54,853	1,06,54,176
2	Great Indian Peninsula,	1,268	1,268	1,272	1,276	1,282	58,53,868	61,72,160
3	Sind, Punjab and Delhi,	663	663	663	663	676	25,78,941	30,77,570
4	Madras,	858	857	857	858	858	26,99,426	27,82,517
5	Bombay, Baroda and Central India,	444	444	444	444	444	23,96,211	23,67,422
6	Eastern Bengal,	171	172	172	172	172	12,85,016	15,29,856
7	Oudh and Rohilkhand,	544	547	547	547	547	17,28,690	17,18,037
8	Indus Valley and Kandahar, ... ..	...	501	508	642	653	...	2,29,084
9	Punjab Northern,	103	103	103	228	343	3,38,552	3,94,881
10	Dhond and Manmad, ... ..	...	145	145	145	145	...	49,641
11	Patna-Gya, ... ..	...	...	57	57	57	...	...
12	Nizam's,	120	120	120	120	120	2,97,145	2,62,213
13	South Indian,	600	611	625	647	663	15,96,193	19,06,087
14	Rajputana,	396	428	445	484	735	8,91,288	8,23,173
15	Holkar and Sindia-Neemuch,	107	172	172	254	289	2,03,655	3,31,845
16	Nagpur and Chhattisgarh, ... ..	...	...	...	53	62	...	...
17	Rangoon and Irrawaddy Valley,	161	161	161	161	161	2,80,860	6,73,079
18	Northern Bengal,	134	219	225	231	233	16,008	3,18,304
19	Turhoot,	76	82	82	82	80	1,53,815	1,92,904
20	Cawnpore and Farkhabad,* ... ..	...	...	...	...	86	...	...
21	Bhavanagar-Gondal,† ... ..	...	...	...	...	170	...	...

* Opened for traffic on the 15th December, 1880.

† Opened for traffic on the 20th December, 1880.

STATISTICS OF INDIAN RAILWAYS.

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of Indian Railways during the years 1877 to 1881.

EARNINGS—RUPEES.								No.
COACHING.			GOODS.					
1879.	1880.	1881.	1877.	1878.	1879.	1880.	1881.	
1,11,77,844	1,16,73,269	1,18,92,133	2,13,34,202	2,75,56,929	3,02,19,425	2,98,32,892	3,22,38,495	1
60,82,221	61,30,903	63,68,419	2,58,16,905	2,11,05,590	1,85,21,797	1,83,14,143	2,52,41,441	2
38,76,099	43,83,619	36,43,784	50,94,748	46,53,186	63,83,378	67,34,266	56,94,210	3
26,21,195	25,45,839	26,42,909	70,87,341	35,69,536	37,30,522	33,41,731	34,85,445	4
23,20,288	27,00,522	33,30,487	47,86,326	43,48,398	46,17,278	51,81,628	61,87,158	5
14,92,425	14,88,015	16,17,285	29,31,399	26,19,807	25,10,442	28,73,263	34,40,206	6
17,89,287	19,13,161	20,59,055	21,86,177	24,86,714	21,81,663	22,16,668	25,27,135	7
7,93,996	18,03,906	14,98,701	...	3,18,543	22,01,809	40,08,327	35,41,392	8
6,90,372	10,79,731	13,52,146	3,38,479	4,92,304	10,99,774	18,78,514	19,89,004	9
1,43,473	3,20,825	3,33,899	...	80,029	2,46,822	3,39,760	2,96,622	10
1,69,452	3,38,392	3,47,195	...	...	50,009	1,38,952	1,60,133	11
3,00,359	3,08,771	2,95,196	5,31,700	5,27,443	3,81,623	3,79,944	4,43,951	12
20,03,022	20,62,513	21,06,450	15,14,783	12,26,495	13,09,533	14,45,911	15,41,534	13
9,27,916	10,66,881	22,35,699	17,31,470	20,61,368	25,08,999	25,75,546	49,09,907	14
3,97,998	5,79,716	7,41,821	2,60,503	5,68,818	7,08,909	7,33,979	11,95,913	15
..	19,712	87,498	...	...	...	83,823	1,89,310	16
6,96,980	7,45,221	7,10,899	61,736	2,79,213	2,44,123	5,58,177	7,15,555	17
4,41,998	5,32,237	5,36,915	13,983	4,42,359	6,75,877	8,07,999	10,30,935	18
2,12,236	2,27,433	2,30,214	96,263	1,58,087	1,48,660	2,03,339	2,40,374	19
..	...	1,54,170	...	...	...	...	1,22,109	20
..	...	3,61,543	...	...	...	...	3,13,259	21

Statement showing the general results of working

No.	RAILWAYS.	EARNINGS					
		STEAM BOAT SERVICE—RUPEES.					SUNDRIES,
		1877.	1878.	1879.	1880.	1881.	1877.
1	East Indian,	45,550	41,118	28,801	30,686	31,849	22,17,157
2	Great Indian Peninsula, .. .. .	..	..	..	..	..	11,09,376
3	Sind, Punjab and Delhi,	15,09,300	8,48,436	4,48,861	2,43,930	1,53,303	6,63,392
4	Madras, .. .. .	..	..	..	..	..	2,48,528
5	Bombay, Baroda and Central India, .. .. .	..	727	215	..	..	6,16,375
6	Eastern Bengal,	4,71,031	4,28,833	4,38,113	4,84,843	5,72,434	1,39,587
7	Oudh and Rohilkhand, .. .. .	..	..	..	..	..	4,26,938
8	Indus Valley and Kandahar, .. .. .	..	18,061	81,224	1,89,723	2,06,471	..
9	Punjab Northern, .. .. .	..	..	..	..	..	19,730
10	Dhond and Manmad, .. .. .	..	..	..	..	..	..
11	Patna-Gya, .. .. .	..	..	..	..	..	..
12	Nizam's, .. .. .	..	..	..	..	..	1,929
13	South Indian, .. .. .	..	..	..	..	..	1,22,270
14	Rajputana, .. .. .	..	..	..	..	..	73,929
15	Holkar and Sindia-Neemuch, .. .. .	..	..	..	..	..	15,970
16	Nagpur and Chhattisgarh, .. .. .	..	..	..	..	..	..
17	Rangoon and Irrawaddy Valley, .. .. .	..	..	..	..	..	1,856
18	Northern Bengal, .. .. .	..	92,059	1,31,949	1,63,505	1,92,708	18,726
19	Tirhoot,	15,635	72,159	74,194	98,143	97,267	33,844
20	Cawnpore and Farnkhabad,
21	Bhavnagar-Gondal,

STATISTICS OF INDIAN RAILWAYS.

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of Indian Railways during the years 1877 to 1881—contd.

—concl.									
INCLUDING TELEGRAPH—RUPEES.				TOTAL RUPEES.					No.
1878.	1879.	1880.	1881.	1877.	1878.	1879.	1880.	1881.	
15,25,786	18,90,151	14,08,269	12,48,996	4,43,51,760	3,97,78,009	4,33,16,221	4,29,45,116	4,54,11,472	1
10,87,061	6,44,297	5,08,207	4,46,963	3,27,74,149	2,83,64,811	2,52,48,315	2,49,53,253	3,20,56,822	2
3,51,023	7,06,337	10,49,703	6,82,850	98,46,381	89,30,215	1,14,14,676	1,24,11,518	1,10,74,147	3
2,78,121	2,74,769	2,74,975	1,82,958	1,00,35,295	66,30,174	66,26,486	61,62,545	63,11,312	4
1,89,135	2,15,007	3,62,225	2,27,487	77,98,912	69,05,677	71,52,788	82,44,375	97,45,132	5
67,825	62,945	90,040	72,117	48,27,033	46,45,821	45,03,925	49,36,161	57,02,042	6
4,17,286	4,23,893	3,25,321	3,42,541	43,41,805	46,22,037	43,44,343	44,55,150	49,28,730	7
6,421	2,00,511	6,60,426	2,88,596	..	5,72,109	32,77,540	66,62,382	55,35,161	8
21,886	59,935	4,10,038	1,28,414	6,96,761	9,09,571	18,50,081	33,68,284	34,69,564	9
5,584	77,262	34,509	..	..	1,35,254	4,67,557	6,95,094	6,33,862	10
..	11,048	4,212	6,104	..	..	2,30,509	4,81,556	5,13,431	11
2,097	12,419	14,001	17,687	8,30,768	7,91,753	6,94,401	7,02,716	7,56,834	12
1,00,557	49,452	51,170	1,07,704	32,33,246	32,33,139	33,62,067	35,59,594	37,55,888	13
88,060	1,08,504	1,81,292	96,641	26,96,687	29,72,601	35,45,420	37,28,719	72,42,247	14
28,382	38,931	37,564	11,846	4,80,128	9,29,045	11,45,338	14,01,259	19,49,579	15
..	..	417	4,721	..	..	..	1,03,952	2,81,529	16
10,677	14,815	19,312	17,168	3,44,452	9,62,969	9,55,918	13,22,710	15,43,622	17
1,26,808	1,34,436	1,09,060	83,331	48,717	9,79,530	13,84,260	16,12,801	18,43,390	18
18,158	23,643	22,152	15,899	2,99,557	4,41,308	4,53,733	5,51,067	5,84,255	19
..	..	..	2,305	..	..	..	..	2,78,584	20
..	..	..	3,584	..	..	..	..	6,88,385	21

Statement showing the general results of working

No.	RAILWAYS.	EXPEN									
		MAINTENANCE PER MILE OF TRACK INCLUDING SIDINGS.					Loco				
		RUPEES.					Total per total train-mile.				
							Annas.				
		1877.	1878.	1879.	1880.	1881.	1877.	1878.	1879.	1880.	1881.
1	East Indian,	1,584	1,912	1,946	1,974	1,858	5-95	6-49	6-63	7-02	7-43
2	Great Indian Peninsula,	1,618	1,810	2,264	1,894	2,156	11-91	12-28	13-30	12-32	13-39
3	Sind, Punjab and Delhi,	1,924	1,859	1,923	1,521	1,925	12-20	13-23	12-18	12-38	13-93
4	Madras,	1,244	1,272	1,321	1,248	1,259	9-52	11-88	11-86	11-48	11-04
5	Bombay, Baroda and Central India,	1,814	1,426	1,385	1,391	1,674	12-46	13-90	13-90	16-23	13-80
6	Eastern Bengal,	1,698	1,630	1,830	1,902	1,569	9-26	10-61	10-11	9-83	12-51
7	Oudh and Rohilkhand,	817	670	829	980	1,090	9-06	10-41	9-93	8-79	11-71
8	Indus Valley and Kandahar, .. .. .	..	478	910	1,237	1,144	..	12-83	14-50	16-54	14-55
9	Punjab Northern,	1,459	2,499	1,602	1,482	1,284	12-52	15-46	20-96	17-70	21-37
10	Dhond and Manmad, .. .. .	..	..	637	620	*	..	16-73	18-61	17-25	*
11	Patna-Gya, .. .. .	..	..	423	672	603	..	..	7-91	10-16	11-32
12	Nizam's,	828	1,076	928	559	636	*	*	15-38	11-03	9-05
13	South Indian,	710	1,033	832	854	1,029	10-34	11-20	10-06	13-17	11-24
14	Rajputana,	1,054	796	962	944	1,197	12-61	11-58	11-39	13-44	11-81
15	Holkar and Sindia-Neemuch,	668	872	907	1,099	1,269	10-30	9-48	11-24	11-96	11-95
16	Nagpur and Chhattisgarh, .. .. .	..	..	..	..	629	..	..	..	14-29	11-39
17	Rangoon and Irrawaddy Valley,	552	1,595	1,420	1,132	1,136	14-94	10-87	11-60	9-75	9-80
18	Northern Bengal, .. .. .	..	524	1,175	738	808	10-62	9-04	9-57	7-65	8-23
19	Tirhoot,	411	639	729	706	719	8-00	8-67	9-27	8-69	7-61
20	Cawnpore and Farukhabad, .. .. .	..	..	..	..	409	..	..	..	..	6-68
21	Bhavnagar-Gondal, .. .. .	..	..	..	..	432	..	..	..	..	9-11

* Included with G. I. P. Railway.

STATISTICS OF INDIAN RAILWAYS.

CCXI

of Indian Railways during the years 1877 to 1881—contd.

DITURE.																					
MOTIVE											CARRIAGE AND WAGON.										
Cost of fuel per total train-mile. Annas.					Repairs per total train-mile. Annas.						Per total train-mile. Annas.					Repairs of stock per total train-mile. Annas.					No.
1877.	1878	1879.	1880.	1881.	1877.	1878	1879	1880.	1881.	1877.	1878	1879.	1880.	1881.	1877.	1878	1879	1880	1881.		
1.30	1.33	1.67	1.58	0.62	1.13	1.42	1.35	1.62	2.68	2.32	2.71	2.44	3.09	2.79	1.98	2.29	1.89	2.56	2.35	1	
5.78	5.34	5.51	5.11	4.60	1.92	2.38	2.58	2.59	2.29	4.58	3.52	4.15	5.12	4.73	3.99	2.86	3.30	4.21	3.88	2	
5.39	6.87	6.77	6.11	5.70	1.94	1.91	1.84	2.21	2.34	2.88	2.55	2.80	3.15	3.90	2.14	1.86	2.14	2.46	2.65	3	
4.47	4.71	4.25	3.96	3.44	2.36	3.36	3.46	3.53	3.44	3.09	4.46	2.72	2.64	4.04	2.54	3.37	1.83	2.56	3.13	4	
5.78	6.11	6.74	6.41	5.65	2.23	3.02	2.05	2.61	1.76	2.95	3.30	3.86	2.62	4.24	2.24	2.75	2.08	2.93	3.56	5	
3.15	3.64	3.36	3.31	3.39	1.37	2.01	1.75	1.92	3.81	3.49	4.49	4.67	4.84	4.24	2.59	3.64	3.63	3.87	3.26	6	
4.51	4.78	4.47	4.03	5.05	1.39	1.87	1.58	1.51	1.85	2.24	3.22	3.03	2.99	3.41	1.79	2.58	2.24	2.25	2.64	7	
..	5.02	5.64	8.30	6.59	..	1.85	2.94	2.93	2.18	..	2.31	2.51	2.26	1.91	..	0.71	1.54	1.37	1.22	8	
5.59	8.27	14.52	10.62	11.39	1.22	1.21	0.86	1.21	2.10	2.05	2.04	1.33	1.42	2.14	1.53	1.43	1.28	0.98	1.63	9	
..	7.51	10.40	10.03	*	..	0.86	1.18	2.28	*	..	0.28	1.02	1.39	*	..	0.04	0.50	0.74	*	10	
..	..	2.97	4.71	4.84	..	..	0.22	0.99	2.52	..	..	1.46	2.69	2.97	..	..	0.51	1.99	1.94	11
*	*	10.18	6.26	3.70	*	*	1.07	0.79	0.89	*	*	0.71	1.79	3.42	*	*	0.37	1.28	2.96	12	
4.62	4.75	4.15	3.86	3.64	1.91	2.62	2.16	2.39	3.45	1.80	1.58	4.71	4.40	3.00	1.41	1.18	1.54	1.59	2.43	13	
5.32	4.88	4.84	5.66	4.66	1.94	1.71	1.97	2.82	2.34	2.60	2.14	1.92	1.56	1.51	1.94	1.37	1.27	1.00	1.13	14	
2.50	3.08	4.70	4.20	4.33	1.66	1.12	1.33	2.27	2.24	2.28	2.63	4.79	3.36	2.48	1.65	1.09	2.39	2.31	1.80	15	
..	..	..	4.99	3.80	..	..	..	0.53	1.27	..	..	..	3.72	3.23	..	..	..	1.63	1.61	16.
2.92	2.93	2.57	2.25	2.65	2.06	1.69	3.22	2.36	2.14	1.43	0.98	1.56	1.69	1.75	0.64	0.26	0.64	0.97	1.10	17	
4.24	2.87	3.78	3.25	2.95	0.33	0.61	0.99	0.54	0.63	0.47	1.87	1.28	1.11	1.24	0.02	0.41	0.53	0.45	0.49	18	
2.36	2.86	2.78	2.78	2.69	0.65	1.35	1.33	1.23	1.33	0.79	1.81	2.11	2.21	1.42	0.37	1.28	1.56	1.46	0.79	19	
..	..	..	..	3.52	..	..	..	..	0.55	..	..	..	..	0.55	..	..	..	..	0.26	20
..	..	..	..	4.99	..	..	..	..	0.23	..	..	..	..	1.19	..	..	..	..	0.22	21

* Included with G. I. P. Railway.

Statement showing the general results of working

No.	RAILWAYS.	EXPEN												
		TRAFFIC PER CENT. OF TRAFFIC EARNINGS.					GENERAL PER CENT. OF GROSS EARNINGS, EXCLUDING STEAM-BOAT.					STEAM-RUPEES.		
		1877.	1878.	1879.	1880.	1881.	1877.	1878.	1879.	1880.	1881.	1877.	1878.	1879.
1	East Indian, ...	6.63	7.02	6.33	6.24	5.96	3.44	3.95	3.54	3.97	3.81	87,720	88,924	82,231
2	Great Indian Peninsula, ...	6.90	7.88	8.95	8.32	6.83	3.22	3.95	4.35	4.15	3.40	...	...	...
3	Sind, Punjab and Delhi, ...	9.31	9.98	9.06	9.58	11.34	6.29	6.49	5.16	5.54	6.73	10,66,533	8,69,819	7,79,423
4	Madras, ...	8.35	13.14	11.24	11.21	10.65	4.30	6.85	6.85	7.10	7.13	...	...	...
5	Bombay, Baroda and Central India,	8.22	9.05	8.44	7.32	6.64	6.41	7.01	6.85	5.87	4.86	126	9,001	8,314
6	Eastern Bengal, ...	12.08	15.26	11.49	11.58	10.81	6.58	7.04	7.46	6.77	5.97	2,64,955	2,82,260	2,89,992
7	Oudh and Rohilkhand, ...	12.11	11.85	13.35	12.93	11.58	6.90	7.77	8.69	8.59	7.92	...	...	...
8	Indus Valley and Kandahar, ...	...	15.40	14.73	10.83	12.54	...	18.91	7.21	5.45	7.89	...	16,572	90,661
9	Punjab Northern, ...	13.66	11.46	10.41	11.59	12.48	16.53	12.50	6.07	4.00	6.62	...	...	...
10	Dhond and Manmad, ...	...	16.43	21.91	12.86	...	...	24.54	14.59	12.01	*	...	...	...
11	Patna-Gya, ...	...	...	11.26	8.05	8.48	...	...	8.61	9.33	8.45	...	...	...
12	Nizam's, ...	*	*	13.65	12.40	13.25	*	*	11.08	11.12	8.10	...	...	...
13	South Indian, ...	86	9.12	9.38	9.71	9.35	4.94	7.61	7.38	7.75	8.56	...	...	...
14	Rajputana, ...	9.11	9.67	9.82	9.61	7.86	10.28	9.95	7.75	7.62	5.70	...	...	...
15	Holkar and Sindia-Neemuch,	16.50	12.28	12.92	12.33	11.00	14.90	12.74	9.16	7.49	7.26	...	...	...
16	Nagpur and Chhattisgarh, ...	...	...	...	21.41	17.71	...	...	...	15.30	15.33	...	...	...
17	Rangoon and Irrawaddy Valley,	32.80	19.64	14.83	13.39	14.32	20.35	13.50	13.48	9.19	7.71	...	...	...
18	Northern Bengal, ...	56.54	19.61	19.59	12.21	9.30	53.20	9.26	20.55	12.97	9.71	...	1,07,081	1,07,824
19	Tirhoot, ...	17.84	15.28	14.46	13.65	13.29	15.72	11.82	14.26	12.27	11.51	15,621	81,322	64,399
20	Cawnpore and Farukhabad,	..	...	...	...	12.12	...	...	...	...	21.88	...	...	...
21	Bhavnagar-Gondal,	12.81	15.89

* Included with G. I. P. Railway.

STATISTICS OF INDIAN RAILWAYS.

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of Indian Railways during the years 1877 to 1881—contd.

DITURE—conold.

BOAT.		MISCELLANEOUS PER CENT. OF GROSS EARNINGS, EXCLUDING STEAM-BOAT.					TOTAL RUPEES.					No.
1880.	1881.	1877.	1878.	1879.	1880.	1881.	1877.	1878.	1879.	1880.	1881.	
37,040	28,381	3 36	2-04	1-83	1-02	0-87	1,41,27,854	1,41,96,819	1,42,35,232	1,41,90,698	1,44,63,162	1
...	...	5-69	2-93	3 04	1-98	1-89	1,53,28,633	1,38,73,563	1,50,57,714	1,38,47,702	1,53,37,335	2
5,56,298	2,95,677	1 08	2-33	4 23	4-92	4-24	56,57,888	57,60,124	63,74,155	69,40,656	70,97,487	3
...	...	6 29	2-74	1 62	2 33	1-07	59,47,403	50,42,194	45,51,316	42,05,409	42,35,456	4
1,270	—4,252	0-40	0 87	1 27	0-87	1-06	32,73,330	32,18,551	33,59,890	35,09,722	39,99,430	5
3,04,304	3,14,381	1-36	0-76	0 70	1-25	0-95	19,82,511	20,30,749	20,70,395	22,11,851	23,32,761	6
...	..	1 52	1-19	0-99	0 99	1 95	22,74,205	25,06,568	25,24,907	25,50,740	29,53,032	7
2,01,586	1,71,595	...	12-56	11-29	11 98	8-24	...	7,03,550	26,60,079	47,39,983	43,57,873	8
..	...	1-43	14-95	23-31	25 83	8 39	6,04,879	9,03,761	14,71,192	28,04,113	31,09,966	9
...	...	...	37 01	13-09	8-73	*	...	1,77,195	4,95,222	6,06,875	5,11,304	10
...	...	...	...	12 37	11 16	19-52	...	...	1,28,723	2,70,300	3,34,286	11
...	...	*	*	10-97	6-22	4-43	6,44,081	6,79,907	6,04,476	4,78,407	4,64,059	12
...	...	4-52	4-81	1-79	0-46	0 58	16,45,026	21,55,032	22,98,815	26,29,576	25,17,962	13
...	...	0-10	0 23	0 22	0-16	0-88	13,33,367	13,42,130	23,66,253	24,90,414	43,75,206	14
...	...	0 85	1-03	0 29	0-15	0-39	3,69,047	6,27,128	8,54,009	10,47,268	13,47,280	15
...	...	...	...	...	0 39	0-16	...	...	...	82,681	2,15,473	16
...	...	0-99	1 79	0-41	0-68	1-24	4,45,584	8,95,812	8,14,175	8,01,626	8,98,545	17
1,14,906	1,00,121	...	1-18	2-43	1-12	1-15	68,347	7,37,724	12,59,140	9,69,292	9,44,574	18
48,596	68,899	1-45	1-01	5-54	0-49	0-46	2,09,251	3,32,500	3,50,914	3,10,795	3,48,055	19
...	...	...	...	...	...	0-23	...	...	...	...	1,94,346	20
...	...	...	...	...	...	0 72	...	...	...	...	4,63,181	21

Statement showing the general results of working.

No.	RAILWAYS.	RESULTS EXCLUSIVE OF												
		EARNINGS PER TRAFFIC TRAIN-MILE. RUPEES.					EXPENDITURE PER TRAFFIC TRAIN-MILE. RUPEES.					NET EARNINGS TRAIN- RUPEES		
		1877.	1878.	1879.	1880.	1881.	1877.	1878.	1879.	1880.	1881.	1877.	1878.	1879.
1	East Indian,	5 00	4 93	5 24	5 61	5 69	1 59	1 76	1 72	1 85	1 81	3 41	3 17	3 52
2	Great Indian Peninsula,	4 02	4 40	4 12	4 24	4 17	1 94	2 15	2 46	2 35	2 06	2 08	2 25	1 66
3	Sind, Punjab and Delhi,	4 79	4 41	4 31	4 89	3 78	2 64	2 67	2 40	2 80	2 57	2 15	1 74	1 91
4	Madras,	2 82	3 08	3 20	3 29	3 38	1 67	2 34	2 20	2 25	2 27	1 15	0 74	1 00
5	Bombay, Baroda and Central India,	6 46	5 93	5 56	6 07	5 92	2 71	2 75	2 59	2 58	2 43	3 75	3 18	2 97
6	Eastern Bengal,	6 63	6 65	6 07	6 59	6 95	2 61	2 76	2 66	2 82	2 73	4 02	3 89	3 41
7	Oudh and Rohilkhand,	3 29	3 39	3 38	3 55	3 85	1 73	1 84	1 97	2 03	2 31	1 56	1 55	1 41
8	Indus Valley and Kandahar, .. .. .	..	2 33	3 51	3 76	2 90	..	2 88	2 82	2 64	2 28	..	-0 55	0 69
9	Punjab Northern,	2 82	3 64	4 84	3 66	3 12	2 45	3 62	3 85	3 05	2 79	0 37	0 02	0 99
10	Dhond and Manmad, .. .. .	..	2 34	3 19	3 08	*	..	3 07	3 38	2 69	*	..	-0 73	-0 19
11	Patna-Gya, .. .. .	..	..	5 36	4 26	5 75	..	..	2 99	2 39	3 74	..	..	2 37
12	Nizam's,	3 40	2 62	2 96	3 04	3 10	2 64	2 25	2 53	2 07	1 90	0 76	0 37	0 38
13	South Indian,	2 84	2 75	2 90	2 99	3 21	1 44	1 83	1 98	2 21	2 25	1 40	0 92	0 92
14	Rajputana,	3 25	2 99	2 41	2 75	2 70	2 21	1 85	1 61	1 84	1 63	1 04	1 14	0 80
15	Holkar and Sindia-Neemuch,	2 79	2 74	2 68	2 74	3 06	2 14	1 85	2 00	2 05	2 11	0 64	0 89	0 68
16	Nagpur and Chhattisgarh, .. .. .	..	..	..	2 66	3 41	..	..	..	2 12	2 61	..	..	..
17	Rangoon and Irrawaddy Valley,	2 22	3 08	3 16	3 93	3 84	2 87	2 86	2 69	2 38	2 24	-0 65	0 22	0 47
18	Northern Bengal,	1 75	2 84	2 73	2 76	3 22	2 45	2 02	2 51	1 63	1 65	-0 70	0 82	0 22
19	Tirhoot,	3 08	3 00	3 08	3 71	3 11	2 15	2 04	2 29	2 15	1 78	0 93	0 96	0 79
20	Cawnpore and Farukhabad, .. .. .	..	..	..	..	2 12	..	..	..	..	1 48	..	..	..
21	Bhavnagar-Gondal,	2 39	1 68

* Included with G. I. P. Railway.

STATISTICS OF INDIAN RAILWAYS.

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of Indian Railways during the years 1877 to 1881—contd.

STEAM-BOAT SERVICE.							CAPITAL EXPENDED ON OPEN LINE, INCLUSIVE OF ROLLING STOCK.					No.
PER TRAFFIC MILE.		AVERAGE GROSS EARNINGS PER MILE PER WEEK, RUPEES.					RUPEES.					
1880.	1881.	1877.	1878.	1879.	1880.	1881.	1877.	1878.	1879.	1880.	1881.	
3.76	3.88	567	509	554	548	580	32,42,03,444	32,53,63,079	32,94,21,094	33,03,98,294	33,26,62,788	1
1.89	2.11	497	429	383	377	481	24,15,85,669	24,63,02,172	24,85,83,445	24,99,77,200	25,10,85,907	2
2.09	1.21	238	230	312	353	285	10,94,60,302	11,09,81,062	11,37,04,800	11,52,29,919	11,61,01,033	3
1.04	1.11	225	148	149	138	141	10,87,19,585	10,99,59,654	11,05,95,550	11,08,55,385	11,12,28,364	4
3.49	3.49	338	298	310	357	422	8,14,97,945	8,14,91,989	8,23,22,437	8,21,07,875	8,37,48,733	5
3.77	4.21	529	473	455	498	574	3,30,24,862	3,38,11,811	3,42,84,355	3,45,85,309	3,46,50,090	6
1.52	1.54	153	163	153	157	173	5,33,86,570	5,52,55,100	5,61,92,646	5,81,44,361	6,01,94,626	7
1.12	0.62	..	55	121	221	157	..	5,13,35,647	5,70,01,762	6,92,82,608	7,44,77,194	8
0.61	0.33	130	170	345	423	195	1,70,25,460	1,71,07,578	2,45,80,202	4,04,24,501	6,19,34,964	9
0.39	*	..	64	76	92	*	..	71,17,400	95,38,053	1,04,58,463	*	10
1.87	2.01	..	..	122	162	173	..	..	28,45,078	32,20,951	35,04,401	11
0.97	1.20	132	126	111	112	121	1,15,06,385	1,14,59,384	1,16,10,466	1,20,62,228	1,21,75,473	12
0.78	1.05	107	102	105	107	109	3,77,65,242	3,93,32,379	4,09,09,354	4,16,72,963	4,28,06,756	13
0.91	1.07	131	137	156	154	189	2,53,82,403	2,83,21,943	3,09,43,568	3,40,61,947	5,20,44,975	14
0.69	0.95	86	122	129	118	130	1,14,38,860	1,95,98,318	2,00,13,727	2,53,37,858	3,16,69,537	15
0.54	0.80	..	..	..	51	87	..	..	..	30,37,689	69,01,473	16
1.55	1.60	61	115	114	158	184	88,45,886	1,12,12,847	1,18,94,894	1,23,07,244	1,24,92,079	17
1.13	1.57	20	87	107	121	136	1,28,04,745	1,69,11,622	1,90,96,004	2,00,98,652	2,03,79,182	18
1.56	1.33	69	91	90	106	117	44,91,006	50,09,950	51,83,919	53,46,672	63,82,438	19
..	0.64	..	..	..	..	62	..	..	..	..	31,26,855	20
..	0.71	..	..	..	..	78	..	..	..	..	67,34,108	21

Statement showing the general results of working

No.	RAILWAYS.	NET EARNINGS. RUPEES.				
		1877.	1878.	1879.	1880.	1881.
1	East Indian,	3,02,23,905	2,55,81,189	2,90,80,929	2,87,54,418	3,09,48,310
2	Great Indian Peninsula,	1,69,45,466	1,44,91,248	1,01,90,601	1,11,05,551	1,62,19,488
3	Sind, Punjab and Delhi,	41,88,498	31,70,091	45,40,520	54,70,862	30,76,660
4	Madras,	40,87,892	15,87,980	20,75,170	19,57,136	20,75,856
5	Bombay, Baroda and Central India,	45,25,582	36,87,126	37,92,898	47,34,653	57,45,702
6	Eastern Bengal,	28,44,522	26,15,072	24,33,580	27,24,310	33,69,281
7	Oudh and Rohilkhand,	20,67,600	21,15,469	18,19,936	19,04,410	19,73,698
8	Indus Valley and Kandahar, ... ..	...	-1,31,441	6,17,459	19,22,399	11,77,288
9	Punjab Northern,	91,882	5,810	3,78,889	5,64,171	3,59,598
10	Dhond and Manmad, ... ..	...	-41,941	-27,664	88,219	1,22,558
11	Patna-Gya, ... ..	...	...	1,01,787	2,11,256	1,79,145
12	Nizam's,	1,86,687	1,11,846	89,925	2,24,309	2,92,775
13	South Indian,	15,88,220	10,78,107	10,63,252	9,30,018	12,37,726
14	Rajputana,	8,63,320	11,30,471	11,79,167	12,33,305	28,67,041
15	Holkar and Sindia-Neemuch,	1,11,081	3,01,917	2,91,828	3,53,991	6,02,299
16	Nagpur and Chhattisgarh, ... ..	...	...	...	21,271	66,056
17	Rangoon and Irrawaddy Valley,	-1,01,132	67,157	1,41,743	5,21,084	6,45,077
18	Northern Bengal,	-19,630	2,41,806	1,25,120	6,43,509	8,99,316
19	Tirhoot,	90,306	1,08,808	1,07,818	2,40,272	2,36,200
20	Cawnpore and Farukhabad,	84,238
21	Bhavnagar-Gondal,	2,05,254

STATISTICS OF INDIAN RAILWAYS.

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of Indian Railways during the years 1877 to 1881—concl'd.

PERCENTAGE OF EXPENSES TO EARNINGS.					PER CENT. OF PROFITS PER ANNUM ON CAPITAL EXPENDITURE.					No.
1877.	1878.	1879.	1880.	1881.	1877.	1878.	1879.	1880.	1881.	
31.85	35.69	32.86	33.04	31.85	9.32	7.86	8.83	8.70	9.30	1
48.30	48.91	59.64	55.49	49.40	7.01	5.88	4.10	4.44	6.46	2
57.46	64.50	60.22	55.92	69.76	3.82	2.86	3.99	4.75	2.65	3
59.26	76.05	68.68	68.24	67.11	3.76	1.44	1.88	1.77	1.87	4
41.97	46.61	46.97	42.57	41.04	5.55	4.52	4.61	5.77	6.86	5
41.07	43.71	45.97	44.81	40.91	8.61	7.73	7.10	7.88	9.72	6
52.38	54.23	58.11	57.25	59.91	3.86	3.83	3.24	3.28	3.28	7
...	122.97	81.16	71.15	78.73	...	-0.26	1.08	2.77	1.58	8
86.81	99.36	79.52	83.25	89.64	0.54	0.03	1.54	1.40	0.58	9
...	131.01	105.92	87.31	80.66	...	-0.58	-0.29	0.84	*	10
...	...	55.84	56.13	65.11	...	...	3.53	6.56	5.11	11
77.53	85.87	87.01	68.08	61.32	1.62	0.98	0.77	1.86	2.40	12
50.88	66.65	68.38	73.87	67.04	4.21	2.74	2.60	2.23	2.39	13
67.99	61.97	66.74	66.88	60.41	3.40	3.99	3.81	3.62	5.51	14
76.86	67.50	74.53	74.74	69.11	0.97	1.54	1.46	1.40	1.90	15
...	...	...	79.54	76.53	...	...	...	0.70	0.95	16
129.36	93.03	85.17	60.60	58.21	-1.14	0.60	1.19	4.23	5.16	17
140.29	75.31	90.96	60.10	51.23	-0.15	1.43	0.66	3.20	4.41	18
69.85	75.34	76.49	56.40	59.57	2.01	2.17	2.10	4.49	3.70	19
...	...	...	...	69.76	...	...	...	...	2.70	20
...	...	...	...	70.18	...	...	...	...	3.05	21

* Included with G. I. P. Railway.

Statement showing the lengths open, the average age, and the general results of working of all Indian Railways from the commencement up to the end of 1881.

Year.	Miles open at end of year.	Mean mileage open during year.	Mean age of lines at end of year.	Capital outlay at close of year.	Cost per mile open	Gross earnings during year.	Working expenses during year.	Net profits of year.	PERCENTAGE ON CAPITAL COST OF			Gross earnings per mile per week.	REMARKS.
									Gross earnings	Working expenses.	Net profits.		
EAST INDIAN RAILWAY.													
				Rs.	Rs.	Rs.	Rs.	Rs.				Rs.	
1854,	...	37.75	13 70	0 36	...	...	93,280	58,005	85,275	...	...	...	181
1855,	...	120 50	113 02	1 05	...	...	6,36,210	3,30,543	3,05,662	...	...	...	108
1856,	...	120 50	120 50	2 05	...	...	10,43,369	4,25,896	6,22,473	...	...	...	167
1857,	...	120.50	120.50	3.05	...	...	14,59,306	5,56,354	9,02,952	...	...	...	232
1858,	...	139 50	125 19	3 53	...	...	18,23,319	8,48,021	9,75,393	...	...	...	279
1859,	...	286 50	249 33	2 59	...	...	32,88,702	14,72,197	18,16,505	...	...	...	253
1860,	...	370 25	304 40	2 63	...	...	36,65,092	17,72,274	18,92,813	...	...	...	231
1861,	...	560 75	430 10	2 68	...	...	53,83,060	25,02,719	28,80,341	...	...	...	240
1862,	...	877.50	638 49	2 41	...	...	63,86,374	34,36,702	29,50,172	...	...	...	192
1863,	...	933 00	923 97	3 26	...	...	1,08,44,651	59,65,320	48,79,231	...	...	...	222
1864,	...	1104 00	1057.13	3 71	...	...	1,39,31,130	70,75,628	68,55,502	...	...	...	253
1865,	...	1127 50	1125 64	4 63	...	...	1,82,50,754	81,79,114	1,00,71,640	...	...	...	311
1866,	...	1127 50	1127 50	5 63	...	...	2,19,89,012	97,28,447	1,22,60,565	...	...	...	374
1867,	...	1353 00	1223 04	5.60	...	...	2,95,33,695	1,15,09,210	1,20,24,485	...	...	...	369
1868,	...	1353 00	1353 00	6 60	...	...	2,43,83,184	1,09,43,821	1,34,39,363	...	...	...	346
1869,	...	1353 00	1353.00	7 60	...	...	2,31,41,532	1,25,00,880	1,56,40,652	...	...	...	399
1870,	...	1353 00	1353 00	8 60	...	...	2,99,06,157	1,30,63,749	1,68,42,408	...	...	...	424
1871,	...	1503 25	1503 25	8 74	...	...	2,65,15,841	1,14,96,674	1,50,19,167	...	...	...	388
1872,	...	1503 25	1503 25	9 74	...	...	2,88,53,069	1,19,56,058	1,68,97,011	...	...	...	368
1873,	...	1503 25	1503 25	10 74	32,17,25,967	2,14,021	2,99,35,196	1,16,00,980	1,83,34,216	9.31	3 61	5.70	382
1874,	...	1503 25	1503 25	11 74	32,22,38,040	2,14,361	3,71,69,144	1,32,67,702	2,39,01,442	11 53	4 12	7.41	474
1875,	...	1503 25	1503 25	12 74	32,27,95,353	2,14,732	2,93,07,977	1,16,00,138	1,77,07,839	9 08	3.59	5.49	374
1876,	...	1503 25	1503 25	13 74	32,31,23,313	2,14,950	3,54,43,718	1,24,34,645	2,30,09,073	10 97	3 85	7 12	452
1877,	...	1503 25	1503 25	14 75	32,42,03,444	2,15,668	4,43,06,210	1,40,40,134	3,02,66,076	13.67	4 33	9 34	565
1878,	...	1503 25	1503 25	15.74	32,53,63,088	2,16,440	3,97,36,391	1,41,57,895	2,55,76,996	12 21	4 35	7 86	507
1879,	...	1504 25	1504 05	16 73	32,94,21,094	2,18,993	4,32,87,420	1,42,03,061	2,90,84,359	13.14	4 31	8 83	552
1880,	...	1504 25	1504 25	17 73	33,03,98,294	2,19,643	4,29,14,430	1,41,53,658	2,87,60,772	12 99	4 28	8 71	549
1881,	...	1506 75	1505.50	18.70	33,26,62,788	2,20,782	4,53,79,623	1,44,34,731	3,09,44,842	13 64	4 34	9 30	578

STATISTICS OF INDIAN RAILWAYS.

CCXIX

Year.	Miles open at end of year.	Mean mileage open during year.	Mean age of lines at end of year.	Capital outlay at close of year.	Cost per mile open.	Gross earnings during year.	Working expenses during year.	Net profits of year.	PERCENTAGE ON CAPITAL COST OF			Gross earnings per mile per week.	REMARKS.
									Gross earnings	Working expenses.	Net profits.		

EASTERN BENGAL RAILWAY.

				Rs.	Rs.	Rs.	Rs.	Rs.				Rs.		
1862,	..	107 25	19 76	0 18	96,656	53,731	42,925	94	* Excluding the length from Kooshtea engine-shed to old Kooshtea (½ mile).
1863,	..	107 25	107 25	1 18	..	..	8,32,921	4,03,380	4,29,541	..	..	..	149
1864,	..	111 25	110 75	2 13	..	..	10,15,049	5,44,741	4,70,308	..	..	..	176
1865,	..	111 25	111 25	3 13	..	..	13,51,424	6,61,987	6,89,437	..	..	..	233
1866,	..	111 25	111 25	4 13	..	..	14,15,941	7,22,863	6,93,078	..	..	..	243
1867,	..	111 25	111 25	5 13	..	..	16,19,833	7,88,971	8,30,862	..	..	..	279
1868,	..	111 25	111 25	6 13	..	..	17,87,154	8,28,037	9,59,117	..	..	..	308
1869,	..	111 25	111 25	7 13	..	..	18,14,151	9,12,291	9,01,860	..	..	..	313
1870,	..	111 25	111 25	8 13	..	..	19,42,323	10,82,049	8,60,774	..	..	..	335
1871,	..	156 25	156 25	6 79	..	..	21,98,314	12,31,267	9,67,047	..	..	..	270
1872,	..	156 25	156 25	7 79	..	..	28,02,173	18,65,279	9,36,894	..	..	..	344
1873,	..	158 00	156 87	8 70	3,05,37,109	1,93,273*	30,84,504	15,13,798	15,70,706	10 10	4 96	5 14	377	
1874,	..	158 00	158 00	9 70	3,16,15,099	2,00,096	35,64,841	18,60,141	17,04,700	11 27	5 88	5 39	433	
1875,	..	158 00	158 00	10 70	3,18,80,302	2,01,774	29,34,327	18,23,909	11,10,418	9 20	5 72	3 48	356	
1876,	..	158 00	158 00	11 70	3,20,75,662	2,03,011	33,01,377	14,41,286	13,60,091	10 29	4 49	5 80	401	
1877,	..	158 00	158 00	12 70	3,21,03,753	2,03,188	43,56,002	17,17,556	26,38,446	13 56	5 35	8 21	529	
1878,	..	158 00	158 00	13 70	3,25,89,022	2,06,260	42,16,988	17,48,489	24,68,499	12 94	5 36	7 58	512	
1879,	..	158 00	158 00	14 70	3,30,17,629	2,08,972	40,65,812	17,80,408	22,85,409	12 31	5 39	6 92	494	
1880,	..	158 00	158 00	15 70	3,31,68,524	2,08,935	44,51,318	19,07,547	25,43,771	13 42	5 75	7 67	540	
1881,	..	159 00	158 50	16 59	3,31,72,422	2,08,631	51,29,608	20,18,380	31,11,228	15 46	6 08	9 38	†621	† Calculated on the total mileage inclusive of Foradsha section.

APPENDIX FF—continued.

OUDH AND ROHILKHAND RAILWAY.

1867,	..	42 00	29 11	0 69	..	..	1,12,166	1,19,986	-7,820	..	..	..	74
1868,	..	42 00	42 00	1 69	..	..	2,62,647	1,69,521	93,126	..	..	..	120
1869,	..	42 00	42 00	2 69	..	..	2,12,925	1,74,041	38,884	..	..	..	97
1870,	..	42 00	42 00	3 69	..	..	2,45,793	5,60,232	-3,14,439	..	..	..	112
1871,	..	42 00	42 00	4 69	..	..	2,56,144	1,77,541	78,603	..	..	..	117
1872,	..	293 50	144 17	1 16	..	..	4,22,760	2,89,922	1,32,838	..	..	..	56
1873,	..	456 50	387 51	1 59	3,02,03,680	66,164	11,29,900	8,19,458	3,04,442	3 72	2 71	1 01	56
1874,	..	540 50	533 00	2 33	4,64,67,380	85,971	20,04,020	12,90,826	7,13,194	4 31	2 73	1 53	72
1875,	..	543 75	542 01	3 31	5,07,05,050	93,251	27,51,244	16,42,745	11,08,499	5 42	3 24	2 18	97
1876,	..	543 75	543 75	4 31	5,29,66,230	97,409	34,11,422	21,81,020	12,30,402	6 44	4 12	2 32	120
1877,	..	543 75	543 75	5 31	5,42,39,610	99,751	48,41,805	22,74,205	20,67,600	8 00	4 19	3 81	153

1878,	..	546 75	544 25	6 28	5,50,82,280	1,00,745	46,22,037	25,06,568	21,15,469	8 39	4 55	3 84	163
1879,	..	546 75	546 75	7 28	5,59,73,380	1,02,375	43,44,843	25,24,907	18,19,936	7 76	4 51	3 25	153
1880,	..	546 75	546 75	8 28	5,77,96,380	1,05,709	44,55,150	25,50,740	19,04,410	7 71	4 41	3 30	157
1881,	..	546 75	546 75	9 28	5,84,40,769	1,06,868	49,28,730	23,53,032	19,75,698	8 43	5 05	3 35	173

SIND, PUNJAB AND DELHI RAILWAY.

1861,	..	109 75	70 06	0 64	..	..	2,11,207	2,05,460	5,747	..	..	..	58
1862,	..	141 75	133 07	1 43	..	..	7,76,082	6,07,683	1,68,399	..	..	..	112
1863,	..	141 75	141 75	2 43	..	..	12,56,851	10,43,747	2,13,104	..	..	..	171
1864,	..	141 75	141 75	3 43	..	..	12,51,843	10,92,345	1,59,498	..	..	..	170
1865,	..	349 75	285 36	2 21	..	..	14,93,936	12,27,676	2,66,260	..	..	..	101
1866,	..	349 75	349 75	3 21	..	..	21,21,223	16,79,002	4,42,221	..	..	..	118
1867,	..	403 25	373 53	3 71	..	..	23,53,895	21,07,980	2,45,965	..	..	..	121
1868,	..	403 25	403 25	4 71	..	..	23,59,764	22,58,168	1,01,596	..	..	..	112
1869,	..	621 25	543 35	3 93	..	..	33,04,109	26,66,257	6,37,852	..	..	..	117
1870,	..	663 50	644 74	4 65	..	..	46,78,353	35,63,101	11,05,252	..	..	..	140
1871,	..	663 50	663 50	5 65	..	..	42,25,148	41,86,072	39,046	..	..	..	122
1872,	..	663 50	663 50	6 65	..	..	46,41,549	39,80,906	6,60,643	..	..	..	134
1873,	..	663 50	663 50	7 65	9,04,02,458	1,36,251	53,16,035	36,50,505	16,65,530	5 88	4 04	1 84	154
1874,	..	663 50	663 50	8 65	8,44,36,811	1,27,260	66,02,995	36,54,750	29,43,245	7 82	4 33	3 49	191
1875,	..	663 50	663 50	9 65	10,36,23,458	1,56,177	55,84,762	35,78,912	20,05,850	5 39	3 45	1 94	161
1876,	..	663 50	663 50	10 65	10,41,58,735	1,56,984	64,37,104	43,15,033	21,22,021	6 16	4 14	2 04	186
1877,	..	663 50	663 50	11 65	10,46,37,469	1,57,705	83,37,081	45,91,305	37,45,776	7 97	4 39	3 58	241
1878,	..	663 50	663 50	12 65	10,61,58,240	1,59,997	80,81,779	48,90,305	31,91,474	7 61	4 61	3 00	234
1879,	..	663 50	663 50	13 65	10,89,27,371	1,64,171	1,09,65,815	60,94,732	48,71,083	10 07	5 60	4 47	317
1880,	..	663 50	663 50	14 65	11,04,52,484	1,66,470	1,21,67,588	63,84,358	57,83,230	11 02	5 78	5 24	352
1881,	..	663 50	663 50	15 65	11,13,77,681	1,67,864	1,00,20,844	68,01,810	32,19,034	8 99	6 10	2 39	352

* Calculated on the total mileage, inclusive of 13 miles of the East Indian Railway from Gazeabad to Delhi, worked over by the Sind, Punjab and Delhi Railway.

MADRAS RAILWAY.

1856,	..	65 00	32 77	0 50	..	..	1,27,863	66,058	61,805	..	..	..	75
1857,	..	80 50	75 15	1 34	..	..	3,58,102	1,68,762	1,89,340	..	..	..	91
1858,	..	95 50	89 83	2 07	..	..	4,33,762	2,40,889	1,92,873	..	..	..	93
1859,	..	95 50	95 50	3 07	..	..	6,06,769	3,66,155	2,40,614	..	..	..	122
1860,	..	136 50	129 51	3 10	..	..	7,91,500	5,81,760	2,09,740	..	..	..	117
1861,	..	296 50	241 89	2 24	..	..	11,45,172	8,13,998	3,31,174	..	..	..	91
1862,	..	446 75	392 79	2 37	..	..	17,16,671	12,70,751	4,45,920	..	..	..	84
1863,	..	446 75	446 75	3 37	..	..	25,53,504	17,50,964	8,02,540	..	..	..	110
1864,	..	569 50	491 81	3 51	..	..	34,09,057	16,91,491	17,17,566	..	..	..	133
1865,	..	609 00	582 70	4 24	..	..	44,18,249	20,18,527	23,99,722	..	..	..	145
1866,	..	643 25	623 36	4 96	..	..	47,80,942	21,81,509	25,99,433	..	..	..	147
1867,	..	643 25	643 25	5 96	..	..	51,38,099	22,23,125	29,14,974	..	..	..	153
1868,	..	675 75	654 11	6 64	..	..	61,76,100	25,62,820	36,13,280	..	..	..	181
1869,	..	705 50	688 22	7 32	..	..	61,37,801	30,17,661	31,20,140	..	..	..	171

Year.	Miles open at end of year.	Mean mile-age open during year.	Mean age of lines at end of year.	Capital outlay at close of year	Cost per mile open.	Gross earnings during year.	Working expenses during year.	Net profits of year.	PERCENTAGE ON CAPITAL COST OF			Gross earnings per mile per week.	REMARKS.
									Gross earnings.	Working expenses.	Net profits.		

MADRAS RAILWAY—(concluded).

				Rs.	Rs.	Rs.	Rs.	Rs.				Rs.	
1870,	..	781-50	709 66	7-52	..	..	53,80,501	28,33,023	25,47,478	..	..	..	146
1871,	..	830 00	823 62	8 07	..	..	59,90,455	30,71,093	29,19,362	..	..	..	139
1872,	..	830 00	830 00	9 07	..	..	62,05,653	32,38,962	29,66,691	..	..	..	143
1873,	..	858 00	842 49	9 76	10,52,09,935	1,22,622	68,83,350	39,19,378	29,63,972	6 54	3 72	2 82	157
1874,	..	858 00	858 00	10 76	10,59,29,106	1,23,046	59,06,500	38,19,533	20,86,967	5-57	3 60	1 97	132
1875,	..	858-00	858 00	11 76	10,63,19,302	1,23,915	64,29,752	45,18,602	19,11,150	6 05	4 25	1 80	144
1876,	..	858 00	858 00	12 76	10,66,82,346	1,24,338	71,13,773	45,79,778	25,33,995	6 67	4 29	2 33	159
1877,	..	858 00	858 00	13 76	10,87,19,585	1,26,713	1,00,35,295	59,47,403	40,87,692	9 23	5 47	3 76	225
1878,	..	858-00	858 00	14 76	10,99,69,654	1,28,158	66,30,174	50,42,194	15,87,980	6 03	4 59	1 44	148
1879,	..	858 00	858 00	15 76	11,05,95,550	1,28,899	66,26,486	45,51,316	20,75,170	5 99	4 11	1 88	148
1880,	..	858-00	858 00	16 76	11,08,55,385	1,29,202	61,62,545	42,05,409	19,57,136	5 56	3 79	1 77	138
1881,	..	858-00	858 00	17 76	11,10,37,589	1,29,414	63,11,312	42,35,456	20,76,356	5 68	3 81	1 87	141

SOUTH INDIAN RAILWAY.

1861,	..	48 25	9 53	0 20	..	..	37,871	17,969	19,902	..	..	..	77
1862,	..	81 75	75 42	1-04	..	..	2,38,607	1,06,033	1,83,574	..	..	..	61
1863,	..	81-75	81-75	2 04	..	..	3,13,899	1,40,001	1,73,898	..	..	..	74
1864,	..	81-75	81 75	3 04	..	..	2,95,279	1,69,929	1,25,350	..	..	..	69
1865,	..	99 25	93-16	3 45	..	..	3,84,396	1,90,381	1,94,015	..	..	..	79
1866,	..	143 75	102 79	3 10	..	..	5,71,677	2,81,709	2,89,968	..	..	..	106
1867,	..	160 50	152 19	3-72	..	..	6,85,132	3,40,264	3,44,868	..	..	..	86
1868,	..	184 00	182-00	4 24	..	..	8,46,331	4,11,646	4,34,685	..	..	..	90
1869,	..	184 00	184 00	5 24	..	..	8,13,028	5,23,940	2,89,088	..	..	..	84
1870,	..	184-00	184 00	6 24	..	..	8,09,549	5,05,148	3,04,401	..	..	..	84
1871,	..	184-00	184-00	7-24	..	..	8,13,882	4,52,563	3,61,319	..	..	..	84
1872,	..	184 00	184 00	8 24	..	..	8,42,022	4,78,872	3,63,150	..	..	..	87
1873,	..	184-00	184 00	9 24	1,53,11,600	82,426	11,53,212	5,76,462	5,76,750	7 53	3-76	3-77	120
1874,	..	184 00	184 00	10 24	1,53,21,663	82,182	9,69,746	5,89,679	3,80,067	6 33	3 85	2 48	101
1875,	..	280 00	216-09	7 36	2,06,06,170	73,593	10,78,481	5,19,400	5,59,081	5-23	2 52	2-71	96
1876,	..	472 75	422-15	5 25	3,13,68,386	68,468	19,90,800	10,60,522	9,30,278	6 35	3 35	3-00	90
1877,	..	598 00	577 98	5-12	3,71,85,036	62,182	32,33,246	16,45,026	15,88,220	8 69	4-42	4-27	107
1878,	..	610-75	605-70	6-00	3,87,44,014	63,437	32,33,139	21,55,032	10,78,107	8-34	5-56	2-73	102

1879,	..	631.50	613.73	6.77	4,09,01,593	64,769	33,62,067	22,98,815	10,63,252	8.22	5.62	2.60	105
1880,	..	645.25	637.26	7.61	4,16,72,963	64,584	35,59,594	26,29,676	9,80,018	8.54	6.31	2.23	106
1881,	..	655.00	655.00	8.49	4,28,06,756	65,354	37,55,688	25,17,962	12,37,726	8.77	6.88	2.89	*109

* Calculated on the total mean mileage inclusive of 8 miles of the Pondicherry line worked by the South Indian Railway Company.

GREAT INDIAN PENINSULA RAILWAY.

1858,	..	20.50	14.49	0.71	..	..	89,634	41,144	48,490	..	..	..	119
1854,	..	33.25	29.06	1.31	..	..	1,48,220	84,045	54,175	..	..	..	88
1855,	..	49.50	37.35	1.63	..	..	1,76,560	1,23,971	52,589	..	..	..	89
1856,	..	87.25	73.70	1.77	..	..	4,33,602	1,82,862	2,50,740	..	..	..	113
1857,	..	87.25	87.25	2.77	..	..	7,25,215	3,28,272	3,96,943	..	..	..	158
1858,	..	193.50	113.37	1.83	..	..	11,24,249	4,74,278	6,49,971	..	..	..	173
1859,	..	244.25	203.23	2.28	..	..	18,28,528	9,35,971	8,92,557	..	..	..	172
1860,	..	297.00	286.29	2.84	..	..	21,43,571	13,06,892	8,36,679	..	..	..	144
1861,	..	437.75	370.16	2.78	..	..	26,78,873	20,45,332	6,33,541	..	..	..	139
1862,	..	495.00	451.40	3.87	..	..	34,95,590	21,68,018	13,27,572	..	..	..	149
1863,	..	555.00	532.37	8.96	..	..	48,24,152	32,58,899	15,65,253	..	..	..	175
1864,	..	587.50	561.14	4.70	..	..	69,61,996	50,17,777	19,44,219	..	..	..	119
1865,	..	703.75	603.72	4.76	..	..	1,29,56,625	77,14,871	52,41,754	..	..	..	414
1866,	..	†817.75	735.16	5.12	..	..	1,36,97,154	79,53,801	57,43,353	..	..	..	357
1867,	..	854.50	843.21	5.86	..	..	1,62,18,683	90,32,796	71,85,867	..	..	..	368
1868,	..	875.50	872.79	6.72	..	..	1,61,45,882	99,79,215	61,66,667	..	..	..	357
1869,	..	875.50	875.50	7.72	..	..	1,58,01,210	1,05,53,746	52,47,464	..	..	..	348
1870,	..	1260.50	1162.74	6.28	..	..	1,81,28,937	1,12,85,474	68,43,463	..	..	..	300
1871,	..	1275.75	1270.74	7.20	..	..	2,02,47,045	1,27,62,671	74,84,374	..	..	..	307
1872,	..	1275.75	(c)1275.75	8.20	..	..	1,87,28,265	1,20,32,009	66,96,256	..	..	..	284
1873,	..	1275.75	1275.75	9.40	23,62,39,190	1,85,176	1,88,51,120	1,20,81,127	67,69,993	7.98	5.11	2.87	284
1874,	..	1275.75	1275.75	10.20	23,67,57,570	1,85,583	2,01,65,973	1,19,32,583	82,33,390	8.54	5.04	3.48	303
1875,	..	1275.75	1275.75	11.20	23,80,65,370	1,86,608	2,15,24,577	1,01,75,859	1,13,48,718	9.04	4.27	4.77	324
1876,	..	1275.75	1275.75	12.20	23,97,99,600	1,87,967	2,45,95,418	1,16,77,891	1,28,57,522	10.23	4.87	5.36	369
1877,	..	1275.75	1275.75	13.20	24,15,85,669	1,89,367	3,27,74,151	1,58,28,683	1,69,45,468	13.57	6.56	7.01	492
1878,	..	1275.75	1275.75	14.20	24,63,02,172	1,93,064	2,83,64,811	1,38,73,663	1,44,91,248	11.51	5.63	5.88	429
1879,	..	1275.75	1275.75	15.20	24,85,83,445	1,94,853	2,52,48,315	1,50,57,714	1,01,90,601	10.16	6.06	4.10	383
1880,	..	1275.75	1275.75	16.20	24,99,77,200	1,95,945	2,49,53,253	1,38,47,702	1,11,05,551	9.98	5.54	4.44	372
1881,	..	†1288.00	1288.00	17.04	25,10,85,907	1,94,942	3,20,56,823	1,58,37,335	1,62,19,488	12.76	6.31	6.45	‡426

† Excludes Mohpani Branch.

(c) Excluding Mohpani Branch.

‡ Includes Mohpani Branch.
§ Calculated on the total mileage inclusive of 159.75 miles of State lines worked by the Great Indian Peninsula Railway Company.

STATISTICS OF INDIAN RAILWAYS.

2/2

BOMBAY, BARODA AND CENTRAL INDIA RAILWAY.

1860,	..	35.00	26.00	0.74	..	..	66,349	46,539	19,790	..	..	..	49
1861,	..	134.00	106.51	0.98	..	..	4,06,854	2,23,639	1,33,215	..	..	..	73
1862,	..	167.25	144.93	1.65	..	..	7,06,723	3,54,370	3,52,333	..	..	..	94
1863,	..	185.00	184.03	2.40	..	..	13,73,292	6,79,869	6,93,423	..	..	..	138

CXXIII

Year.	Miles open at end of year.	Mean mileage open during year.	Mean age of lines at end of year.	Capital outlay at close of year.	Cost per mile open.	Gross earnings during year.	Working expenses during year.	Net profits of year.	PERCENTAGE ON CAPITAL COST OF			Gross earnings per mile per week.	REMARKS.
									Gross earnings	Working expenses	Net profits.		

BOMBAY, BARODA AND CENTRAL INDIA RAILWAY—(concluded).

				Rs.	Rs.	Rs.	Rs.	Rs.				Rs.	
1864, ...	305.75	196.25	2.05	...	...	15,95,503	13,61,402	2,34,101	...	...	...	156	
1865, ...	305.75	305.75	3.05	...	...	35,62,142	22,73,327	12,88,314	...	...	...	223	
1866, ...	305.75	305.75	4.06	...	...	44,47,505	31,98,915	12,48,590	...	...	...	278	
1867, ...	305.75	305.75	5.06	...	...	46,36,910	30,86,175	15,50,735	...	...	...	291	
1868, ...	306.75	305.75	6.04	...	...	45,78,698	33,72,675	12,06,023	...	...	...	287	
1869, ...	307.50	307.15	7.02	...	...	49,20,186	36,56,821	12,63,365	...	...	...	307	
1870, ...	312.50	312.41	7.91	...	...	53,79,250	32,56,664	21,22,586	...	...	...	327	
1871, ...	349.75	323.31	8.00	...	...	54,74,096	32,67,071	22,07,025	...	...	...	300	
1872, ...	389.25	373.67	8.15	...	...	56,49,316	33,87,867	22,61,449	...	...	...	290	
1873, ...	411.75	403.67	8.69	7,90,85,433	1,92,071	55,89,798	33,10,942	22,78,856	7.07	4.19	2.88	260	* Includes Patri Branch.
1874, ...	428.50	424.05	9.34	8,10,04,047	1,89,041	58,58,414	30,53,218	28,05,196	7.23	3.77	3.46	265	
1875, ...	430.25	430.23	10.30	8,13,99,633	1,89,191	63,86,783	34,75,021	29,11,762	7.84	4.27	3.57	285	
1876, ...	439.25	430.89	11.07	8,14,56,207	1,85,467	67,72,292	37,07,006	30,65,286	8.31	4.55	3.76	296	
1877, ...	444.00	443.63	11.94	8,22,35,127	1,85,214	77,98,912	32,73,204	45,25,708	9.48	3.98	5.50	345	
1878, ...	444.00	444.00	12.94	8,22,31,760	1,85,207	69,04,950	32,09,550	36,95,400	8.40	3.91	4.49	298	
1879, ...	444.00	444.00	13.94	8,30,57,040	1,87,065	71,52,573	33,56,576	37,95,997	8.61	4.04	4.57	309	
1880, ...	444.00	444.00	14.94	8,28,42,480	1,86,532	82,44,375	35,08,452	47,35,923	9.95	4.23	5.72	355	
1881, ...	444.00	444.00	15.94	8,37,48,733	1,88,623	97,45,132	39,99,430	57,45,702	11.64	4.76	6.86	423	

CALCUTTA AND SOUTH-EASTERN RAILWAY.

1862, ...	15.00	14.96	1.00	...	...	27,780	35,688	-7,888	...	...	...	36	
1863, ...	28.00	23.23	1.36	...	...	47,328	62,032	-14,704	...	...	...	38	
1864, ...	28.00	28.00	2.36	...	...	77,332	1,05,971	-28,639	...	...	...	53	
1865, ...	28.00	28.00	3.36	...	...	1,08,952	1,24,552	-15,600	...	...	...	75	
1866, ...	28.00	28.00	4.36	...	...	1,15,293	1,36,731	-21,438	...	...	...	79	
1867, ...	28.00	28.00	5.36	...	...	92,920	1,24,198	-31,278	...	...	...	64	
1868, ...	28.00	28.00	6.36	...	...	87,878	1,52,131	-64,253	...	...	...	60	
1869, ...	28.00	28.00	7.36	...	...	80,786	1,17,579	-36,793	...	...	...	55	
1870, ...	28.00	28.00	8.36	...	...	98,844	1,03,670	-4,826	...	...	...	55	
1871, ...	28.00	28.00	9.36	...	...	79,308	72,027	7,281	...	...	...	40	
1872, ...	28.00	28.00	10.36	...	...	58,711	54,057	4,654	...	...	...	40	
1873, ...	28.00	28.00	11.36	73,21,970	2,61,499	1,02,072	1,04,687	-2,615	1.39	1.43	-0.04	70	
1874, ...	28.00	28.00	12.36	73,08,800	2,61,499	99,489	77,945	21,544	1.36	1.07	0.29	68	
1875, ...	28.00	28.00	13.36	69,07,090	2,46,682	1,03,660	83,429	20,231	1.50	1.21	0.29	71	

1876,	...	28 00	28 00	14 36	69,01,150	2,46,470	98,343	1,06,824	-8,481	1.43	1.55	-0.12	68
1877,	...	28 00	28 00	15 36	69,01,160	2,46,470	1,18,487	96,847	21,640	1.72	1.40	0.31	79
1878,	...	28 00	28 00	16 36	69,01,160	2,46,470	1,25,694	94,372	31,322	1.82	1.37	0.45	88
1879,	...	28 00	28 00	17 36	66,39,840	2,37,137	1,34,087	89,088	44,999	2.02	1.34	0.68	92
1880,	...	28 00	28 00	18 36	66,39,843	2,37,131	1,42,098	1,01,344	40,754	2.14	1.53	0.61	98
1881,	...	28 00	28 00	19 36	67,36,171	2,40,578	1,52,512	1,01,307	51,205	2.26	1.50	0.76	1.04

NALHATI RAILWAY.

1864,	...	27 25	27 25	1 03	*52,086	*25,460	*26,626	86	* From 21st December, 1863 to 31st December, 1864.
1865,	...	27 25	27 25	2 03	...	...	57,507	36,392	21,115	...	...	...	41
1866,	...	27 25	27 25	3 03	...	...	52,102	54,787	-2,685	...	...	...	36
1867,	...	27 25	27 25	4 03	...	...	63,118	43,432	19,686	...	...	...	45
1868,	...	27 25	27 25	5 03	...	...	81,365	68,024	13,341	...	...	...	57
1869,	...	27 25	27 25	6 03	...	...	84,595	50,454	34,141	...	...	...	60
1870,	...	27 25	27 25	7 03	...	...	86,271	42,077	44,194	...	...	...	60
1871,	...	27 25	27 25	8 03	...	...	77,875	45,219	32,656	...	...	...	55
1872,	...	27 25	27 25	9 03	...	...	56,447	32,252	24,195	...	...	...	53
1873,	...	27 25	27 25	10 03	3,00,000	11,009	84,453	50,724	33,729	28.15	16.91	11.24	60	
1874,	...	27 25	27 25	11 03	2,73,170	10,024	85,122	57,220	27,902	31.16	20.95	10.21	61	
1875,	...	27 25	27 25	12 03	2,71,690	9,970	80,098	61,144	18,954	29.48	22.50	6.98	57	
1876,	...	27 25	27 25	13 03	2,71,690	9,970	75,199	83,585	-8,386	27.68	30.76	-3.08	54	
1877,	...	27 25	27 25	14 03	2,71,690	9,970	89,464	89,875	-421	32.92	33.08	-0.16	64	
1878,	...	27 25	27 25	15 03	2,87,610	10,554	90,261	71,677	18,584	31.38	24.92	6.46	64	
1879,	...	27 25	27 25	16 03	3,17,030	11,634	91,779	62,009	29,770	28.95	19.56	9.39	65	
1880,	...	27 25	27 25	17 03	3,25,210	11,934	69,925	73,653	-3,728	21.50	22.65	-1.15	49	
1881,	...	27 25	27 25	18 03	3,07,780	11,295	67,005	53,070	13,935	21.77	17.24	4.53	47	

NORTHERN BENGAL RAILWAY.

1877,	...	134 25	46 34	0 34	1,28,04,740	95,558	48,717	68,347	-19,630	0.38	0.53	-0.15	20
1878,	...	232 50	210 12	1 10	1,68,35,580	77,149	8,87,471	6,30,642	2,56,829	5.25	3.73	1.52	81
1879,	...	243 50	238 94	2 03	1,76,12,060	76,243	12,52,311	11,51,317	1,00,994	7.11	6.54	0.53	101
1880,	...	243 50	243 50	3 03	1,96,73,728	80,796	14,49,296	8,54,386	5,94,910	7.86	4.34	3.02	114
1881,	...	245 50	244 57	4 00	1,99,52,044	81,271	16,51,182	8,44,453	8,06,729	8.28	4.23	4.04	114

† Calculated on 232 miles, $\frac{1}{2}$ e, exclusive of Poradaha section.

TIRHOOT RAILWAY.

1875,	...	43 00	7 19	0 16	16,64,126	33,723	14,830	15,960	-1,130	0.89	0.96	-0.07	39
1876,	...	43 00	43 00	1 16	23,33,401	54,265	1,79,414	1,23,196	56,218	7.69	5.28	2.41	71
1877,	...	78 00	70 69	1 55	44,48,248	57,029	2,83,922	1,93,620	90,302	6.38	4.85	2.03	77
1878,	...	78 00	78 17	2 51	48,87,801	62,664	4,41,308	3,32,500	1,08,808	9.03	6.80	2.23	108
1879,	...	85 00	78 00	3 55	49,99,086	58,813	4,58,733	3,50,914	1,07,819	9.18	7.02	2.16	118
1880,	...	85 00	85 00	4 55	51,51,330	62,821	4,52,324	2,62,199	1,90,725	8.79	5.09	3.70	102
1881,	...	85 00	79 00	5 55	54,00,495	63,535	4,86,987	2,79,155	2,07,832	9.02	5.17	3.85	119

Year.	Miles open at end of year.	Mean mile-age open during year.	Mean age of lines at end of year.	Capital outlay at close of year	Cost per mile open.	Gross earnings during year.	Working expenses during year.	Net profits of year.	PERCENTAGE ON CAPITAL COST OF			Gross earnings per mile per week.	REMARKS.
									Gross of earnings	Working expenses	Net profits.		

PATNA AND GYA RAILWAY.

				Rs.	Rs.	Rs.	Rs.	Rs.				Rs.	
1879,	...	57 00	36 49	0.64	28,45,078	49,914	2,30,510	1,28,723	1,01,737	8 10	4 52	3 58	121
1880,	...	57.00	57 00	1 64	32,20,951	56,508	4,81,556	2,70,300	2,11,256	14 95	8 39	6 56	162
1881,	...	57.00	57.00	2.64	35,04,401	61,481	5,13,431	3,34,286	1,79,145	14 65	9.54	5 11	173

MUTTRA-HATHRAS RAILWAY.

1875,	...	29 00	5 88	0 20	9,55,863	32,961	33,151	19,287	13,864	3 47	2 02	1 45	108
1876,	...	29 00	29 00	1.20	9,21,560	31,778	33,406	48,159	35,247	9.05	5 23	3 32	55
1877,	...	29 00	29 00	2 20	9,91,590	34,193	93,900	53,689	45,211	9 98	5 42	4 66	66
1878,	...	29 00	29 00	3 20	9,93,600	34,262	93,308	52,431	45,877	9 89	5 27	4 62	65
1879,	...	29.00	29.00	4 20	10,34,720	35,680	1,25,930	69,222	56,708	12.17	6 69	5 48	83
1880,	...	29.00	29 00	5 20	10,83,160	37,523	1,35,226	77,556	57,670	12 43	7.13	5 30	89
1881,	...	29.00	29.00	6.20	10,50,961	36,240	1,35,335	93,632	41,703	12 88	8 91	3 97	90

MUTTRA-ACHNERA RAILWAY.

1881,	...	22 75	3.43	0.15	5,91,245	25,989	6,943	6,180	763	1.17	1.04	0 13	39
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CAWNPORE-FARUKHABAD RAILWAY.

1880,	...	49 25	2 29	0 05	27,08,089	54,987	2,202	5,134	-2,932	0 08	0.19	-0.11	18
1881,	...	36 00	32 88	0 99	31,26,855	36,359	2,78,585	1,94,347	84,238	8 91	6 21	2 69	65

DILDARNAGAR-GHAZIPUR RAILWAY.

1880,	...	12 00	2 89	0.24	5,63,297	46,941	8,351	10,717	-2,366	1.48	1 90	-0.42	56
1881,	...	12 00	12 00	1 24	5,92,433	49,369	39,032	33,843	189	6 59	6 56	0 03	63

RAJPUTANA RAILWAY.

1873,	...	91-75	64-47	0 70	...	...	1,08,717	1,05,011	3,708	...	...	...	32
1874,	...	291-75	171-30	0 80	1,32,70,992	45,488	6,18,314	4,96,548	1,21,766	4 66	3-74	0 92	69
1875,	...	373 75	344 36	1 53	2,12,63,580	56,141	17,46,960	11,18,692	6,23,268	8 22	5 26	2-96	98
1876,	...	399 00	393 90	2 44	2,38,46,230	60,016	23,29,592	15,23,623	8,05,969	9 77	6 39	3 38	114
1877,	...	399 00	399-00	3 44	2,53,82,400	63,615	26,96,687	18,33,367	8,63,320	10 62	7-22	3 40	130
1878,	...	431 25	419 41	4 16	2,83,46,980	68,128	29,72,601	18,42,130	11,30,471	10 49	6 50	3 99	136
1879,	...	465-50	438-47	4 80	3,09,43,568	66,474	35,45,420	23,66,253	11,79,167	11 46	7-65	3 81	153
1880,	...	489 50	470 30	5 52	3,40,61,947	69,585	37,23,719	24,90,414	12,33,305	10 93	7 31	3-62	152
1881,	...	826 50	735 59	4 15	5,20,44,975	62,970	72,42,247	43,75,207	28,67,040	13 91	8-41	5-51	169

HOLKAR AND SINDIA-NEEMUCH RAILWAY.

1874,	...	37 00	33 21	0 90	15,80,158	42,707	1,03,364	86,844	16,520	6-54	5-50	1-04	60
1875,	...	57-25	56-20	1-56	48,74,640	85,147	3,59,320	3,29,524	29,796	7-37	6-76	0 61	123
1876,	...	107 50	78-04	1 56	1,07,87,850	1,00,352	4,01,101	3,72,490	28,611	8 72	3-45	0 27	99
1877,	...	107-50	107 50	2 56	1,14,38,860	1,06,408	4,80,128	3,69,047	1,11,081	4 19	3-22	0-97	86
1878,	...	171 75	146-24	2 45	1,95,98,320	1,14,109	9,29,045	6,27,128	3,01,917	4-74	3-20	1 54	122
1879,	...	171 75	171-75	3-45	2,00,13 727	1,16,528	11,45,837	8,54,009	2,91,828	5 72	4 27	1-45	128
1880,	...	254 50	227 71	3 22	2,63,37,858	99,559	14,01,259	10,47,268	3,53,991	5 53	4-13	1 40	118
1881,	...	289 75	282-69	3 80	3,16,69,637	1,09,299	19,49,579	13,47,280	6,02,299	6-15	4-25	1 90	132

PATRI BRANCH.

1873,	...												
1874,	...												
1875,	...												
1876,	...												
1877,	...	...									
1878,	...												
1879,	...												
1880,	...												
1881,	...												

Worked by Bombay, Baroda and Central India Railway.

DHOND-MANMAD.

1878,	...	145-75	108-03	0 74	71,17,400	43,833	1,35,254	1,77,195	-41,941	1-90	2 49	-0 59	24
1879,	...	145 75	145-75	1-74	95,43,500	65,478	4,87,557	4,95,222	-27,665	4-90	5 19	-0 29	62
1880,	...	145-75	145 75	2 74	1,04,58,463	71,766	6,95,094	6,06,875	88,219	6-65	5-80	0-85	91
1881,	...	145-75	145-75	3 74	99,49,395	68,263	Included with G. I. P. Railway.	1,22,557	Included with G. I. P. Railway.	1-23		Included with G. I. P. Ry.	

Year.	Miles open at end of year.	Mean mile-age open during year.	Mean age of lines at end of year.	Capital outlay at close of year.	Cost per mile open.	Gross earnings during year.	Working expenses during year.	Net profits of year.	PERCENTAGE ON CAPITAL COST OF			Gross earnings per mile per week.	REMARKS.
									Gross earnings.	Working expenses.	Net profits.		

WARDHA COAL RAILWAY.

				Rs.	Rs.	Rs.	Rs.	Rs.				Rs.	
1874,	..	18-50	16-96	0 91	12,57,886	67,994	21,023	22,064	-1,041	16-71	17-54	-0 83	23
1875,	..	18-50	18 50	1 91	12,67,270	68,501	29,316	31,274	-1,958	2 31	2-46	-0-15	31
1876,	..	18 50	19-50	2 91	12,66,152	68,440	21,836	25,536	-3,700	1-72	2 02	-0-30	23
1877,	..	46 50	23-70	1-66	45,99,370	98,911	79,087	55,555	23,532	1-72	1 21	0 51	67
1878,	..	46 50	46 50	2 66	47,73,695	1,02,660	1,30,399	1,22,372	8,027	2 73	2-56	0-17	54
1879,	..	46-50	46 50	3-66	47,99,450	1,03,214	1,65,159	1,34,833	30,325	3 44	2-81	0-63	69
1880,	..	46 50	46 50	4 66	56,15,804	1,20,769	1,55,900	2,38,376	-82,476	2-78	4 25	-1-47	65
1881,	..	46-50	46 50	5 66	57,06,733	1,22,725	4,75,988	4,96,711	-20,723	8 34	8-71	-0-37	197

NAGPUR AND CHHATTISGARH RAILWAY.

1880,	..	53-00	39 21	0 74	30,37,689	57,315	1,03,952	82,681	21,271	3-42	2-72	0 70	51
1881,	..	98-00	62-00	1-18	56,83,159	57,991	2,81,528	2,15,472	66,056	4 95	3-79	1-16	*87

*Calculated on 62 miles, i.e., exclusive of portion closed during the year.

RANGOON AND IRRAWADDY VALLEY RAILWAY.

1877,	..	161 00	108 07	0-67	88,99,650	54,905	3,44,452	4,45,584	-1,01,132	3 90	5-04	-1 14	61
1878,	..	161-00	161-00	1 67	1,12,12,847	69,645	9,62,969	8,95,812	67,157	8 59	7 99	0 60	115
1879,	..	161 00	161-00	2 67	1,18,94,894	78,881	9,55,918	8,14,175	1,41,743	8-04	6-85	1-19	114
1880,	..	161-00	161 00	3 67	1,23,07,244	76,443	13,22,710	8,01,626	5,21,084	10-74	6 51	4 23	158
1881,	..	161-00	161 00	4 67	1,24,92,079	77,591	15,43,622	8,98,545	6,45,077	12-36	7-19	5-17	184

SINDIA RAILWAY.

1878,	..	84-00	33 16	0 95	42,42,416	1,24,777	93,911	1,25,186	-31,275	2 21	2-95	-0-74	54
1879,	..	66-50	44-68	1-15	73,20,207	1,10,078	90,916	1,22,688	-31,772	1-24	1 68	-0-44	39
1880,	..	66-50	66-50	2 15	81,51,903	1,22,585	2,01,824	1,77,714	24,110	2 48	2-18	0-30	53
1881,	..	74-75	71-72	2 87	85,86,577	1,14,629	3,01,681	2,23,339	78,342	3-51	2 60	0 91	81

PUNJAB NORTHERN RAILWAY.

1875,	..	62-00	44-84	0-72	54,06,984	87,209	1,42,788	90,543	52,245	2 64	1 68	0 96	61
1876,	..	103-25	90-88	1 81	1,79,57,838	1,73,926	4,75,946	3,67,778	1,08,168	2 65	2 05	0 60	101
1877,	..	103-25	103 25	2 31	1,70,25,460	1,64,895	6,96,761	6,04,879	91,882	4 09	3 55	0 54	130
1878,	..	103-25	103-25	3-31	1,73,40,018	1,67,942	9,09,571	9,03,761	5,810	5 24	5 21	0-03	169
1879,	..	103-25	103-25	4-31	2,44,93,832	2,37,228	18,50,081	14,71,192	3,78,889	7 55	6 01	1 54	345
1880,	..	224-75	180-12	2-78	4,04,37,319	1,79,921	33,68,284	28,04,113	5,64,171	8-33	6 93	1-40	360
1881,	..	354-75	326 90	2-71	5,47,31,396	1,54,281	34,69,563	31,09,965	3,59,598	6 34	5-68	0 66	198

INDUS VALLEY AND KANDAHAR RAILWAY.

1878,	..	501 00	188 57	0-87	5,12,46,691	1,02,293	5,72,109	7,03,559	-1,31,441	1 12	1 39	-0 26	56
1879,	..	501-00	501-00	1 97	5,70,95,291	1,13,963	31,96,316	25,69,418	6,26,898	5 60	4 50	1-10	121
1880,	..	653-00	594-18	1 96	6,92,82,608	1,06,099	64,72,659	45,38,397	19,34,262	9 34	6 55	2 79	209
1881,	..	653-00	653 00	2 96	7,44,25,913	1,13,975	53,28,690	41,86,278	11,42,412	7-16	5 62	1 54	*155

* Calculated on 660 miles, i.e., including 7 miles of the Sind, Punjab and Delhi Railway from Mooltan to Mozufferabad worked.

WESTERN RAJPUTANA RAILWAY.

1879,	..	82-63	10 50	0-13	..	..	47,810	41,056	6,754	..	..	..	86
1880,	..	82-63	82 63	1-18	63,17,255	76,452	6,50,103	5,57,724	32,379	10-29	8 83	1 46	151

Included with Rajputana Railway.

GAEKWAR OF BARODA'S RAILWAY.

1878,	..	20-00	14-68	0-73	..	..	15,758	15,497	261	..	..	..	21
1874,	..	20-00	20-00	1 73	*4,00,000	20,000	33,087	25,074	8,013	8 27	6-27	2 00	32
1875,	..	20 00	20-00	2-73	*4,00,000	20,000	34,302	26,965	7,337	8-57	6 74	1 33	33
1876,	..	20 00	20-00	3-73	*4,00,000	20,000	39,776	29,971	9,805	9-94	7 49	2 45	38
1877,	..	20-00	20-00	4-73	3,82,500	19,125	46,400	36,265	10,115	12 18	9 49	2 64	45
1878,	..	20-00	20-00	5-73	3,82,500	19,125	44,891	28,022	16,869	11-74	7-33	4-41	43
1879,	..	40-25	30-65	3-61	6,67,687	16,588	72,083	40,474	31,609	10-80	6 07	4-73	46
1880,	..	57-75	49-07	3-37	11,44,210	19,813	1,28,824	63,687	65,137	11 26	5 57	5-69	51
1881,	..	59-25	59 12	4 29	12,34,622	20,491	1,41,233	92,384	48,849	11 44	7-48	3-96	46

* Approximate.

KHAMGAON RAILWAY.

1870,	..	8-00	6-64	0 83	..	..	10,713	19,957	-9,244	..	..	..	31
1871,	..	8-00	8 00	1 83	..	..	23,306	20,718	2,588	..	..	..	56
1872,	..	8-00	8-00	2-83	..	..	12,910	8,989	3,921	..	..	..	31
1873,	..	8-00	8 00	3-83	4,85,054	60,632	18,147	16,094	2,053	3-74	..	0 42	31

Opened for traffic on 4th March, 1870.

STATISTICS OF INDIAN RAILWAYS.

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Year.	Miles open at end of year.	Mean mile-age open during year.	Mean age of lines at end of year.	Capital outlay at close of year.	Cost per mile open.	Gross earnings during year.	Working expenses during year.	Net profits of year.	PERCENTAGE ON CAPITAL COST OF			Gross earnings per mile per week.	REMARKS.
									Gross earnings.	Working expenses.	Net profits.		

KHAMGAON RAILWAY—(concluded).

				Rs.	Rs.	Rs.	Rs.	Rs.				Rs.		
1874,	..	8 00	8 00	4 83	4,85,054	60,632	28,517	15,011	13,506	5 88	5 09	2 79	127	
1875,	..	8 00	8 00	5 83	4,44,630	55,579	40,318	27,640	12,678	9 07	6 22	6 85	174	
1876,	..	8 00	8 00	6 83	4,44,630	55,579	32,274	23,376	8,898	7 26	5 26	2 00	132	
1877,	..	8 00	8 00	7 83	4,85,054	60,632	50,990	31,473	19,517	10 51	6 49	4 02	154	
1878,	..	8 00	8 00	8 83	4,71,140	58,892	52,991	21,539	31,452	11 25	4 57	6 68	191	
1879,	..	8 00	8 00	9 83	5,23,328	65,416	38,086	38,350	-264	7 28	7 33	-0 05	146	
1880,	..	8 00	8 00	10 83	5,08,187	63,523	27,363	23,106	4,257	5 38	4 55	0 83	98	
1881,	..	8 00	8 00	11 83	5,08,187	63,523	Included with G. I. P. Railway.		10,531	Included with G. I. P. Railway.		2 07	Included with G. I. P. Ry.	

AMRAOTI.

1871,	..	6 00	5 24	0 87	..	..	19,085	13,956	5,129	..	..	..	70	Opened for traffic on 6th February, 1871.
1872,	..	6 00	6 00	1 87	..	..	23,025	20,263	2,757	..	..	..	74	
1873,	..	6 00	6 00	2 87	4,37,278	72,880	24,124	20,745	-3,621	5 52	6 34	-0 82	77	
1874,	..	6 00	6 00	3 87	4,37,278	72,880	31,615	30,434	1,181	7 23	6 96	0 27	101	
1875,	..	6 00	6 00	4 87	4,00,840	66,807	58,106	45,039	13,067	14 49	11 23	3 26	186	
1876,	..	6 00	6 00	5 87	4,37,278	72,880	69,166	48,863	20,303	15 82	11 17	4 65	212	
1877,	..	6 00	6 00	6 87	4,37,278	72,880	80,092	27,383	52,709	18 31	6 26	12 05	257	
1878,	..	6 00	6 00	6 87	4,25,848	70,975	89,124	38,980	50,144	20 92	9 15	11 77	286	
1879,	..	6 00	6 00	8 87	4,65,695	77,617	69,904	53,728	16,176	15 01	11 54	3 47	224	
1880,	..	6 00	6 00	9 87	4,34,261	72,377	50,865	47,226	3,639	11 71	10 87	0 84	163	
1881,	..	6 00	6 00	10 87	4,34,261	72,377	Included with G. I. P. Railway.		20,347	Included with G. I. P. Railway.		4 69	Included with G. I. P. Ry.	

NIZAM'S RAILWAY.

1874,	..	121 00	27 85	0 23	99,32,120	82,084	1,15,230	1,09,482	5,748	1 16	1 10	0 06	79	
1875,	..	121 00	121 00	1 23	1,03,75,760	85,750	4,96,519	5,63,904	-67,385	4 79	5 44	-0 65	79	
1876,	..	121 00	121 00	2 23	1,06,23,010	87,793	5,81,738	4,98,674	83,064	5 48	4 69	0 79	92	

1877,	..	121-00	121-00	8-23	1,15,06,385	95,094	8,80,768	6,44,081	1,86,687	7-22	5-60	1-62	132
1878,	..	121-00	121-00	4-23	1,14,59,384	94,706	7,91,753	6,79,907	1,11,846	6-91	5-93	0-98	126
1879,	..	121-00	121-00	5-23	1,16,10,466	95,954	6,94,401	6,04,476	89,925	5-98	5-21	0-77	110
1880,	..	121-00	121-00	6-23	1,20,62,228	98,588	7,02,716	4,78,407	2,24,309	5-83	3-97	1-86	112
1881,	..	121-00	121-00	7-23	1,21,75,473	1,00,623	7,56,834	4,64,059	2,92,775	6-21	3-81	2-40	120

MYSORE RAILWAY.

1881,	..	58-00	49-73	0-86	*36,00,827	62,083	1,31,525	77,772	53,753	3-65	2-16	1-49	51	*This is the expenditure on lines in course of construction, inclusive of working stock. Nothing is shown under lines open for traffic.
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BHAVNAGAR-GONDAL RAILWAY.

1881,	..	192-50	170-00	0-99	47,34,108	34,982	6,88,885	4,83,131	2,05,254	10-22	7-17	3-05	78
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DARJEELING-HIMALAYAN RAILWAY.

1881,	..	50-00	45-66	1-11	18,18,723	36,374	2,61,154	1,52,298	1,08,856	14-35	3-31	75-98	103-44	† As part of the Capital was called up at the end of 1881, the net profits were 8 per cent. on Capital subscribed.
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STATISTICS OF INDIAN RAILWAYS.

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STATEMENT SHOWING THE MILEAGE, AGE, COST AND GENERAL RESULTS OF WORKING OF INDIAN RAILWAYS FOR THE YEAR 1881.

(Steam Boat earnings and expenses have been excluded from the following figures).

Number.	RAILWAYS.	Miles open at end of year.	Mean mileage open during year.	Mean age of lines at end of year.	Capital outlay at close of year.	Cost per mile open.	Gross earnings during year.	Working expenses during year.	Net profits of year.	PERCENTAGE ON CAPITAL COST OF			Gross earnings per mile per week.	REMARKS.
										Gross earnings.	Working expenses.	Net profits.		
	BROAD GAUGE.				Rs.	Rs.	Rs.	Rs.	Rs.				Rs.	
	5 FEET 6 INCHES.													
1	East Indian, ..	1,506.75	1,505.50	18.70	83,26,62,788	2,20,782	4,53,79,623	1,44,34,781	3,09,44,842	13.64	4.34	9.30	578	
2	Eastern Bengal, ..	159.00	158.50	16.59	3,31,72,422	2,08,631	51,29,608	20,18,380	31,11,228	15.46	6.08	9.88	621	
3	Oudh and Rohilkhand, ..	546.75	546.75	9.28	5,84,40,769	1,06,888	49,28,730	29,53,032	19,75,698	8.43	5.05	8.86	173	
4	Sind, Punjab and Delhi, ..	663.50	663.50	15.65	11,13,77,581	1,67,864	1,00,20,844	68,01,810	32,19,034	8.99	6.10	2.89	285	
5	Madras, ..	858.00	858.00	17.76	11,10,37,589	1,29,414	63,11,312	42,35,456	20,75,856	5.68	3.81	1.87	141	
6	Great Indian Peninsula, ..	1,288.00	1,288.00	17.04	25,10,85,907	1,94,942	3,20,56,823	1,58,37,335	1,62,19,488	12.76	6.31	6.45	426	
7	Bombay, Baroda and Central India, ..	†444.00	444.00	15.94	3,37,48,733	1,88,623	97,45,132	39,99,430	57,45,702	11.64	4.78	6.86	423	
8	Calcutta and South-Eastern, ..	28.00	28.00	19.36	67,36,171	2,40,578	1,52,512	1,01,307	51,205	2.26	1.50	0.76	104	
9	Patna-Gya, ..	57.00	57.00	2.64	35,04,401	61,481	5,13,431	3,34,286	1,79,145	14.65	9.54	5.11	173	
10	Dildarnagar-Ghazipur, ..	12.00	12.00	1.24	5,92,433	49,369	39,032	38,843	189	6.59	6.56	0.03	63	
11	Dhond and Manmad, ..	145.75	145.75	3.74	99,49,395	68,263	Included with G. I. P. Railway.		1,22,557	Included with G. I. P. Ry.	1.28	Included with G. I. P. Railway		
12	Wardha Coal, ..	46.50	46.50	5.66	57,06,733	1,22,725	4,75,988	4,96,711	-20,723	8.34	8.71	-0.37	197	
13	Sindia, ..	74.75	71.72	2.87	85,86,577	1,14,629	3,01,631	2,23,339	78,342	3.51	2.60	0.91	81	
14	Punjab Northern, ..	354.75	336.90	2.71	5,47,31,396	1,54,281	34,69,563	31,09,965	3,59,598	6.34	5.68	0.66	198	
15	Indus Valley, ..	653.00	653.00	2.96	7,44,25,913	1,13,975	53,28,630	41,86,278	11,42,412	7.16	5.62	1.54	155	
16	Khamgaon, ..	8.00	8.00	11.83	5,08,187	63,523	Included with G. I. P. Railway.		10,531	Included with G. I. P. Ry.	2.07	Included with G. I. P. Railway		
17	Amraoti, ..	6.00	6.00	10.87	4,34,261	72,377			20,347				4.69	
18	Nizam's, ..	121.00	121.00	7.23	1,21,75,473	1,00,623	7,56,334	4,64,059	2,92,775	6.21	3.81	2.40	120	
	Total and average, ..	6,972.75	6,950.12	13.77	1,15,88,76,729	1,67,494	12,46,09,803	5,92,35,012	6,55,28,226	10.75	5.10	5.65	347	

* Includes Mohpani Branch.

† Including Patri Branch 22½ miles.

STATISTICS OF INDIAN RAILWAYS.

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Statement showing the mileage, age, cost, and general results of working of Indian Railways for the year 1881—continued.

Number.	RAILWAYS.	Miles open at end of year.	Mean mileage open during year.	Mean age of lines at end of year.	Capital outlay at close of year.	Cost per mile open.	Gross earnings during year.	Working expenses during year.	Net profits of year.	PERCENTAGE ON CAPITAL COST OF			Gross earnings per mile per week.	REMARKS.
										Gross earnings.	Working expenses.	Net profits.		
NARROW GAUGE.														
METRE.														
					Rs.	Rs.	Rs.	Rs.	Rs.				Rs.	
1	South Indian, ..	655 00	655 00	8 49	4,28,06,756	65,354	37,55,688	25,17,962	12,37,726	8 77	6 88	2 89	109	
2	Nalhati, ..	27 25	27 25	18 03	3,07,780	11,235	67,005	53,070	13,935	21 77	17 24	4 53	47	4 ft. gauge.
3	Northern Bengal, ..	245 50	244 57	4 00	1,99,52,044	81,271	16,51,182	8,44,453	8,06,729	8 27	4 23	4 04	137	
4	Tirhoot, ..	85 00	79 00	5 55	54,00,495	63,535	4,86,987	2,79,155	2,07,832	9 02	5 17	3 85	119	
5	Muttra-Hathras, ..	29 00	29 00	6 20	10,50,961	36,240	1,35,335	93,632	41,703	12 88	8 91	3 97	90	
6	Muttra-Achnera, ..	22 75	3 43	0 15	5,91,245	25,989	6,943	6,180	763	1 17	1 04	0 13	39	
7	Cawnpore and Farukhabad, ..	86 00	82 88	0 99	31,26,855	36,359	2,78,585	1,94,347	84,238	8 91	6 21	2 69	65	
8	Nagpur and Chhattisgarh, ..	98 00	62 00	1 18	56,83,159	57,991	2,81,528	2,15,472	66,056	4 95	3 79	1 16	87	
9	Rangoon and Irrawaddy Valley,	161 00	161 00	4 67	1,24,92,079	77,591	15,43,622	8,98,545	6,45,077	12 36	7 19	5 17	184	
10	Rajputana, ..	826 50	735 59	4 15	5,20,44,975	62,970	72,42,247	43,75,207	28,67,040	13 91	8 41	5 51	189	
11	Holkar and Sindia-Neemuch, ..	289 75	282 69	3 80	3,16,69,537	1,09,299	19,49,579	13,47,280	6,02,299	6 15	4 25	1 90	132	
12	Mysore, ..	58 00	49 73	0 86	36,00,827	62,083	1,31,525	77,772	53,753	3 65	2 16	1 49	51	
13	Bhavnagar-Gondal, ..	192 50	170 00	0 60	67,34,108	34,982	6,88,385	4,83,131	2,05,254	10 22	7 17	3 05	114	
14	His Highness the Gaekwar's, ..	59 25	59 12	4 29	12,34,622	20,491	1,41,233	92,384	48,849	11 44	7 48	3 96	46	2 ft. 6 inch gauge.
15	Darjeeling-Himalayan, ..	50 00	45 66	1 11	18,18,723	36,374	2,61,154	1,52,298	1,08,856	14 35	8 31	5 98	103 44	2 ft. gauge.
	Total and average, ..	2,885 50	2,686 92	4 73	18,85,14,166	65,332	1,86,20,998	1,16,30,888	69,90,110	9 88	6 17	3 71	133	
	Total and average Guaranteed,	4,614 25	4,613 75	14 72	69,16,69,757	1,49,898	7,19,48,137	3,83,63,405	3,35,84,732	10 40	5 54	4 86	288	
	Total and average State, ..	5,254 00	5,023 29	7 98	65,57,21,138	1,25,042	7,12,82,664	3,25,02,495	3,39,33,604	10 87	4 96	5 93	282	
	GRAND TOTAL AND AVERAGE,	9,858 25	9,637 60	11 13	1,34,73,90,895	1,36,827	14,32,30,801	7,05,65,900	7,25,18,336	10 63	5 25	5 38	285	

* Includes Patri Branch 21½ miles.
† Exclusive of Dhulea Tramway.

‡ Includes the following payments to the State —
Net Profits Dhond and Manmad Railway, Rs. 1,22,557
Khamgaon " " 10,531
Amraoti " " 20,347
Total Rs., 1,53,435

APPENDIX GG.

EXTRACT FROM RETURN OF THE BOARD OF TRADE RELATIVE TO THE SYSTEM OR SYSTEMS UPON WHICH THE LINES OF RAILWAY IN THE UNITED KINGDOM WERE WORKED ON THE 31st DECEMBER, 1881.

NAME OF RAILWAY COMPANY.	Total Length of Railway open for Passenger Traffic.		Distance worked by Telegraph.			Distance worked by Telegraph, but not on either of the foregoing Systems.		Distance of Single Lines (not included in the foregoing Columns) worked under the following Systems.		
	Double	Single.	Absolute Block.		Per- missive Block. Double.	Double.	Single (in addition to Train Staff System).	System in which only One Engine in Steam or Two or more Engines coupled together are allowed to be upon Line or Portions thereof at one and the same Time. (No. 1.)	Train Porter System. (No. 2.)	Train Staff System. (No. 3.)
			Double.	Single (in addition to Train Staff System).						
ENGLAND AND WALES.	m. ch.	m. ch.	m. ch.	m. ch.	m. ch.	m. ch.	m. ch.	m. ch.	m. ch.	m. ch.
Aylesbury and Buckingham, ..	..	12 33	..	..	..	..	..	..	..	12 33
Bodmin and Wadebridge, ..	..	14 0	..	..	..	..	..	14 0	..	..
Brecon and Merthyr Tydfil Junction, ..	4 42	49 21	..	*44 23	..	0 30	..	..	..	4 78
Bristol Port Railway and Pier, ..	..	5 61	..	..	..	..	..	2 61	..	8 0
Cambrian, ..	8 75	167 48	8 75	147 36	..	..	..	3 50	0 13	16 29
Cheshire Lines Committee, ..	109 22	..	76 55	..	..	..	..	..	..	..
Colne Valley and Halstead, ..	..	19 0	..	..	..	..	19 0	..	..	..
Cornwall, ..	1 52	64 1	1 52	*64 1	..	..	..	..	..	..
Coves and Newport, ..	..	4 20	..	..	..	..	..	..	..	4 20
Dover and Deal, ..	10 11	..	10 11	..	..	..	..	..	..	..
Festiniog, ..	..	13 20	..	..	..	..	..	..	..	13 20
Festiniog and Bisanau, ..	..	8 60	..	..	..	..	..	3 60	..	..
Furness, ..	63 58	84 66	63 19	*34 43	..	0 39	0 23	..	..	..
Garstang and Knot End, ..	..	7 0	..	..	..	..	..	7 0	..	..
Great Eastern, ..	466 53	471 53	399 78	132 14	..	..	..	..	..	335 77
Great Northern, ..	589 35	170 22	541 45	62 56	..	47 9	67 59	..	..	39 67
Great Northern and London and North-Western, ..	41 59	..	41 59	..	..	..	..	..	..	..
Great Western, ..	1,022 31	897 48	790 29	*678 30	27 76	41 11	..	53 74	..	165 24
Hammersmith and City, ..	3 74	..	3 74	..	..	..	..	..	..	..
Hoylake and Birkenhead, ..	..	6 50	..	..	..	..	1 18	..	..	5 32
Isle of Wight, ..	1 0	10 27	1 0	3 39	..	..	6 68	..	..	..
Isle of Wight (Newport Junction), ..	..	9 5	..	..	..	..	..	9 5	..	..
Lancashire and Yorkshire, ..	421 59	14 19	419 79	9 59	..	1 60	..	..	..	4 40
Lancashire and Yorkshire and London and North-Western Joint Lines, ..	53 46	6 54	53 12	..	0 34	..	..	..	..	6 54
Liskeard and Looe, ..	..	6 74	..	..	..	..	..	6 74	..	..
London and North-Western, ..	1,289 75	359 53	1,244 74	*293 2	9 55	..	17 46	8 00	..	41 5
London and North-Western and Great Western Joint, ..	111 77	27 22	102 51	..	..	..	..	0 67	..	26 35
London and North-Western and Midland Joint, ..	19 50	6 10	19 50	6 10	..	..	..	..	..	..
London and South-Western, ..	517 65	228 76	517 65	204 46	..	..	..	16 10	..	8 20
London, Brighton, and South Coast, ..	316 20	107 60	316 20	107 60	..	..	..	..	..	..
London, Chatham, and Dover, ..	144 29	14 4	144 29	14 4	..	..	..	..	..	..
London, Tilbury, and Southend, ..	41 45	3 67	41 29	..	..	0 16	3 67	..	..	..
Londonderry, ..	6 0	..	..	..	..	..	..	..	..	..
Lynn and Fakenham, ..	..	20 59	..	20 59	..	..	..	..	..	..
Macclesfield Committee, ..	10 42	..	10 42	..	..	..	..	..	..	..
Maenlochog, ..	..	8 50	..	..	..	..	..	8 50	..	..
Manchester and Milford, ..	..	41 40	..	..	..	..	..	..	..	41 40
Manchester, Sheffield, and Lincolnshire, ..	230 9	4 43	117 02	..	..	103 4	..	3 40	..	1 3
Manchester South Junction and Altrincham, ..	9 13	..	8 0	..	..	1 13	..	..	..	..

* The following distances are worked *without* the Train Staff System :—

Brecon and Merthyr, ..	m. ch.	44 23	Great Western, ..	m. ch.	156 70
Cornwall,	64 01	London and North-Western,	13 25
Furness,	2 53			

LENGTH OF RAILWAYS IN THE UNITED KINGDOM.

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NAME OF RAILWAY COMPANY.	Total Length of Railway open for Passenger Traffic.		Distance worked by Telegraph.			Distance worked by Telegraph, but not on either of the foregoing Systems.		Distance of Single Lines (not included in the foregoing Columns) worked under the following Systems.		
	Double.	Single.	Absolute Block.		Per- missive Block Double.	Double.	Single (in addition to Train Staff System).	System in which only One Engine in Steam or Two or more Engines coupled together are allowed to be upon Line or Portions thereof at one and the same Time. (No. 1.)	Train Porter System. (No. 2)	Train Staff System (No. 3).
			Double.	Single (in addition to Train Staff System).						
m. ch.	m. ch.	m. ch.	m. ch.	m. ch.	m. ch.	m. ch.	m. ch.		m. ch.	m. ch.
Maryport and Carlisle,	27 73	13 34	0 73	..	..	..	..	..	..	13 34
Mawddwy, .. ..	..	6 60	..	..	..	..	..	6 60	..	..
Metropolitan,	17 2	1 76	17 2	*1 76	..	..	..	..	..	..
Metropolitan District,	13 38	..	13 38	..	..	..	..	..	..	..
Midland,	983 14	268 44	926 79	200 76	..	28 73	7 75	29 59	..	29 74
Midland and North-Eastern, ..	25 48	..	25 48	..	..	..	..	..	..	..
Mid-Wales, .. ..	..	48 40	..	48 40	..	..	..	..	..	..
Neath and Brecon (Neath Br), ..	..	11 15	..	*11 15	..	..	..	..	..	..
Northampton and Banbury Junction,	..	15 6	..	..	..	..	..	..	..	15 6
North and South-Western Junction,	3 14	1 46	3 14	1 46	..	..	..	..	..	..
North-Eastern,.. ..	911 43	399 55	874 74	275 30	..	36 49	112 9	12 16	..	..
North London,	11 78	..	11 78	..	..	..	..	..	..	..
North Staffordshire,	146 25	23 18	144 66	23 18	0 28	1 11	..	..	..	..
North Wales (Narrow Gauge), ..	..	11 70	..	..	..	..	..	11 70	..	..
Oldham, Ashton-under-Lyne, and Gude Bridge Junction,	5 64	..	5 64	..	..	..	..	..	..	..
Pembroke and Tenby, .. ..	..	27 34	..	27 34	..	..	..	..	..	..
Ravenglass and Eskdale, .. ..	..	7 20	..	..	..	..	..	7 20	..	..
Rhymney,	15 78	18 20	15 78	*17 67	..	..	..	0 33	..	..
Rhymney and Great Western Joint,	9 20	..	9 20	..	..	..	..	..	..	..
Ryde and Newport, .. ..	..	8 40	..	8 40	..	..	..	..	..	..
Severn and Wye and Severn Bridge,	2 0	20 35	1 20	19 60	0 60	..	..	0 55	..	..
South-Eastern,	318 42	25 41	318 42	20 51	..	..	..	4 70	..	..
South-Western and Midland, ..	..	92 26	..	92 26	..	..	..	..	..	..
Southwold, .. ..	..	8 60	..	..	..	..	..	8 60	..	..
Stafford and Uttoxeter,	1 60	13 20	1 60	..	..	..	..	..	..	13 20
Swindon, Marlboro', and Andover,	..	11 22	..	11 22	..	..	..	..	..	..
Talsjlyn, .. ..	..	6 70	..	..	..	..	..	6 70	..	..
Taff Vale,	52 20	13 15	6 28	*2 13	43 20	..	..	10 57	..	..
Torbay and Brixham, .. ..	..	2 6	..	..	..	..	..	2 6	..	..
Trent, Ancholme, and Grimsby, ..	13 2	..	..	..	..	13 2	..	..	..	..
Vale of Towey, .. ..	..	11 8	..	*11 8	..	..	..	..	..	..
Watlington and Princes Risborough,	..	8 66	..	..	..	..	..	8 66	..	..
West Lancashire,	7 62	..	7 62	..	..	..	..	..	..	..
West London Extension,	5 8	..	5 8	..	..	..	..	..	..	..
West Somerset Mineral, .. ..	..	6 0	..	..	..	..	..	6 0	..	..
Whitland and Cardigan, .. ..	..	14 6	..	14 6	..	..	..	..	..	..
Wrexham, Mold, and Connah's Quay, .. ..	..	8 76	..	..	..	..	..	..	..	8 76
Yarmouth and North Norfolk, ..	..	24 20	..	24 20	..	..	..	..	..	..
Total, England and Wales, ..	8,067 53	3,941 55	7,325 44	2,635 10A	82 33	274 77	236 45	255 13	0 13	810 67

* Absolute Block and Train Porter Systems combined.

*, Without Train Staff—

	m ch.
Neath and Brecon,	11 15
Rhymney,	16 27
Taff Vale,	0 45
Vale of Towey,	11 8

A Total, .. 320 33

NAME OF RAILWAY COMPANY,	Total Length of Railway open for Passenger Traffic.		Distance worked by Telegraph.			Distance worked by Telegraph, but not on either of the foregoing Systems.		Distance of Single Lines (not included in the foregoing Columns) worked under the following Systems.		
	Double.	Single.	Absolute Block.		Per- missive Block. Double.	Double.	Single (in addition to Train Staff System).	System in which only One Engine in Steam or Two or more Engines coupled together are allowed to be upon Line or Portions thereof at one and the same Time. (No. 1.)	Train Porter System. (No. 2.)	Train Staff System. (No. 3.)
			Double.	Single (in addition to Train Staff System)						
SCOTLAND.										
	m. ch.	m. ch.	m. ch.	m. ch.	m. ch.	m. ch.	m. ch.	m. ch.	m. ch.	m. ch.
Caledonian,	423 10	355 39	420 48	124 1 ^a	..	..	^b 54 33	0 61	..	174 69
City of Glasgow Union,..	3 11	..	3 11	..	..	..	..	..	..	..
Dundee and Arbroath Joint, ..	17 7	0 36	15 20	..	..	1 48	^b 0 31	0 5	..	..
Glasgow and Kilmarnock Joint, ..	23 42	5 5	23 42	0 41	..	..	..	..	..	4 44
Glasgow and Paisley Joint, ..	8 0	..	7 22	..	..	..	..	..	..	..
Glasgow and South-Western, ..	206 72	115 40	153 5	66 38	18 12	..	..	0 79	..	48 3
Great North of Scotland, ..	13 32	274 08	13 32	268 28	..	..	..	5 60	..	..
Highland,	6 65	395 20	6 65	395 20	..	..	..	..	..	..
North British,	391 37	437 18	189 19	87 46 ^a	29 37 [*]	4 4	0 38	315 53
Wigtownshire, .. .. .	..	20 28	..	20 28	..	..	..	..	..	..
Total, Scotland, ..	1,093 36	1,603 34	832 24	962 42	18 12 29 37 [*]	1 48	^b 54 64	11 49	0 38	543 06
IRELAND.										
Ballymena and Larne, .. .. .	..	28 46	..	..	..	..	28 46	..	..	..
Belfast and County Down, ..	..	55 40	..	..	..	..	..	..	..	55 40
Belfast and Northern Counties, ..	33 26	146 64	33 26	42 14	..	..	..	..	..	104 50
Belfast Central,	1 72	..	1 72	..	..	..	..	..	..	..
Belfast, Holywood, and Bangor, ..	4 40	7 60	..	..	..	..	..	..	..	7 60
Cork and Bandon, &c., .. .. .	..	64 40	..	..	..	..	..	16 00	..	48 40
Cork and Macroom Direct, ..	..	24 60	..	..	..	..	..	..	..	24 60
Cork, Blackrock, and Passage, ..	..	6 37	..	..	..	..	..	6 37	..	..
Dublin, Wicklow, and Wexford, ..	25 48	109 72	..	..	..	..	..	..	..	109 72
Dundalk and Greenore, .. .. .	..	26 49	..	26 49	..	..	..	..	..	..
Finn Valley, .. .. .	..	13 48	..	..	..	..	..	13 48	..	..
Great Northern of Ireland, ..	136 60	371 27	3 60	14 40	..	..	..	12 88	..	344 29
Great Southern and Western of Ireland,	200 20	239 38	8 17	..	..	..	..	..	..	239 38
Londonderry and Lough Swilly, ..	..	12 2	..	..	..	..	..	12 2	..	..
Midland Great Western,	148 22	276 39	53 37	5 0	2 55	..	26 00	..	..	245 33
Newry, Warrenpoint and Rostrevor, ..	..	6 0	..	..	..	..	..	6 0	..	..
Sligo, Leitrim, and Northern, ..	..	43 0	..	42 0	..	..	..	..	..	..
Waterford and Central Ireland, ..	..	59 32	..	..	..	..	..	..	..	59 32
Waterford and Limerick,	21 60	254 20	..	68 40	..	..	..	..	..	185 60
Waterford and Traamore, .. .. .	..	7 20	..	..	..	..	..	7 20	..	..
Waterford, Dungarvan, and Lismore, ..	..	42 71	..	42 71	..	..	..	..	..	..
Total, Ireland,	572 28	1,845 45	100 52	241 54	2 55	..	54 46	73 65	..	1,475 40
TOTAL, UNITED KINGDOM, ..	3,733 37	7,390 54	8,258 40	3,839 26 ^a	103 20 29 37 [*]	276 45	345 75 ^b	340 47	0 51	2,829 33

* Single Lane. m. ch.
^a " Caledonian .. 17 11 } worked without the Train Staff System,
North British .. 64 52 }
402 15 } ditto ditto.
54 64 } ditto ditto.
Total .. 456 79

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