

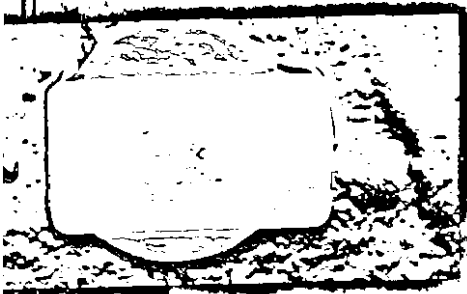
RAILWAY DEPARTMENT  
GOVERNMENT OF INDIA  
RAILWAY BOARD

# Railways in India

Administration Report for the year  
1916-17

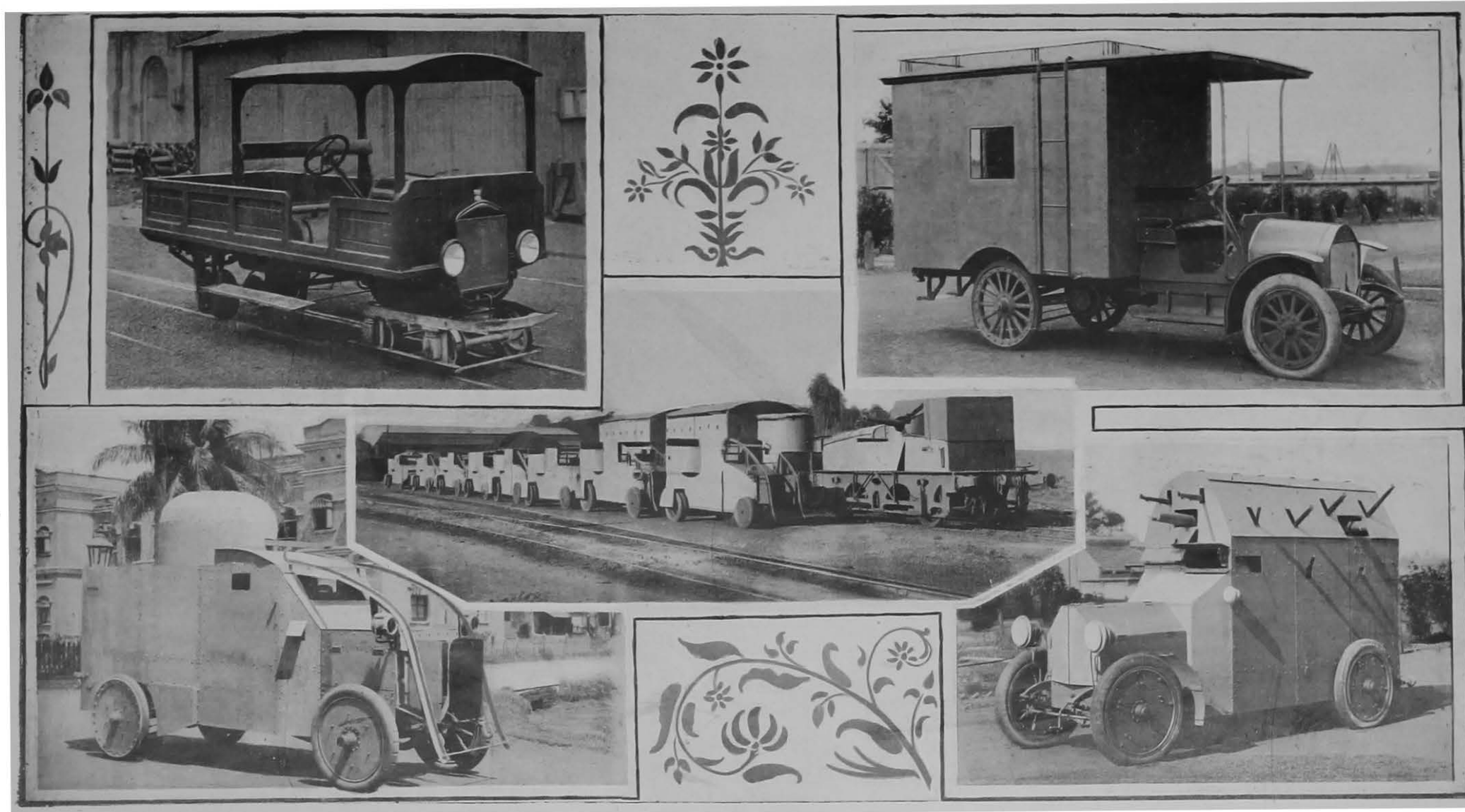


VOLUME I  
(REPORT)



SIMLA  
GOVERNMENT CENTRAL PRESS  
1918

Price Rs. 1/8/- or 2s. 3d.



**Motor Vehicles adapted in Railway Workshops to War purposes.**

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## Contents.

	PAGE
INTRODUCTORY ... ..	1
CAPITAL ... ..	2
RESULTS OF WORKING ... ..	3
THE WAR AND RAILWAYS ... ..	6
MILEAGE ... ..	10
LINES OPENED DURING THE YEAR ... ..	11
IMPORTANT LINES UNDER CONSTRUCTION ... ..	13
NEW CONSTRUCTION FINANCED BY PRIVATE ENTERPRISE, ETC. ..	14
AERIAL ROPEWAYS ... ..	18
OPEN LINE IMPROVEMENTS ... ..	19
CONGESTION OF TRAFFIC ... ..	21
REDUCTION IN TRAIN SERVICES ... ..	23
INCREASE OF FARES AND WITHDRAWAL OF CONCESSIONS ... ..	24
SURCHARGE ON GOODS TRAFFIC ... ..	24
OIL FUEL TRIALS ... ..	25
GOVERNMENT TEST HOUSE AT ALIPUR ... ..	26
SUPPLY OF MATERIALS FROM THE UNITED KINGDOM ... ..	27
PURCHASE OF STORES IN INDIA ... ..	27
COAL DEPARTMENT ... ..	28
INSULATED AND REFRIGERATING VANS ... ..	29
ACCIDENTS ... ..	30
RAILWAY STAFF ... ..	32
CONCLUSION ... ..	32
NOTES ON THE RELATION OF THE GOVERNMENT TO RAILWAYS IN INDIA ...	33

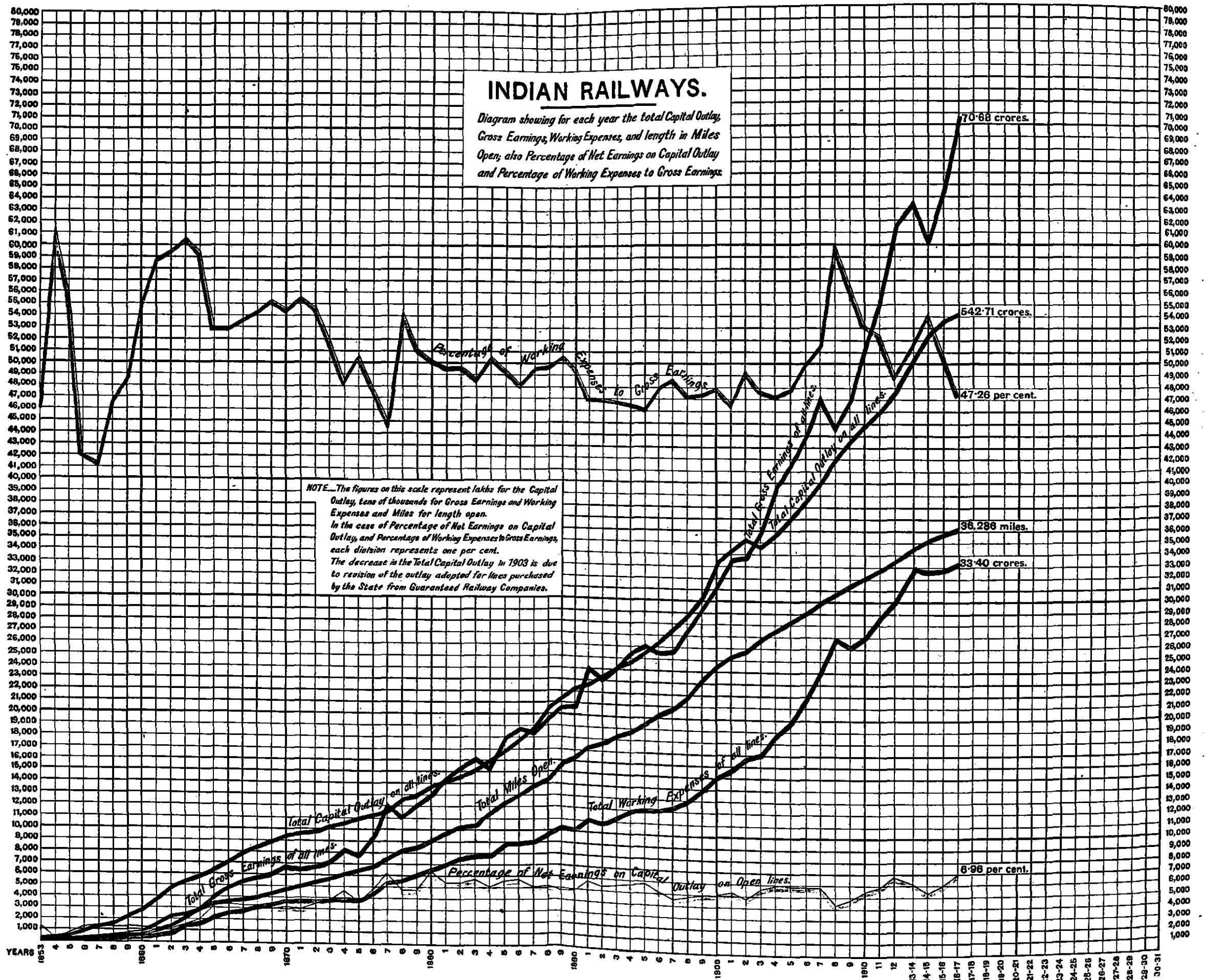
### **Note on Indian Currency.**

For the information of foreign readers of this report, who are unaccustomed to the use of Indian currency and units, it may be mentioned that Rs. 1,00,000, a " lakh " of rupees, is the equivalent, at the now normal rate of Rs. 15 to the pound sterling, of £6,666. A " crore " of rupees is 100 lakhs, Rs. 1,00,00,000 and is therefore equal to £666,666, or £  $\frac{2}{3}$  million sterling. An anna is one-sixteenth part of a rupee, equal to one penny ; and a pie is one-twelfth part of an anna and is thus the equivalent of one-third of a farthing.

# INDIAN RAILWAYS.

Diagram showing for each year the total Capital Outlay, Gross Earnings, Working Expenses, and length in Miles Open; also Percentage of Net Earnings on Capital Outlay and Percentage of Working Expenses to Gross Earnings.

NOTE.—The figures on this scale represent lakhs for the Capital Outlay, tens of thousands for Gross Earnings and Working Expenses and Miles for length open. In the case of Percentage of Net Earnings on Capital Outlay, and Percentage of Working Expenses to Gross Earnings, each division represents one per cent. The decrease in the Total Capital Outlay in 1903 is due to revision of the outlay adopted for lines purchased by the State from Guaranteed Railway Companies.



ADMINISTRATION REPORT

ON THE

RAILWAYS IN INDIA

FOR THE YEAR

1916-17.

**Introductory.**

This report deals with the second complete year during the whole of which war conditions have prevailed. The reduced scale of expenditure both under Capital and Revenue Renewals which formed a feature of last year's programme is again reflected in this year's figures. Owing to the extraordinary demand for railway materials in the different theatres of war and the consequent diversion of supplies on which our railway works in India are still largely dependent, it is inevitable that a great part of the necessary renewals and improvements on all lines must continue to be deferred till normal conditions supervene. The figures of gross earnings on the other hand again show an increase mainly due to the heavy military and coal traffic.

Some small changes have been made in the arrangement of Volume II with the object of eliminating certain minor details which were of small practical interest.

The note on the relation of the Government to the Railways in India again finds a place at the end of this Volume, as it is likely to continue to be found of interest to the public.

In the pocket inside the back cover of this Volume will be found, in addition to the special map referred to on page 21 under the head "Open Line Improvement," a general map of India showing railways open and under construction on the 31st March 1917; also one prepared by Mr. J. H. Trott.\*

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\* *Map of Railway Systems, by Mr. J. H. Trott.*—This additional map is included only in copies of the report used for official purposes. It may be obtained by the public, on payment, from Mr. J. H. Trott, The War Hospital, Moradabad, United Provinces, who holds the copyright.

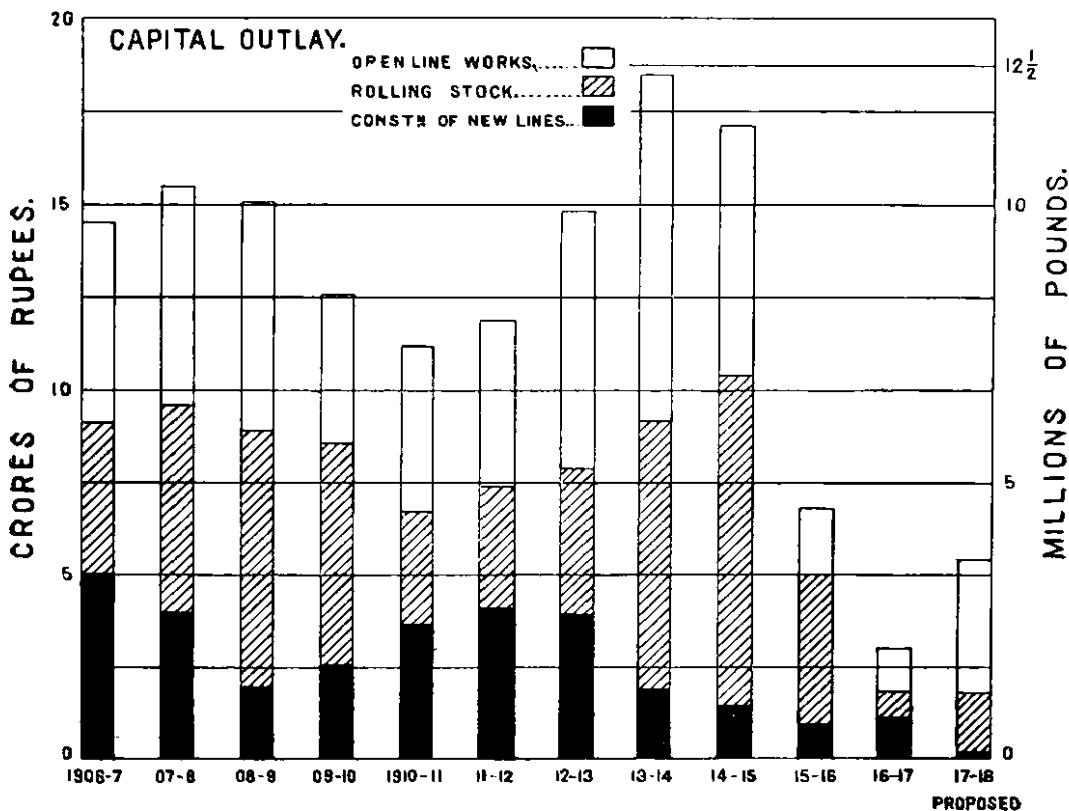
### Capital.

The Capital outlay incurred by the Government in the purchase and construction of its railways, including the liability which remains to be discharged by means of Annuity and Sinking Fund payments, amounted at the end of 1916-17 to **£3,666,470,011**.

The outlay incurred during 1916-17 was **£1,980,428** distributed as follows :—

	Rs.
Open Line Works including suspense ... ..	1,13,69,415
Rolling-stock ... ..	72,04,000
New Lines ... ..	1,11,33,000
Total ... ..	<u>2,97,06,415</u>
Equivalent at Rs. 15 = £1 to	<u>£1,980,428</u>

The following diagram shows graphically how these figures compare with those of past years. The distribution of the grant of **£3·6** millions (Rs. 5·40 lakhs) which has been sanctioned for the financial year 1917-18 is also added for purposes of comparison—





During the year under review, the actual capital expenditure fell short of the sanctioned grant for the year by Rs. 153 lakhs. This lapse was due mainly to the difficulties attendant on the supply of railway materials from England. There was also a reduction in the suspense balance owing to the transfer of stores to the Army Department for Military purposes.

The capital expenditure sanctioned for 1917-18 is £3·6 millions. This is an advance on the 1916-17 programme which amounted to £3 millions only, but the severe restriction of expenditure in the last two years has caused a large number of works to be deferred which have become most necessary and the urgency of which is increasing as time goes on. It has therefore become necessary to provide for a slightly more liberal programme than in 1916-17. Funds have not been allotted for the commencement of any new line of railway, and the bulk of the expenditure proposed to be incurred is on open lines.

The actual capital outlay on railways which have been financed by private enterprise, such as Branch Lines promoted by Companies, District Board Lines, Native State Lines, etc., amounted at the end of 1916-17 to Rs. 66,80,79,000. The capital expenditure on such lines during the year was as follows :—

			Rs.
Branch Line Companies' Railways	...	...	1,63,40,000
District Board Lines	...	...	20,40,000
Native State Lines..	...	...	63,61,000
		Total	2,47,44,000

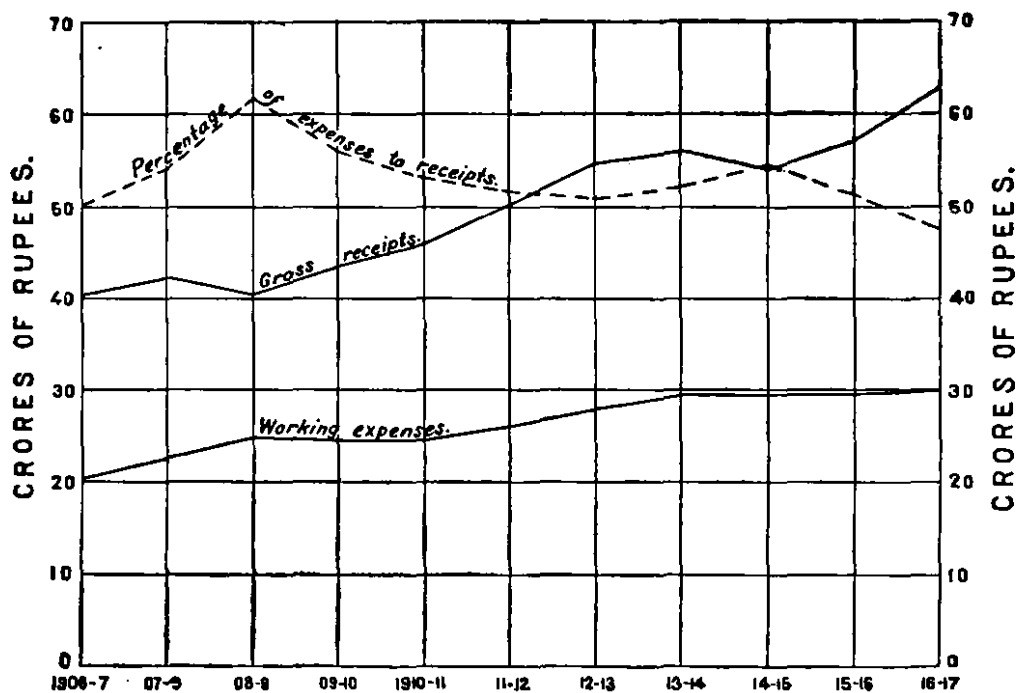
### Results of Working.

The following table compares the financial results attained in the working of the State Railways during the year 1916-17 with those of previous years (in the case of money the figures are shown in thousands) :—

	1911-12.	1912-13.	1913-14	1914-15.	1915-16.	1916-17.
	£	£	£	£	£	£
Capital at charge at end of each year ...	331,247	340,103	361,302	301,500	364,853	305,463
<b>Revenue.</b>						
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Gross traffic receipts.—State Railways	60,36,97	65,02,05	60,31,02	64,15,78	67,20,43	62,04,60
Deduct—Working Expenses	25,89,48	28,02,31	29,33,91	29,52,87	29,13,09	29,01,80
NET RECEIPTS	24,47,41	27,00,64	26,93,01	24,62,91	27,73,43	32,07,84
	£	£	£	£	£	£
Equivalent in sterling Rs. 15=£1	10,31,6	18,004	17,073	16,410	18,489	21,363
Percentage of return on capital at charge	4·93	5·20	5·12	4·54	5·03	6·02

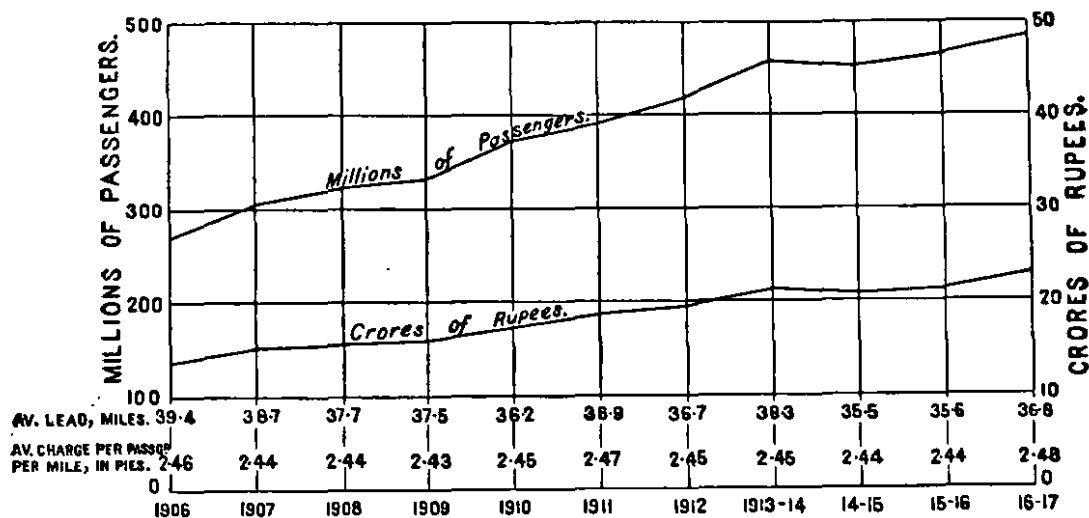
The net working profit from State Railways, after meeting interest and other miscellaneous charges, amounted in the year 1916-17 to £7,482,314. It would have been more, had it not been that in accordance with instructions of the Secretary of State for India certain Annuity and Sinking Fund payments which really go to the discharge of debt are included in the Railway Revenue Account.

The revenue expenditure and gross receipts of the State lines worked by the State and Companies for the past eleven years are compared in the following diagram :—



The working expenses during the year 1916-17 amounted to Rs. 29.97 crores or only 4.1 lakhs more than the actual working expenses of 1915-16. This result is remarkable seeing that the receipts of the year exceeded those of 1915-16 by over 5½ crores. It was due to the increasing difficulty of obtaining railway material from England in consequence of which repairs and renewals of permanent-way and rolling-stock have been restricted.

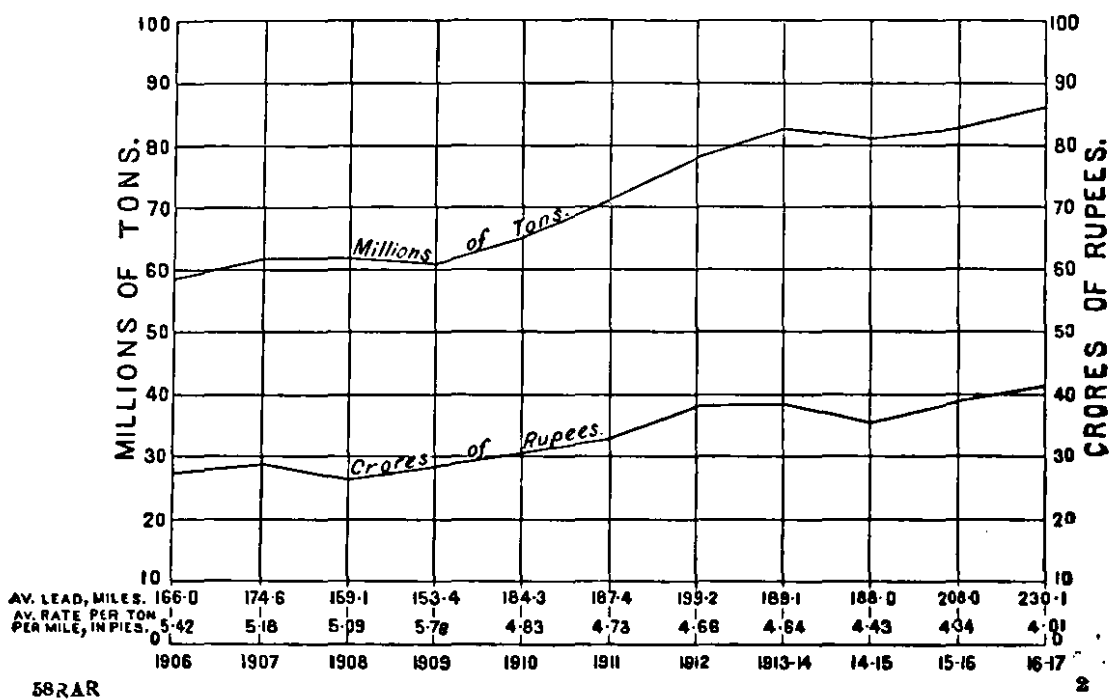
The numbers of passengers carried and the earnings therefrom on all Indian railways are compared below :—



The increase in the passenger traffic during the year under review as compared with that of 1915-16 was chiefly due to the larger movements of troops and opening of new lines.

The increase in earnings was also to some extent due to the enhancement of fares referred to on page 24 which, however, was introduced towards the end of the year and could not have had much effect. The primary object of the enhancement was not to increase earnings but to discourage travelling as it was necessary to reduce train services in order to conserve material for repairs, etc.

A similar comparison of the tonnage of, and earnings from, goods traffic is afforded by the following diagram :—



The better results of the year under review are attributable to the larger movement of military stores, opening of new lines and to the heavier bookings of coal and wheat.

The decrease in the average rate earned per ton per mile is due to the longer average lead over which traffic was conveyed, and to the fact that coal, which formed the bulk of this long lead traffic, is charged at a very low average rate.

The gross earnings of railways other than State lines, such as District Boards' lines, Native State lines, etc., during 1916-17 amounted to Rs. 783·37 lakhs, as compared with Rs. 729·85 lakhs in 1915-16, being an increase of Rs. 53·52 lakhs, and as the working expenses were more only by Rs. 19·61 lakhs than the previous year, the net earnings rose from Rs. 369·32 lakhs to Rs. 403·23 lakhs in 1916-17, or an increase of Rs. 33·91 lakhs. These net earnings yielded a return on the Capital outlay (Rs. 6,305·54 lakhs) on open lines, that is on mileage earning revenue, of 6·39 per cent as against 6·08 per cent in 1915-16.

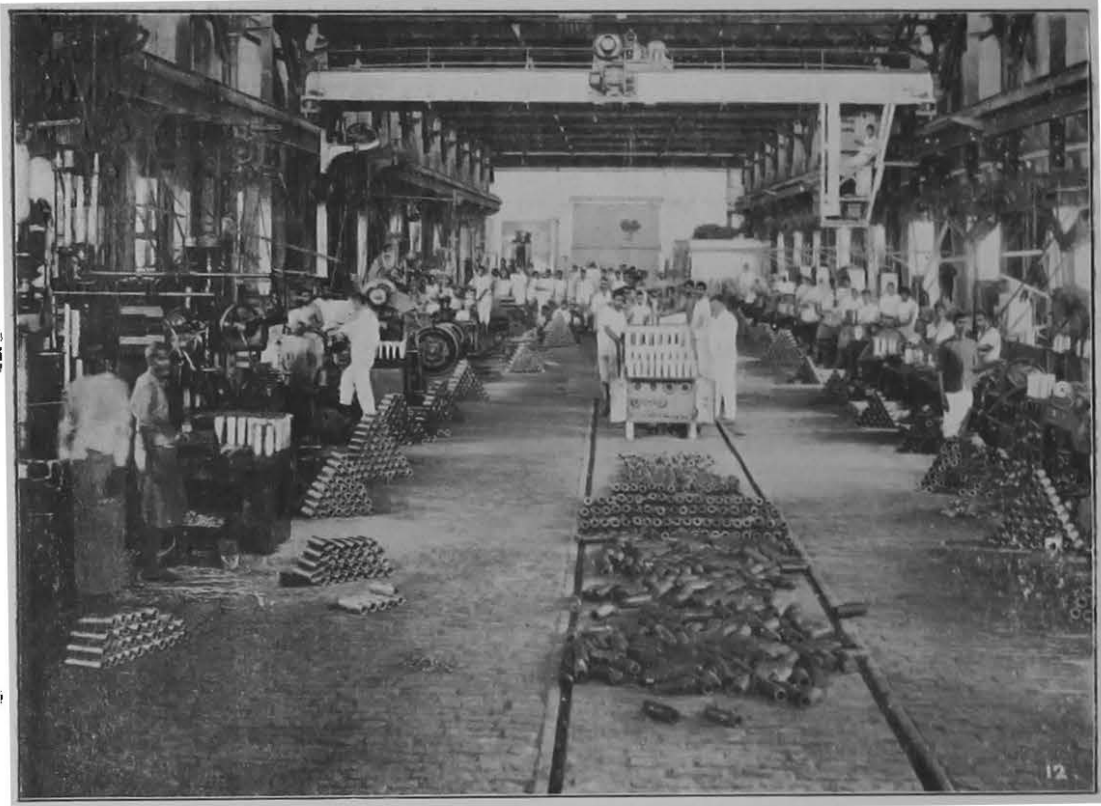
### **The War and Railways.**

For the first two years of the war the necessary work of co-ordinating the assistance required of the railways of India in connection with the despatch of staff and material for railways in East Africa, Mesopotamia, and elsewhere was done by the Railway Board and their ordinary headquarters establishment. In September, 1916, however, it had to be recognised that the existing organisation was insufficient to cope with the ever increasing railway demands from overseas and the work connected with the inland water transport—which the Board took over—and, therefore, certain temporary additional appointments were sanctioned and a separate War Branch of the Board's Office was formed, working under the orders of Mr. A. R. Anderson, C.I.E., one of the Members of the Board.

By the end of March 1917, the Railway Board were relieved of this special work and the personnel of the War Branch was then absorbed by the Indian Munitions Board and the Adjutant General's Branch, Army Head-Quarters, respectively, the departments entrusted with the provision of stores and staff for overseas.

In the report for 1915-16 mention was made of the number of railway employés that had been released for employment on railways in East Africa, Mesopotamia and elsewhere. During the year under review railways have continued to set free staff of all kinds for employment in connection with the war. In addition, railways have assisted very largely in the recruitment of men from outside their own establishments and to this end have in many instances set free one or more of their superior staff to act as Recruiting officers for the Military Railways which draw upon India for personnel.

The development of Military operations in Mesopotamia, East Africa and elsewhere afforded to Indian Railways during the year 1916-17, an opportunity of contributing, in an increasing degree to the conduct of the war. Mention was made in the report for 1915-16 of the extent to which Indian Railway Workshops were employed on the manufacture of shell. This manufacture

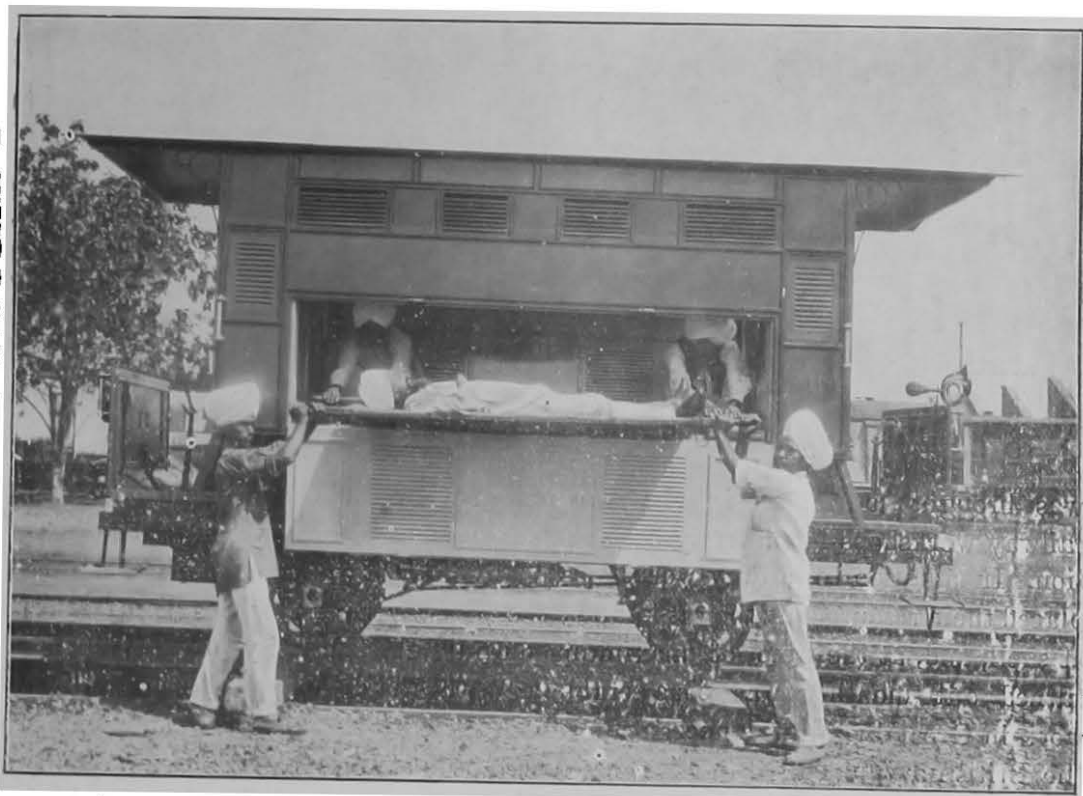


Shell Manufacture.

was brought to a close in the year under review and the total output from railway workshops has already been the subject matter of a separate compilation. In addition to railway workshops, many private workshops and industries placed their resources at the disposal of the Railway Board for the manufacture of shell, and, at the time of maximum output, the quantity of shell being turned out monthly was considerable. With the development of munitions work in Great Britain the necessity for calling on India for shells to supplement the British output ceased to exist, and the manufacture was, therefore, gradually discontinued from August 1916 and ceased in December 1916. A very high quality of steel with special properties and of a composition which had not previously been made by the Tata Iron and Steel Works is required for high explosives; much research and experimental work had, therefore, to be carried out by the Metallurgical staff and the staff of the Tata Iron and Steel Works and the results obtained were completely successful. To Dr. McWilliam, the Railway Board's Metallurgical Inspector, Mr. Tutwiler, General Manager of the

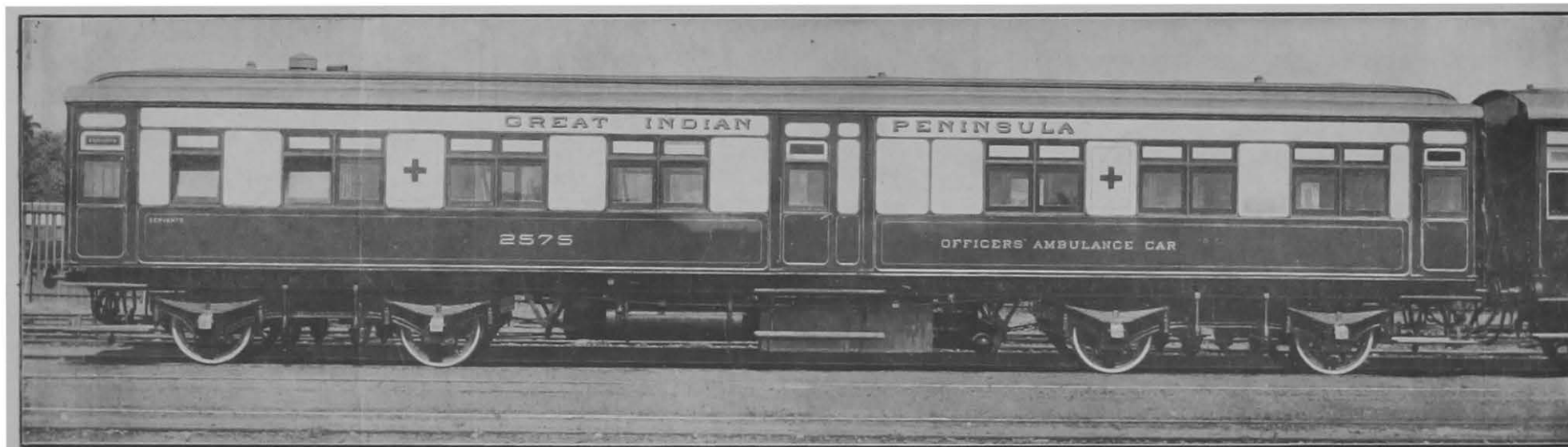
Tata Iron and Steel Company and their respective staffs much credit is due, and, the Railway Board take this opportunity of placing their appreciation on record.

The resources of Indian railways have, however, been employed in a multiplicity of ways in meeting overseas demands. Various railway administrations have contributed directly to the several overseas theatres of war large numbers of metre gauge and 2 feet 6 inches gauge locomotives and vehicles and have also set free a large mileage of track. A large quantity of rails destined for ordinary maintenance of railways in India from the works of the Tata Iron and Steel Company has also been diverted to overseas military railways. Together with the stock and track referred to above, they provided plant, equipment, and as has been stated before, personnel; and their stores organizations were extensively employed on the purchase of materials for supply to Expeditionary Forces. Their workshops undertook miscellaneous manufactures such as clothing, tent and picketing gear, hospital furniture, ambulance trains, armoured cars, and rail motor ambulance vehicles.



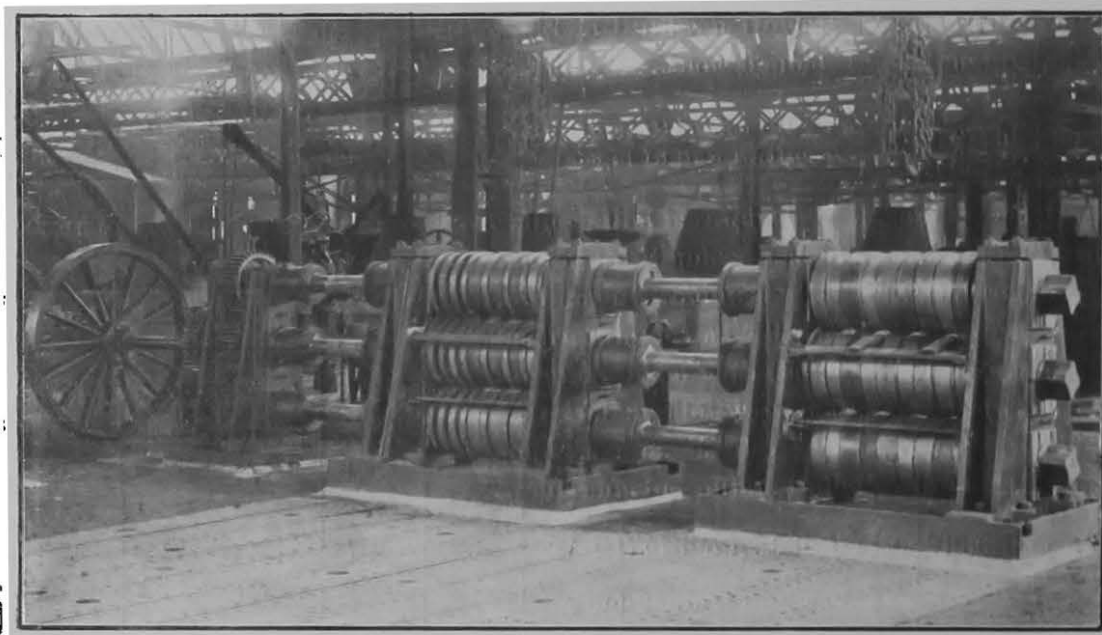
Two feet six inch Gauge Motor Ambulance.

These rail motor ambulances were constructed in the Bengal-Nagpur Railway Workshops for use on the 2' 6" gauge railways in Mesopotamia; they were built on Drewry rail motor car chassis to accommodate four lying down



patients each ; trailers of a similar capacity to be run with the motor vehicles were built entirely in the same workshops.

Five more broad gauge hospital trains similar to those described in the report for 1915-16 were turned out by the North Western Railway Workshops and three metre gauge ambulance trains for Mesopotamia were constructed or were under construction in the Workshops of the Bombay, Baroda and Central India Railway. Further works carried out during the year were the provision of kitchen cars for the supply of hot meals in the intercommunicating troop trains, which have been placed in service on the Great Indian Peninsula and the North Western Railways, steamers and barges for river service on the Tigris, and rail motor cars for East Africa. Moreover, the plant, materials and stores with railway administrations, have, at all times, been freely drawn upon to meet the needs of His Majesty's forces. The works detailed above cover but a few of the heads, under which railways have given direct assistance to the conduct of the war. The time has not yet come to enumerate them in full, but on the conclusion of the war, it is proposed to publish an account of their full achievements. A pleasing feature of the work has been the manner in which the various railway administrations have co-operated with the Government of India in carrying out work which, from its nature, had to be executed without delay, and often to the prejudice of the ordinary work of the railways.



**Spring Steel rolls manufactured by the Great Indian Peninsula Railway.**

The *annexe* to the Great Indian Peninsula Railway Head Offices at Victoria Terminus still continues to be used by the military authorities as a hospital for sick and wounded soldiers returned from Mesopotamia.



### Mileage.

During the year 1916-17, 467·98 miles of railway were opened to traffic, bringing the total mileage open (after allowing for minor corrections due to realignments, etc.) up to 36,286 miles. The additional mileage was made up as follows :—

	5' 6" gauge.	3' 3½" gauge.	2' 6" gauge.	2' 0" gauge.	Total.
	Miles.	Miles.	Miles.	Miles.	Miles.
State lines worked by the State ...	8·88	...	46·48	...	55·36
State lines worked by Companies...	45·26	3·20	...	51·10	99·56
Branch line Companies' railways under guarantee terms, worked by the Branch line Companies.	...	...	42·69	...	42·69
Branch line Companies' railways under rebate terms, worked by the Branch line Companies.	...	...	7·58	...	7·58
Branch line Companies' railways under rebate terms, worked by the main line.	31·68	...	...	...	31·68
Branch line Companies' railways under guarantee and rebate terms.	...	31·25	...	...	31·25
Companies' lines subsidized by the Government of India.	14·76	...	...	...	14·76
Native State lines worked by Native States ...	...	11·69	38·52	...	50·21
Native State lines worked by the main line ...	35·90	102·49	...	...	128·39
Companies' lines guaranteed by Native States	...	...	6·50	...	6·50
<b>TOTAL ...</b>	<b>126·48</b>	<b>148·63</b>	<b>141·77</b>	<b>51·10</b>	<b>467·98</b>

The progress made during the past ten years is summarised in the following table :—

Gauge.	MILEAGE OPEN AT THE END OF									
	1907.	1908.	1909.	1910.	1911.	1912.	1912-14.	1914-15.	1915-16	1916-17.
5' 6" ...	15,821	15,951	16,309	16,701	17,016	17,189	17,641	17,327	18,060	18,182
3' 3½" ...	12,613	12,863	13,323	13,530	13,759	14,105	14,389	14,552	14,671	14,806
2' 6" ...	1,234	1,394	1,443	1,486	1,632	1,692	2,174	2,402	2,539	2,663
2' 0" ...	342	368	415	432	432	438	452	504	563	615
<b>TOTAL ..</b>	<b>30,010</b>	<b>30,576</b>	<b>31,190</b>	<b>32,099</b>	<b>32,839</b>	<b>33,434</b>	<b>34,656</b>	<b>35,285</b>	<b>35,833</b>	<b>36,286</b>

The mileage of new construction sanctioned during the year was 222·45 miles of which 115 miles were to be financed by Government and had to be undertaken for purely military purposes. The remaining mileage was almost all under the heading of Native State lines.

The total mileage under construction, or sanctioned for construction, at the close of the year was :—

	5' 6" gauge.	3' 3½" gauge.	2' 6" gauge.	2' 3" gauge.	Total.
	Miles.	Miles.	Miles.	Miles.	Miles.
State lines worked by the State ... ..	115·00	...	...	...	115·00
State lines worked by Companies... ..	377·61	36·54	8·43	...	422·58
Branch line Companies' railways under guarantee terms, worked by the Branch line Companies.	...	...	120·33	...	120·33
Branch line Companies' railways under guarantee terms, worked by the main line.	...	74·11	8·30	...	82·41
Branch line Companies' railways under rebate terms, worked by the main line.	33·30	...	161·06	...	224·36
Branch line Companies' railways under guarantee and rebate terms.	...	69·48	...	...	69·48
Companies' lines subsidized by the Government of India.	...	5·31	19·50	...	24·81
Unassisted Companies' lines ... ..	...	...	27·20	...	27·20
District Board lines ... ..	3·86	91·69	...	...	95·55
Native State lines worked by Native States ... ..	...	481·41	23·75	14·72	519·88
Native State lines worked by the main line ... ..	...	205·14	171·81	...	376·95
Companies' lines guaranteed by Native States	...	...	3·50	...	3·50
<b>TOTAL</b> ... ..	<b>529·77</b>	<b>963·68</b>	<b>673·88</b>	<b>14·72</b>	<b>2,092·05</b>

An examination of the statement of new mileage opened shows that only one-third of this was on lines financed by Government, and it may be mentioned that work on these lengths constructed out of Government funds had been in progress before the commencement of the war. As to the table showing the total mileage under construction or sanctioned it should be explained that on most of the new lines comprised in this statement work is either held entirely in abeyance or can only be proceeded with very slowly as financial considerations and the limitations in the supply of essential materials permit; in fact the principal activity (and that is very limited) is under lines financed by Branch Line Companies and Native States. The following paragraphs show the position on some of the more important projects.

### Lines opened during the year.

Funds for the construction of the Sara-Sirajganj Railway, 52·93 miles in length, standard gauge, were raised by the Company of that name in October 1913, under the rebate terms of the Branch Line Terms Resolution. The line, which has been constructed on behalf of the Company by the Eastern

Bengal Railway Administration, connects with the latter railway at Ishurdi and traverses a well populated agricultural district of Eastern Bengal. The principal product of the district is jute, in which a heavy traffic is expected particularly from the important centre of Sirajganj on the Jamuna River where a number of merchants occupied with the jute trade are established. The first section from Ishurdi to Bhangoora, 21.25 miles in length, was opened to goods traffic in July 1915, and for passenger traffic in February 1916, the remainder of the line being opened for all classes of traffic in July 1916.

The Kolar District Railway, 63.51 miles in length, connects Bowringpet, a station on the South-West Line of the Madras and Southern Mahratta Railway, with Chik Ballapur, the terminus of the Bangalore-Chik Ballapur Light Railway. The line has been built by the Mysore State Railways, Construction Department, from funds provided by the Kolar District Board. The section Bowringpet to Kolar was opened for public traffic on the 15th December 1913 and that from Kolar to Chintamani on the 6th March 1916. The section Chintamani to Chik Ballapur, opened on the 8th November 1916, completes the remaining link in the 2 feet 6 inches gauge line between Bowringpet and Chik Ballapur giving a light railway through connection between Bowringpet and Yelahanka.

The Burdwan-Howrah Chord, 55.41 miles in length of the East Indian Railway, is a new double track line, commencing at Lillooah station, 4 miles from Howrah and running parallel to the main line of the East Indian Railway for 2.24 miles which it leaves just before Bally station is reached. It then traverses flat rice country as a new double line for 45.26 miles, passing under the Tarkessur Branch Railway and over the Bengal Provincial Railway, and rejoins the main line at Saktigarh station quadrupling it for 7.91 miles to Burdwan Junction. This important project was undertaken with the object of relieving the heavily worked section of the East Indian Railway between Burdwan and Howrah, the distance between which points it also shortens by 7 miles. The Chord line was opened throughout for public traffic on the 1st January 1917.

The Jind-Panipat Railway, 40.66 miles in length, of which 25.90 miles lie in the Jind State and the remainder in British territory, connects Jind City station on the Southern Punjab Railway with Panipat, a station on the Delhi-Umballa-Kalka Railway. The line which is owned partly by the Jind State and partly by the Delhi-Umballa-Kalka Railway Company, has been constructed chiefly with the object of developing that part of the Jind State through which it passes and which is for the most part well irrigated by the western Jumna Canal System.

The first section of the Sylhet Branch, Kulaura to Fenchuganj Ghat, 15.10 miles, was opened on the 16th April 1912, the second section Kusiara to Sylhet, 15.14 miles, on the 1st April 1915; the two portions being separated by the Kusiara River, across which communication was maintained by a ferry.

**Assam-Bengal Railway.**

The opening of the Kusiara Bridge on the 1st July 1916, completed the Sylhet Branch, bringing Sylhet into direct rail communication with the main line.

This extension, which was opened to traffic throughout on the 15th November 1916, was constructed to afford railway communication to the Manganese Mines at Pani and to open out a tract of inaccessible country in the Barya and Chota Udaipur States. Some comparatively heavy work has been necessary between Ghanta and Nathpura. The work of construction has been carried out by the Guzerat Railways Company, who will also undertake its working.

**Shivrajpur-Pani Extension of the Champaner-Shivrajpur Section, Guzerat Railways.**

This line is an extension of the Jaipur State Railway northwards of the city of Jaipur, 34.38 miles in length. It was opened for traffic on the 19th December 1916 and will be worked by the Bombay, Baroda and Central India Railway. The completion of a further length of 30.97 miles is delayed owing to circumstances connected with the war.

**Jaipur-Reengus Section of the Jaipur-Shaikhawati Railway.**

The line traverses undulating sandy but fertile plains and the traffic to be served is chiefly local import of goods and also passenger traffic between the Northern Districts of the Jaipur State and Jaipur City.

The Khijadiya-Dhari Railway, 37.22 miles in length, has been built by the Baroda Durbar. It was opened as far as Gavadka, miles 16.39, on the 1st March 1913, thence to Chalala, miles 9.14, on the 10th March 1914 and the extension to Dhari, miles 11.69, on the 27th May 1916.

**Khijadiya-Dhari Railway.**

The line which connects with the Gondal-Porbandar State Railway at Khijadiya Junction will afford access to the Baroda Mahals. It passes through a district thinly populated but of average fertility. From the traffic earning point of view, however, it will be handicapped by the high cost of construction.

### **Important lines under construction.**

The construction of the Bombay Overhead connection has made very fair progress. It involves much heavy work in the heart of the city and will, when completed, provide an easy and rapid communication for traders, passing between the business centre of Bombay in the

**Great Indian Peninsula Railway Overhead connection at Bombay.**

vicinity of Victoria Terminus across the Great Indian Peninsula Railway Goods Yard at Wadi Bunder to the grain warehouses and Cotton Market near Mazgaon on the Harbour Branch Railway. It is anticipated that the line will be opened for traffic in June 1918.

The Itarsi-Nagpur Railway, 238·16 miles in length, will, when completed, form part of a through North and South broad gauge connection and furnish an additional outlet for the traffic of the Pench Valley Coal Fields.

**Itarsi-Nagpur Railway with a branch to the Pench Valley Coal Fields.**

The project is divided into three sections, *viz.*, Northern, from Itarsi to Amla; Southern, from Amla to Nagpur; and Eastern, from Amla to Parasia (Pench Valley Branch).

The Northern Section, Itarsi to Amla, 80·56 miles, was completed and opened for passenger traffic in October 1914.

The Eastern section, Amla to Parasia, 53·86 miles, was opened on the 1st November 1915.

Work on the tunnels on the Southern section Amla to Nagpur is proceeding but it has been found necessary, owing to the war, to postpone the remaining work on this section.

The Secunderabad-Gadag Railway which is being constructed by the Nizam's Guaranteed State Railways Company, is the property of His Highness the Nizam's Government. When completed it will afford an outlet to the port of Mormugoa from the southern portion of Hyderabad State, and will link up the metre gauge system of that State with the metre gauge sections of the Madras and Southern Mahratta and South Indian Railways.

**Secunderabad-Gadag Railway.**

The first section from Secunderabad to Mahbubnagar, 70·20 miles, was opened throughout to passenger traffic on the 1st October 1916; and the second section Mahbubnagar to Wanaparti, 33·10 miles, on the 1st April 1917.

The open sections are being worked by the Nizam's Guaranteed State Railways Company under the terms of an agreement between His Highness the Nizam's Government and the Company.

### **New construction financed by private enterprise, District Boards and Native States.**

The Branch Line Terms which are now well known throughout India, have undergone no change during the year and are reproduced as Appendices Nos. 33, 34 and 35 of Volume II of this report. They provide for the grant by the

**Branch Line Companies.**

Government of India of financial assistance to private companies furnishing capital for the construction of feeder lines to existing railways, in either of the following forms :—

- (1) a firm guarantee by Government of a return of  $3\frac{1}{2}$  per cent on the paid up share capital of the Branch Line Company ;
- (2) a rebate paid by the parent line from its net earnings from traffic brought to it by the branch, sufficient to make up a dividend of 5 per cent on the paid up share capital; the liability of the main line being, however, limited to the total of its net earnings from such traffic.

The option is allowed to companies, under certain circumstances, of raising a portion of their capital under guarantee terms and the remainder under rebate terms ; while in the province of Assam, on account of the relatively less developed state of the country and the difficulty experienced in obtaining capital for private railway enterprises under the ordinary terms, it has been provided that the Local Administration may, in approved cases, supplement the Imperial guarantee of  $3\frac{1}{2}$  per cent described above by the grant from provincial funds of an additional guarantee for a specified term of years of 1 per cent on the paid up capital of the Company.

The table below shows the projects sanctioned for construction under the Branch Line Terms during the year under review. The fall in their number as compared with previous years, is entirely due to causes directly connected with the war. Conditions in the money market had become unfavourable for the raising of capital on reasonable terms, while increases in the cost of manufactured materials, such as rails, and rolling-stock, led to large increases in estimates for construction. For these reasons, the Government of India found it necessary towards the end of July 1916, to prohibit altogether the raising of capital for Branch Line Projects, except under the most special circumstances. It was recognised, however, that this prohibition would have to be relaxed in the case of railways already under construction and of new projects, considered to be of sufficient urgency for commercial or other reasons to be undertaken in spite of the unfavourable circumstances mentioned. The railways shown in the table therefore fall under one or other of these two classes. The Arakan Light Railway, formerly known as the Buthidaung-Maungdaw Tramway, was already under construction under a concession granted by the Burma Government. The Tramway Company, however, failed to raise the capital necessary to complete construction ; and a new concession was accordingly granted by the Government of India under the Branch Line Terms to a Company floated by Messrs. Martin and Company for the acquisition and completion of the line.

The Panposh-Raipura Railway was sanctioned for construction with the object of opening out a new source of supply of lime-stone at Raipura for use in connection with the Tata Iron and Steel Company's smelting works, while the

project for the conversion from the 2' 6" to the metre gauge of the Teesta-Kurigram Railway was sanctioned in order to release narrow gauge rolling-stock for the Khulna-Bagirhaut Railway, the construction of which was in progress when the prohibition referred to above was brought into force.

Name of railway.	Gauge.	Length.	Capital subscribed.	Financial assistance.	Working Agency.	PROMOTERS.
Arakan Light ...	2' 6"	18.50	Rs. (in lakhs). 22.00	Guarantee	Arakan Light Railway Company.	Messrs. Martin and Company.
Panposh-Raipur ...	5' 6"	14.30	15.00	Rebate ...	Bengal-Nagpur Railway.	Bisra Lime Stone Company.
Teesta-Kurigram conversion.	3' 3½"	14.85	7.00	Rebate ...	Eastern Bengal Railway.	Messrs. Apte, Joshi and Company.

With a view to the resumption, on the return of normal conditions, of a full programme of railway construction, the Railway Board decided to proceed with negotiations with Branch Line promoters in connection with projects which were already under consideration, up to the stage short of actual flotation of the new companies. In accordance with this policy, concessions have been granted for the construction, under the Branch Line Terms Resolution, of the Trichinopoly-Pudukkottai Railway, 32 miles, the Shahdara-Narowal extension, 48 miles, of the Sialkot-Narowal Railway, and the Kurigram-Chilmari extension, 21 miles, of the Teesta-Kurigram Railway. A concession has also recently been offered to a Bombay promoter for the construction of the Phaphund-Auriya Railway, 13 miles, and negotiations are in progress in connection with a number of schemes in all parts of India, covering an aggregate mileage of 3,747 and involving a total capital expenditure of close upon 15 millions sterling.

District Board enterprise in the Madras Presidency has also been affected by the difficulty in obtaining materials and the restrictions on the raising of capital referred to above. As stated in the report for last year, an arrangement had been come to, under which District Boards were permitted to borrow from the Presidency Bank; and not only was it found necessary to cancel this arrangement but owing to the prohibitive prices of railway materials, those Boards, which had funds in hand as a result of their cess accumulations, were unable to embark on new railway enterprises. As a result of these conditions, concession for the construction of only one District Board railway, the Repali-Viseswaram extension of the Tenali-Repali Railway, was granted during the year; but the Guntur District Board decided to defer its construction until the cost of materials fell to a normal level. For the same reasons it was decided to postpone the construction of the Manamadura-Sivaganga, Mayavaram-Tranquebar and Tinnevely-Tiruchendur Railways, sanctioned during 1915-16.

The Madras Presidency still stands alone in this form of local enterprise, no other province having so far enacted legislation for the levy of a railway cess. The bill to empower District Boards to levy a railway cess which was stated in the last report to have been introduced in the Legislative Council of the Punjab was withdrawn in September 1916 owing to lack of support. The desirability of introducing legislation in this behalf has, however, been recognised elsewhere, and it may be expected that when the war is over, other provinces may find it possible to follow the lead given by Madras.

The progress of new construction in Native States continues to suffer from the restrictions arising out of lack of funds caused by the large contributions, direct and indirect, which the Native States have made to the Imperial resources for the conduct of the war. An extension of the Jaipur-Reengus-Sikar Railway from Sikar to Jhunjnu and the Bhojani Road-Bechraji Railway in the Jaipur and Baroda States aggregating 61.15 miles of new construction on the metre gauge were, however, sanctioned. The following table gives a complete list of railways which were under construction in Native States during the year :—

			Length in miles.
<b>Baroda State.</b>			
1. Bodeli-Chhota Udaipur (2' 6" gauge)	...	...	22.65
2. Bhojani Road-Bechraji (metre gauge)	...	...	21.30
3. Masor Road-Jambusar (2' 6" gauge)	...	...	6.97
4. Motipura-Tankhala (2' 6" gauge)	...	...	26.29
5. Okhamandal (metre gauge)	...	...	37.02
6. Samlaya-Timba (2' 6" gauge)	...	...	33.34
7. Unai-Kalamba (2' 6" gauge)	...	...	8.66
<b>Bhavnagar.</b>			
Savar Kundla-Mahuva with branch to Port Albert Victor (metre gauge)			51.30
<b>Cutch.</b>			
Anjar-Bachan (2' 6" gauge)	...	...	23.75
<b>Hyderabad.</b>			
Wanaparti Road-Gadwal (metre gauge)	...	...	13.45
<b>Jaipur.</b>			
1. Reengus-Sikar (metre gauge)	...	...	30.97
2. Sikar-Jhunjnu (metre gauge)	...	...	39.55



<b>Junagad.</b>				
Veraval-Una (metre gauge)	...	...	...	.. 56.91
<b>Mysore.</b>				
1. Lakvalli-Narasimharajapura (2' 0" gauge)	...	...	...	14.72
2. Mysore-Arsikere (metre gauge)	...	...	...	102.25
<b>Rajpipla State.</b>				
Nandod-Nandod Town (2' 6" gauge)	...	...	...	1.74
<b>Travancore.</b>				
Quilon-Trivandrum (metre gauge)	...	...	...	37.91

Amongst the Native States which now own property in the shape of railways are :—

Baroda, Hyderabad, Bhavnagar, Gondal, Porbandar, Jodhpur, Bhopal, Patiala, Morvi, Junagad, Kashmir, Kolhapur, Rajkot, Jetpur, Mysore, Cooch Behar, Gwalior, Mewar, Kotah, Navanagar, Rajpipla, Bikaner, Dhrangadra, Parlakimedi, Cambay, Maler Kotla, Jind, Cochin, Travancore, Cutch, Jaipur, Mourbhanj, Sangli, Dholpur, and Bahawalpur. The order in which these names are given represents approximately the sequence in which the different States first began to interest themselves in schemes of railway extension.

The total mileage of railways in Native States open to traffic at the close of the year was 4,826 miles, distributed between the various gauges as under :—

	Miles.		Miles.
5' 6" gauge	... 960.23	2' 6" gauge	... 519.23
3' 3½" gauge	... 3,059.06	2' 0" gauge	... 287.09

### Aerial Ropeways.

Since 1914-15 the advisability of introducing special legislation for the control of aerial ropeways has been under the consideration of the Government of India. As stated in the report for the last year a practical difficulty has, however, arisen in the way of the introduction of this legislation. Any Act passed for the purpose must necessarily provide for the adequate inspection of ropeways, whether for goods or for passenger traffic, both prior to opening and periodically thereafter, in order to ensure that due regard is paid to the safety of the public and of property. So long as the war lasts, it is impracticable to obtain engineers with adequate knowledge and experience of this special branch of engineering to act as Inspectors on behalf of the Government. It is, however, hoped that temporary arrangements will be made which will prevent any interference, pending the introduction of a Ropeways Act, with progress in the construction of aerial ropeways, for which several projects are now before the Government of India.

### Open Line Improvements.

During the year under review it was again found necessary to confine expenditure to such new works on open lines as were absolutely necessary for the working of traffic.

In order to provide the much needed traffic facilities on the Blusaval-Nagpur section, the scheme for doubling the line from Badnera to Wardha is being pushed on. The third section, Badnera to Dhamangaon, 28.76 miles, was opened to public traffic on 25th January 1917.

Rapid progress was maintained during the year on this scheme on the section beyond Thana, which was completed before the end of the year. The Thana-Diva Up and Down roads were opened for traffic on the 30th and 31st March 1917 respectively, while the section from Diva to Kalyan was brought into use on the first of the same month.

The scheme marks an important step in the improvement of facilities in railway transport towards Bombay from the country served by the Great Indian Peninsula Railway; and it has proved its efficacy even while only partially in service by easing considerably the situation created by the transfer of traffic from sea to rail.

The Thal Ghat realigned section was brought into use on the 2nd of January 1917. The new alignment is two miles long and is on a grade of 1 in 37, the ruling gradient on the Ghat. It shortens the through distance by about 1½ miles; but its chief value lies in eliminating the reversing station previously in use which was a great handicap to the expeditious handling of traffic. Under the old conditions, trains had to be worked in sections and much time was lost in the breaking up and remaking of trains, further delay being caused at the reversing station by the reversing of engines. Trains of a length of 850 feet are already in use on the realigned section and it is expected that trains of 1,500 and 1,800 feet long will be running shortly. The new alignment has a single tunnel in place of the three on the old line.

The carrying capacity of the Santahar-Parbatipur and Katihar-Parbatipur sections of the Eastern Bengal Railway being already exceeded, it has been decided to carry out the following improvements to relieve the situation:—

- (1) Conversion to broad gauge of the existing metre gauge line from Santahar to Parbatipur; and

- (2) Doubling of the existing metre gauge line from Katihar to Parbatipur.

Of these item (1) has already been commenced, the earthwork and masonry of bridges having been put in hand, but no commencement is likely to be made on (2) at present.

No new remodelling schemes of any magnitude have been sanctioned during the current year, but progress has been maintained on the yards mentioned in the last year's Administration Report, of which the new Sorting and Marshalling Yard at Moghal Sarai estimated to cost Rs. 9,28,745 was completed during the course of the year. The schemes for remodelling Nagpur and Nandgaon stations are also being proceeded with in order to relieve congestion of traffic on the Great Indian Peninsula Railway between the Coal-fields and Bombay.

On account of the difficulty of obtaining permanent-way materials no large programme of renewals has been sanctioned during the year under review.

The congestion of Traffic, which is described elsewhere in this report, has necessitated the construction of additional crossing stations, sidings and other facilities on certain lines and the addition of 21 crossing stations on the Bengal-Nagpur and North-East line of the Madras and Southern Mahratta Railway may be specially mentioned. Reference was made in a special paragraph of the previous year's report to the advantages derived from the introduction of a system of train control; those advantages have been further emphasised during 1916-17 and, although an additional 170 miles only were brought under this control in that period, very large additions to the mileage of Indian Railways worked under the system are proposed but are necessarily postponed owing to the shortage of material.

Floods caused considerable damage to open railway lines throughout India during the year under review, notably to the frontier lines worked by the North Western Railway and the Great Indian Peninsula and Bengal and North-Western Railways. In the case of the Bengal and North-Western Railway the damage due to floods was considerably aggravated by the action of the neighbouring villagers in cutting the railway embankments in the attempt to afford an escape to flood water.

Railways in Southern India have also suffered severely from heavy rainfall which caused breaches with serious damage to bridges; and they were further

exposed along the East Coast to a cyclonic storm of great violence on the night of the 22nd November 1916. Two heavy South Indian Railway bogie corridor trains with passengers were overturned, the engines alone remaining standing, telegraphic communications were interrupted and the line breached, and in several places blocked with uprooted trees. Serious damage was done to station buildings and semaphore signals, and traffic was dislocated for several days.

The repair of the Hill section of the Assam-Bengal Railway, which was destroyed by heavy floods in 1915, has been proceeded with, and it is expected that the damaged section will be ready for re-opening throughout, shortly.

The Secretary of State for India has accepted the necessity for the construction of a bridge at Mokameh as an integral part of the Tirhoot Railway, when financial conditions permit of funds being set apart for the purpose. The question of the best site for this bridge is now under investigation.

The special map which accompanies this report shows where the more important open line works were in progress during the year.

### **Congestion of Traffic.**

The year under review was not marked by any easing of the position in regard to coal traffic, which was described in last year's report. On the contrary the pressure on the railways concerned was increased in consequence of heavier demands of the Admiralty. The quantity of coal carried over the East Indian Railway for the public and foreign railways was 1½ million tons more than in 1915-16. The difficulty had, however, been anticipated, and, as mentioned in the last report, the views of Local Governments and Administrations had been called for on the question of the possibility of according preferential treatment to certain essential commodities in the event of it being found that the railways were unable to carry all the traffic offering. The question was also discussed by Government with the representatives of Chambers of Commerce and of principal railways at a meeting held at Calcutta in July 1916 under the presidency of the Hon'ble Member in charge of the Railway Department. The conclusion arrived at as a result of these references was that there was no need at the time to set up new machinery for deciding questions of preference, and that each emergency as it arose, should be dealt with, as was done during the busy season of 1915-16, by co-operation between the railways and commercial representatives.

At the meeting referred to, stress had been laid on the point that efforts should be made by the industrial concerns and railways to lay in stocks of coal during the slack season. It appeared, however, from the discussions that the

limiting factor in this case was the amount of coal raised and not the number of wagons supplied and later events confirmed this view. Owing to the scarcity of labour, due to prevalence of sickness at the collieries and also to a bumper crop the raisings were low and in consequence the collieries were unable to fulfil their contracts with railways and supplies had fallen into arrears when the busy season commenced. The position was then acute and it became necessary to take special steps, which are referred to further on in this report under the heading "Coal Department," in order to reserve the output of first class coal for essential services and generally to regulate supplies. At the same time a notification was issued under Section 147 of the Indian Railways Act exempting the East Indian and Bengal-Nagpur Railways from their obligation in the matter of supply of wagons under Section 42 (2) of that Act.

Another step taken later on was to increase the carrying capacity of railways by the introduction of a system allowing of the indiscriminate use within the coal-field districts of wagons belonging to any railway, which, by avoiding the delays involved in the sorting, allocation and marshalling of rolling-stock according to ownership under the old system, was expected to be of considerable advantage. The scheme was adopted by the representatives of broad gauge railways at a meeting convened by the Railway Board at Calcutta in February 1917, and its immediate effect was to reduce the delay to wagons and to raise the daily loading capacity of the coal-fields.

Towards the close of the year under report and for some weeks thereafter, the difficulties in regard to the movement of traffic were further accentuated by the heavy demands made on behalf of Government for the transport of wheat and other essential food grains for export to the United Kingdom. The pressure was severe on the metre gauge route to Karachi, which was met by a diversion of the traffic in excess of the capacity of that route to the broad gauge route, and on the Great Indian Peninsula Railway which was obliged to stop the booking of public traffic for considerable periods in order to carry the urgent military and other essential traffic. This was the position on the Bengal-Nagpur Railway too in regard to traffic *via* certain junctions, and similar heavy restrictions on public traffic had to be imposed on certain sections of the Madras and Southern Mahratta Railway and from time to time temporarily over the Bombay, Baroda and Central India and several other railways.

All these facts pointed to the need for the appointment of a whole-time officer to control the movement of traffic under the conditions created by the war. Since the close of the year under report the Railway Board have appointed a "Controller of Traffic," whose duties are to advise railways as early as possible of anticipated heavy traffic and to instruct them when any traffic should be restricted or held up to permit of more urgent traffic being carried; to divert traffic from one or more routes to others in order to quicken transit or remove congestion; to divert wagons temporarily, if necessary, from one railway to another; in short to take such steps on behalf of Government as will result in

the most economical use of the limited transport available on railways and to control traffic over railways in the best interests of national and general purposes.

A small committee had also been appointed to draw up a scheme for a general pool of goods stock of all the broad gauge railways to be established under a central control, if at any time it was found to be absolutely necessary, the idea being to work all standard gauge railways as practically one system for purposes of traffic transport. The scheme is being perfected.

### **Reduction in Train Services.**

In view of the practical impossibility (referred to in the report for 1915-16, and further on in this report) of obtaining sufficient supplies of railway material from England, where the full time of the workshops was taken up in the manufacture of munitions of war, the restriction of passenger train services in India became imperative in order to reduce the demands for materials required for the maintenance of locomotives and rolling-stock, and to conserve the available Locomotive power for the carriage of military and other essential traffic. The subject was discussed with the Agents and Managers of principal railways at a meeting which was convened by the Railway Board at Delhi in the beginning of December 1916.

As a result of this meeting, certain mail and a large number of passenger trains were abolished, all possible measures being adopted to minimise the inconvenience caused to the public who are obliged to travel by making up to the maximum permissible the loads of trains left on, and by reducing upper class accommodation and replacing it by third class. The total reductions in train mileage thus effected during the last four months of the year under report amounted to over 22 per cent of the passenger and mixed train mileage of the railways as compared with the corresponding period of 1915-16. Instructions were also issued to restrict everything in the nature of luxuries, such as restaurant cars and reserved carriages, wherever this could be done without causing disadvantages outweighing the advantages to be gained.

Since the close of the year under report, instructions have been issued to railway administrations to the effect that at the present time pilgrim and festival traffic should be permitted only to the extent it can be dealt with without interfering with essential goods traffic and causing congestion or delay to goods stock. The Local Governments and Administrations were invited to co-operate in this matter by making it known among the people generally that no additional or special trains would be run in connection with *melas*, etc., and warning them of the inconvenience likely to be experienced by those who intend to travel on such occasions.

### **Increase of Fares and withdrawal of Concessions.**

These questions were also discussed with the Agents of railways at the meeting at which the question of reduction in train service was considered. It was agreed as a general principle that fares on fast trains should be enhanced up to the existing maximum in order to discourage travelling with a view to avoiding undue overcrowding in passenger trains consequent on the reduction in train services.

As the result of another meeting with Agents and Traffic Managers held at Delhi towards the end of March 1917, further measures to effect a reduction in the numbers of passengers were considered absolutely necessary and the only means of gaining the object in view appeared to be a general enhancement of fares. It was, therefore, decided that on all the principal broad gauge lines the third class fare should be advanced to the existing maximum and on others, where the ordinary fare had been only 2-3rds of the maximum, that it should be advanced by 25 per cent. It was also decided to increase the maxima of all classes to the following limits :—

- (a) The maxima of first and second class fares from 18 and 9 to 24 and 12 pies per passenger per mile, respectively,
- (b) The maximum of the intermediate class fare from  $4\frac{1}{2}$  to 6 pies per passenger per mile for mail and fast passenger trains only, and
- (c) The maximum of the third class fares from 3 to 4 pies per passenger per mile for mail and fast trains only.

This decision gave authority to Railway Administrations to increase the fares up to those limits as circumstances rendered this necessary, but it was not incumbent on them to increase fares all round to those maxima immediately.

As the object of all concessions in fares is to attract passengers, there was obviously no need for them when steps were being taken to reduce the number of passengers with a view to prevent overcrowding. It was accordingly decided to withdraw all concessions in fares which had hitherto been in force.

### **Surcharge on Goods Traffic.**

The Freight (Railway and Steam Vessel) Tax Act, 1917 (No. XIII of 1917), which was passed as a war measure and came into force on and from 1st April 1917, authorises the levy of a surcharge of one pie per maund on coal, coke and firewood and of two pies per maund on all other goods carried by rail or any inland steam vessel except in the cases noted below :—

- (a) All consignments of less than one maund in weight;
- (b) All goods which are carried for a distance of 10 miles or less;

- (c) Railway stores and coal carried for consumption on the home line; and
- (d) All goods which are the property of Government at the time of despatch.

### Oil Fuel Trials.

The final trials with oil fuel were carried out on the Karachi District of the North Western Railway between 1st June and 30th November 1916. During the preliminary trials many classes of burners were tried. Those which proved unsatisfactory for various reasons were eliminated and the final trials were carried out with two systems; the "Holden" and "Mexican Trough" burners which were used both singly and combined.

A full account of these trials will be published at a later date, but meantime the results obtained may be described briefly :—

Twenty engines in all were under trial in the mail and passenger services. Four burned coal while the rest were equipped with the different types of oil burners. The average mileage per engine throughout the trials was 19,500.





The tests showed that on the average the work done by one ton of oil would require 1·815 tons of coal. As the calorific value of samples of the coal and oil used were as 1 to 1·563, the figures demonstrate the increased fire box efficiency of the oil. The oil used, which had a flashpoint of 187 degrees F., was supplied from the Persian concessions of the Anglo-Persian Oil Company, at a price of Rs. 28-12-0 per ton *ex* ship Karachi. To this were added certain charges of Rs. 2 per ton on account of storage in the Oil Company's tanks and Re. 0-10-0 for wharfage, giving a total cost of Rs. 31-6-0 per ton *ex* tank Karachi. By the construction of railway storage tanks, it is hoped to reduce the former charge to some Re. 0-8-0 per ton including charges on account of interest on Capital and depreciation, giving a rate of about Rs. 30 per ton *ex* Railway tank Karachi.

The cost of the coal used in the trials averaged Rs. 16-15-6 per ton including freight over rail to Kotri, at which point the coal burning engines were fuelled. Making allowance for a small reduction in the price of oil *ex* tanks and taking the other comparative costs as demonstrated in the trials, the engine costs of coal and oil under the conditions prevailing on the Karachi District are practically equal. The comparative destructive effects of coal and oil as fuels on boilers and fireboxes have yet to be determined by experience, and many other indeterminate factors exist, such as the release of coal carrying rolling-stock and stacking grounds, abolition of ash-pits and the cost of the removal of ashes. These, however, are believed to be, in the main, in favour of oil, and it has therefore been decided to proceed with the conversion of all the 250 engines on the Karachi district from coal to oil burning. The oil consumption on the district will then average about 5,000 tons per month in place of an average of 9,000 tons of coal now consumed. The average comparative factor of coal to oil as 1 to 1·815 determined by these trials cannot be considered as the maximum of efficiency which will be obtained. Throughout the trials as the engine crews gained experience, there was a progressive improvement in the performances of oil. Moreover, the flexibility of an oil fire makes it especially suited to goods trains which have long halts at way side stations. It is anticipated therefore that its adoption on the goods engines of the district will show an improved efficiency, compared with the trials carried out on the mail and passenger services. Tentative trials have in fact indicated that a factor of 2 to 1 will be obtained in goods engines. In view of the anticipated increased output of oil from the Persian concessions of the Anglo-Persian Oil Company the introduction of oil fuel on other lines terminating at Western Indian Ports is now under consideration.

### **Government Test House at Alipore.**

War conditions were reflected in the work done by the Superintendent of Local Manufactures and his staff during 1916-17. The general retrenchment in expenditure on Railways and Public Works, together with the difficulty in obtaining iron and steel except at high prices, led to a reduction in the manufacture of steel structures and consequently in the inspection work carried out.

The physical and chemical laboratories, however, were busily employed in testing materials for high explosive shells. The following distribution of the samples examined will indicate the amount of work done on behalf of various interests :—

Munitions samples	...	...	...	...	2,159
Samples from Government Departments			...	...	216
Samples from other sources		...	...	...	329
			Total	...	<u>2,704</u>

### Supply of Materials from the United Kingdom.

The difficulties in obtaining supplies of materials from England, described in the report for 1915-16, increased during 1916-17. The procedure by which the Railway Board became responsible for the scrutiny and certification of demands on England, resulted in many non-essential demands being disallowed, while the resources of India were utilised in an increasing degree. The classes of materials, however, required for the Navy and Army and allied war services include those which are essential for the maintenance of railways. As the war became increasingly one of material, the surplus which could be made available for railways, diminished. Moreover, the heavy drain on the financial resources of Britain coupled with an adverse American exchange due to heavy war purchases, precluded Indian Railways from obtaining supplies from that country to any appreciable degree. They were unable, therefore, to obtain the full supplies necessary for their adequate maintenance. It was impossible to obtain rolling-stock either for additions or renewals, while boilers long overdue for replacement, had perforce to be kept in service, at the cost of an increased consumption of materials for repairs. The shortage of shipping had diverted a large volume of traffic from the sea to the rail route. Railways therefore were faced with an abnormal demand for traffic facilities at a time when additional equipment was unobtainable and facilities for repairs were curtailed. These difficult conditions led to the adoption of ingenious devices for the reutilisation of old materials, and to a relaxation in accepted standards of wear. The success of railways in maintaining services under such adverse circumstances is highly creditable.

### Purchase of Stores in India.

The restrictions on supply of stores from abroad, referred to in the report for 1915-16, are reflected in the value of stores imported direct, shown in Appendix 24. Notwithstanding the progressive appreciation in prices in the United Kingdom and other countries on account of heavy demands for war materials, the value of imported stores decreased by over two crores in the year now under review. At the same time, the value of imported stores purchased in India, increased by over a crore of rupees. Similarly, the value of stores of indigenous origin or Indian manufacture increased by almost 1·13 crores of

rupees. Making full allowance for the rise in the prices of the latter which took place in sympathy with a world wide rise in prices, it is indisputable that the war conditions have forced consumers in India to rely, in an increasing degree, on the products of the country and have stimulated the initiation and development of industries in India.

The total values under the heads stores purchased in India include materials costing over 26 lakhs of rupees purchased for military purposes and Overseas Expeditionary Forces.

### Coal Department.

In 1916, 17,254,309 tons of coal were mined in India, an increase of over 1,50,377 tons on the preceding year. Including bunker coal, shipments from Calcutta to Indian and Foreign Ports amounted to 1,999,657 tons as compared with 2,757,118 tons in 1915 and 3,651,087 tons in 1914.

The State Railways Coal Department inspected 6,061,658 tons of coal in 1916-17 as compared with 4,527,163 tons in 1915-16. The amount of inspected coal shipped from Calcutta was 1,003,178 tons the greater portion of which was for Admiralty requirements.

With the idea of laying in a stock of coal before the busy season, about 600,000 tons of coal were purchased for all railways between March and May 1916. Owing to unfavourable conditions in the coal-fields not only was it impossible to obtain delivery of this extra coal, but all railway contracts fell into arrears. These arrears were not overtaken for several months owing to heavy demands of coal for Naval and Military purposes.

In the autumn of 1916 there was a scarcity of labour at the collieries due to an epidemic of malaria and to the labour seeking more profitable employment in reaping a bumper crop, and this coupled with the heavy demands from railways, the Admiralty and the Marine Department, brought about a position in which supply was insufficient to meet demands. The stocks on railways ran down to a dangerous point and it was necessary, at one time, to restrict traffic considerably on the North Western and Great Indian Peninsula Railways on account of the coal shortage. In order to meet the situation, it became necessary to prohibit the export of 1st class coal from India and to take steps to ensure that 1st class coal was reserved for war and essential services. For this purpose the Mining Engineer to the Railway Board was invested with powers under the Defence of India (Consolidation) Rules 1915 to requisition the output of any colliery. Further with a view to the immediate adoption of measures to relieve the situation a meeting of representatives of the mining interests, Chambers of Commerce and railways interested in the coal

trade was convened in Calcutta in December. The conclusion come to at this meeting was that inspite of the labour shortage the estimated outturn was sufficient to meet all essential requirements up to the end of February 1917, by which time it was expected that raisings would be considerably increased. As a result of the discussions also a small committee consisting of the Agent, East Indian Railway, Mining Engineer to the Railway Board, to representatives of the coal trade and two nominees of the Government of Bombay was formed to regulate the supplies of coal and to ensure that coal supplies in general should be made available to consumers of the greatest national importance; it was also their function to distribute, and to decide against which coal contracts wagons should be supplied for loading. It was possible by this means to eliminate unimportant consumers.

The powers given to the Mining Engineer referred to above were freely used in securing supplies of coal. The scope of the Coal Department's work was in consequence greatly increased, firstly by the responsibility which devolved upon them for the supply of coal for the armed forces of the Crown, for railways and other important services in India and secondly by the exercise of these powers to control supplies in the interest of public utility works and services whose operations were held to be necessary for the conduct of the war. The Railway Board are glad to acknowledge the manner in which the coal supplies Committee and Mr. R. W. Church, B. Section, Mining Engineer with the staff under him carried out their arduous and difficult duties and the valuable assistance and co-operation which was freely extended to Government by the coal mining interests in India.

### **Insulated and Refrigerating Vans.**

In view of the success which has accompanied the carriage of perishable goods by rail in cold storage in America and other countries, it was decided to carry out experiments to ascertain the financial prospects of similar facilities in India and the class of vehicle most suited to Indian conditions. Experiments were commenced on the Eastern Bengal Railway with a self-contained refrigerating vehicle from the Great Indian Peninsula Railway in conjunction with certain insulated vans from the North Western Railway. It became evident early in the experiments that self-contained refrigerating vehicles similar to the Great Indian Peninsula Railway car would be unsuitable having regard to the heavy first cost, the difficulty of repairs and maintenance, the loss of carrying capacity and the high proportion of unremunerative dead weight to be hauled. It was decided, therefore, to concentrate on experiments with insulated vans cooled by ice. The trials with the North Western Railway Vans of this type, however, indicated defects in their insulation and therefore the construction of new experimental insulated vans with different classes of insulation was undertaken, with a view to further experiments being carried out in the hot weather of 1917.

### Accidents.

The number of persons killed and injured in the working of Indian Railways during 1916-17, as compared with previous years, was as follows:—

Particulars.			1912.	1913-14.	1914-15.	1915-16.	1916-17.
Passengers ...	Killed	By accidents to trains, rolling-stock, permanent-way, etc.	7	58	16	4	15
		By accidents from other causes, including accidents from their own want of caution or misconduct.	199	210	217	243	229
		Total killed ...	206	268	233	247	244
"	Injured	By accidents to trains, rolling-stock, permanent-way, etc.	159	104	140	81	241
		By accidents from other causes, including accidents from their own want of caution or misconduct.	635	711	731	740	858
		Total injured ...	794	815	871	821	1,099
Railway Servants.	Killed	By accidents to trains, rolling-stock, permanent-way, etc.	20	36	36	19	22
		By accidents from other causes, including accidents from their own want of caution or misconduct.	385	444	407	414	404
		Total killed ...	405	480	443	433	426
"	Injured	By accidents to trains, rolling-stock, permanent-way, etc.	130	133	160	109	135
		By accidents from other causes, including accidents from their own want of caution or misconduct.	736	712	699	687	658
		Total injured ...	866	845	859	796	793
Other persons...	Killed	At level crossings ...	44	56	52	40	48
		Trespassers ...	1,173	1,308	1,327	1,315	1,363
		Suicides ...	234	208	245	256	239
		Miscellaneous ...	88	23	67	127	81
		Total killed ...	1,534	1,590	1,691	1,738	1,731
"	Injured	At level crossings ...	42	49	37	35	39
		Trespassers ...	353	394	361	425	454
		Suicides, attempted ...	7	8	9	8	9
		Miscellaneous ...	47	31	39	63	38
		Total injured ...	449	482	446	536	540
Total of all classes.	Killed	.....	2,145	2,338	2,867	2,418	2,401
	Injured	.....	2,109	2,142	2,176	2,153	2,432

The total number of persons of all classes killed by causes beyond their control was 70 against 38, in 1915-16, the increase being partly due to the large number of persons killed in the accident at Kalanour station on the North Western Railway referred to below and to minor accidents; the number injured amounted to 424 against 237 in the previous year, the increase being chiefly attributable to a larger number of persons being injured in minor accidents. Out of a total of 486 millions of passengers travelling 244 were killed and 1,099 injured, while of the former only 15 were killed through causes beyond their own control.

The following are particulars of the more important train accidents :—

While a down goods train was standing on the loop line at Nandalur, **Madras and Southern Mahratta Railway.** a station on the broad gauge system of the Madras and Southern Mahratta Railway, on the night of the 13th May 1916, the up Bombay mail was also admitted on to it instead of the main line due to the points being incorrectly set and collided with the goods train. The engines and rolling-stock were damaged and fourteen passengers were slightly injured.

On investigation it was found that the Assistant Station Master was primarily responsible for the accident, in that he gave the points jamedar orders to set the road for the departure of the goods train, but failed to countermand this order when line clear was refused for the goods and given for the mail train. The points jamedar also contributed to the accident by having been asleep at his post, and the driver of the mail train, by non-observance of signals at, and the speed limit over the points.

The staff at fault were suitably punished.

On the night of the 30th August 1916, the down Lahore-Calcutta mail ran into the rear of a goods train which was **North Western Railway.** standing at Kalanour station, between Ambala and Saharanpur, resulting in the death of 2 European and 7 Indian passengers, and injuries to 5 European and 20 Indian passengers. The majority of the casualties occurred in the two vehicles of the mail train next to the engine which were completely wrecked. Five wagons and a brake van of the goods train were also completely smashed. Judging by the damage done the speed of the mail was estimated to have been at least 30 miles an hour at the time of the collision.

The case was the subject of departmental enquiry as a result of which the accident was attributed to the negligence of the driver of the mail in running past all the signals which were set against his train. The driver was subsequently prosecuted and sentenced to six months' rigorous imprisonment.

### Railway Staff.

The total number of servants in railway employ at the close of the year was 636,488, of which number 6,907 were Europeans, 10,425 Anglo-Indians and 619,156 Indians. Of the Europeans and Anglo-Indians 15,311 were enrolled as Volunteers. At the close of 1916-17 there were 11,384 children and 10,413 apprentices and workmen attending the Railway Schools.

The corresponding figures for the past ten years are shown in the following table :—

Year.	EMPLOYEES.				Number who are Volunteers.	Children attending Railway Schools.	Apprentices and Workmen attending Railway Schools.
	Europeans.	Anglo-Indians.	Indians.	Total.			
1907 ... ..	7,186	9,984	499,988	517,153	13,816	7,140	7,358
1908 ... ..	7,344	9,951	508,188	525,483	13,911	8,719	6,513
1909 ... ..	7,278	9,635	493,933	510,896	13,924	7,922	8,912
1910 ... ..	7,406	9,554	522,741	539,701	13,723	8,289	8,552
1911 ... ..	7,685	9,872	545,337	562,894	14,632	8,679	8,280
1912 ... ..	7,850	10,006	571,506	589,422	15,014	9,682	9,591
1913-14 ... ..	7,986	10,437	614,882	633,305	15,606	10,992	8,943
1914-15 ... ..	7,641	10,349	582,493	600,483	15,981	10,664	10,163
1915-16 ... ..	7,274	10,412	607,919	625,605	15,449	11,232	10,474
1916-17 ... ..	6,907	10,425	619,156	636,488	15,311	11,384	10,413

### Conclusion.

From a consideration of the various matters which have been dealt with in this Report it will be clear that the demands made on railways under the abnormal conditions of the present time have been extremely heavy. They have in many directions contributed to the war. They have had at the same time to carry an unprecedented traffic. They have been hampered by depletion of staff. They have been hampered by scarcity of materials of every kind. On no occasion, whether called on to undertake an entirely new work such as the manufacture of shell, to carry out against time the construction of new railways or to deal with a sudden press of essential traffic, have they failed to do what was required of them. Results of this kind are a tribute to the efficiency of the staff as a whole, and were rendered possible only by the co-operation of all ranks from the highest to the lowest. The Railway Board desire therefore to conclude their Report with an acknowledgment of the devotion to duty of all grades of the railway staff, and of the success which they have attained.

## Notes on the relation of the Government to Railways in India.

(Reprinted from the Report for 1914-15.)

One of the special features of the Indian Railway system is the diversity of conditions that prevails in the relation of the State to the various lines in respect of ownership and control. **Diversity of relations between the State and Railways.** Of the important lines situated in British India or in which the Government of India is interested, three (the North Western, Eastern Bengal, and Oudh and Rohilkhand Railways) are owned and worked by the State; eight (the East Indian, Great Indian Peninsula, Bombay, Baroda and Central India, Madras and Southern Mahratta, Assam-Bengal, Bengal-Nagpur, South Indian, and Burma) are owned by the State but worked on its behalf by companies enjoying a guarantee of interest from the Government; three important lines (the Bengal and North-Western, Rohilkund and Kumaon, and Southern Punjab) and many of less importance are the property of private companies, some being worked by the owning companies and some by the State or by the companies that work State-owned systems; several minor lines are the property of District Boards or enjoy a guarantee of interest granted by such Boards.

The diversity of conditions is in certain respects less important than might at first appear for the following reasons:—

The Government of India exercises under the Indian Railways Act, 1890, in respect of all railways in British India (and also, by virtue of arrangements with Native States, in respect of the chief railways passing through such States), certain general powers. Thus a railway may not be opened until a Government Inspector has certified that it has been constructed so as to comply with requirements laid down by the Government and can be used for the public carriage of passengers without danger to them. The Government of India can also, in the interest of the safety of passengers, require a railway to be closed, or the use of particular rolling-stock to be discontinued, or may prescribe conditions for the use of the railway or the rolling-stock. They can appoint a Railway Commission to investigate complaints on certain matters such as the withholding of reasonable traffic facilities or the grant of undue preference.

In addition the Government of India (or in some cases Local Governments) exercise under the provisions of contracts detailed control over the management of all railways in British India greatly exceeding that which is secured by the Indian Railways Act. They also have a certain financial interest in all companies in British India, and a preponderating interest in most of those which are of the first importance.

The main causes which have led to the present diversity of conditions in regard to the agency by which railways are managed, and the relations of the Government with the various classes of companies now in existence, are summarised in the following paragraphs:— **History of relations of the Government and companies.**

The first proposals for the construction of railways in India were submitted in 1844 to the East India Company in England by Mr. R. M. Stephenson, afterwards Chief Engineer of the East Indian Railway, and others; they included the construction of lines by railway companies to be incorporated for the purpose and the guarantee by the East India Company of a specified return. A contract for the construction by the East Indian



Railway Company of an experimental line of 100 miles from Calcutta towards Mirzapore or Rajmehal at an estimated cost of 1,000,000*l.* was made in 1849, and a return of 5 per cent. was guaranteed by the East India Company on the capital; and a similar contract was made in the same year with the Great Indian Peninsula Railway Company for a line from Bombay to Kalyan at an estimated cost of 500,000*l.* But the policy of entrusting generally the construction of Indian railways to guaranteed companies was not adopted until 1854 on the recommendation of Lord Dalhousie, who, in a minute dated 20th April 1853, explained his reasons for preferring the agency of companies, under the supervision and control of the Government, to the construction of lines on behalf of the Government by its own officers. He held that the State Engineer officers would make railways as well and possibly as cheaply and as expeditiously as companies; but that the withdrawal from other duties of the large number of officers required would be detrimental to the public interest, that the conduct of commercial undertakings did not fall within the proper functions of any Government and least of all within the functions of the Government of India, since the dependence of the population on the Government was, in India, one of the greatest drawbacks to the advance of the country, and that the country would therefore benefit by the introduction of English energy and English capital for railway purposes, with the possibility that such energy and capital would in due course be encouraged to assist in the development of India in other directions.

The policy supported by Lord Dalhousie was adopted, and between 1854 and 1860 contracts for the construction of Railways in India were made by the East India Company, or (after 1858) by the Secretary of State for India with the East Indian, Great Indian Peninsula, Madras, Bombay, Baroda and Central India, Scinde (afterwards the Scinde, Punjab and Delhi), Eastern Bengal, Great Southern of India (afterwards, when amalgamated with the Carnatic Railway Company—see below—the South Indian) and Calcutta and South-Eastern Railway Companies. Under these contracts the railway companies undertook to construct and manage specified lines, while the East India Company (or the Secretary of State for India) agreed to provide land and guaranteed interest on the capital, the rate fixed being in various cases 5, 4½ and 4¼ per cent. according to the market rates prevailing when the various contracts were made. Half of any surplus profits earned was to be used towards repaying to the Government any sums by which it had been called upon to supplement the net earnings of any previous period in order to make good the guarantee of interest; and the remainder was to belong to the shareholders. In practically all matters of importance, except the choice of staff, the companies were placed by the contracts under the supervision and control of the Government, which had power to decide on the standard and details of construction; the rolling-stock to be provided; the number, time, and speed of trains; the rates and fares to be charged; the expenditure to be incurred; the standard of maintenance; and the form of accounts. The railways were to be held by the companies on leases terminating at the end of 99 years, and on such termination the fair value of their rolling stock, plant, and machinery was to be paid to them. But provision was also made to enable the Government to purchase the lines after 25 or 50 years on terms calculated to be the equivalent of the companies' interests therein, and also to enable the companies to surrender their lines to the Government and to receive in return their capital at par.

An attempt to secure the construction of railways in India, on terms more favourable to the Government than those of the contracts with the original guaranteed companies, was first made in 1862, when a subsidy, but not a guarantee, was granted to the Indian Branch Railway Company

**Early attempts to secure funds for railway construction without a guarantee.**

which proposed to make feeders to the trunk lines in Northern India, and did actually make one such line. Similar assistance was granted later to the Indian Tramway Company, which made a short line in Madras. In 1864 the terms granted to the two companies mentioned were taken as a standard for general adoption with a view to the encouragement of similar companies. The chief provisions were that the Government, besides giving the necessary land free of cost, would grant an annual subsidy for 20 years at a rate not exceeding 100% per mile of line, with an addition in respect of large bridges costing more than 10,000%. These terms failed to attract capital, and the two unguaranteed companies which had begun work found themselves after a few years unable to proceed without further assistance from the Government. Consequently, in 1867, a contract was entered into with the Indian Branch Railway Company (which soon after changed its name to the "Oudh and Rohilkhand Railway Company") by which the company was guaranteed interest at 5 per cent per annum on the cost of certain lines to be carried out by it, on conditions similar to those laid down in the contracts of the period 1854—1860. Similarly the Indian Tramway Company, after having been given in 1868 a guarantee of 3 per cent. per annum, went into liquidation in 1870, and became absorbed in a new company called the Carnatic Railway Company (afterwards amalgamated with the Great Southern of India Railway Company to form the South Indian Railway Company), with which the Secretary of State entered into a contract guaranteeing interest on its capital at 5 per cent. per annum. In 1869, Sir John Lawrence summed up the result of the experiment of the construction of railways by unguaranteed companies as follows:—"The Government of India has for several years been striving to induce capitalists to undertake the construction of railways in India at their own risk, and on their responsibility with a minimum of Government interference. But the attempt has entirely failed, and it has become obvious that no capital can be obtained for such undertakings otherwise than under a guarantee of interest fully equal to that which the Government would have to pay if it borrowed directly on its own account."

The attempt to encourage unguaranteed companies having thus been unsuccessful, it became necessary to decide whether the old practice of relying on guaranteed companies, of the type that had provided capital for, and had constructed, the first railways in India, should be continued. The Government of India expressed their objections to this course. They doubted whether their power of control over such companies secured the greatest possible economy in construction. They also disliked the arrangements under which they guaranteed the interest on the capital of companies, and thus became responsible for loss on working while having only a comparatively remote prospect of profiting by the result of successful working. Two important changes were consequently made in the practice that had been followed since the beginning of railway construction in India:—

1. Arrangements were made with some of the most important of the guaranteed companies that, in lieu of the provision that half of any surplus profits was to be applied in repayment of sums advanced by the Government under the guarantee of the interest, half of the surplus profits for each half-year should be the property of the Government. In consideration of this modification, the Government relinquished, in the case of three companies, the Great Indian Peninsula, the Bombay, Baroda and Central India, and the Madras, its right to purchase the lines at the end of the first 25 years from the dates of the respective contracts.
2. It was decided by the Secretary of State that the time had arrived when in both raising and expending such additional capital as might be required for new lines in India, the Government should secure to itself the full benefit of its own credit and of the cheaper methods which it was expected that it would be

able to use. Accordingly for several years after 1869 the chief capital expenditure on railways was incurred direct by the State and no fresh contracts with guaranteed companies were made except for small extensions. Among the lines constructed or begun by State agency and from State capital between 1869 and 1880 were the Indus Valley, Punjab Northern, Rajputana-Malwa, Northern Bengal, Rangoon and Irrawaddy Valley, and Tirhoot.

By the end of 1879, in about 25 years from the introduction of railways in India, 6,128 miles of railway had been constructed by companies which had expended approximately, 97,872,000*l.* **Progress in the construction of railways.** (These figures include the Calcutta and South-Eastern and Nalhati Railways, which were constructed by companies but were purchased by the Government in 1868 and 1872, respectively.) By the same date 2,175 miles of railway had been constructed by the Government at a cost of 23,595,220*l.*

In 1880, the necessity for great and rapid extension of the railway system was urged by the Famine Commissioners, appointed after the great famine of 1878, who estimated that at least 5,000 miles were still necessary for the protection of the country from famine. It was held by the Government of the time that a limit was necessary on the capital borrowed annually; and it was clear that the limit fixed was not high enough to allow of such progress in railway construction as was desirable. With reference to this difficulty the Famine Commissioners **Introduction of modified guarantee terms.** remarked "that there would be manifest advantages in giving free scope to the extension of railways by private enterprise if it were possible; and, though the original form of guarantee has been condemned, it may not be impossible to find some substitute which shall be free from its defects, and may secure the investment of capital in these undertakings without involving the Government in financial or other liabilities of an objectionable nature."

Action in the direction suggested by the Commission was taken by the formation of three companies without a guarantee (the Bengal Central in 1881 and the Bengal and North-Western and Rohilkund and Kumaon in 1882) and three new guaranteed companies (Southern Mahratta in 1882, the Indian Midland in 1885, and the Bengal-Nagpur in 1887). The Bengal and North-Western and the Rohilkund and Kumaon Railway Companies are referred to more fully in a later paragraph. The Bengal Central Railway Company's operations were not successful at the outset, and a revised contract was entered into with the company, with effect from the 1st July 1885, under which the Secretary of State guaranteed interest at 3½ per cent. on the company's capital the balance of net earnings remaining after payment of interest on advances by the Secretary of State and debenture capital (but not the share capital) being divided between the Secretary of State and the company in the proportions of three-quarters to the former and one-quarter to the latter. The new contract gave the Secretary of State the right to take possession of the line on the 30th June 1905, or subsequently at intervals of 10 years, on repaying the Company's capital at par. The rate of interest guaranteed to the Southern Mahratta Railway company was also 3½ per cent; in this case the balance of net earnings remaining after payment of interest on advances by the Secretary of State (but not on share or debenture capital) was divisible in the same way as in the case of the Bengal Central Railway Company. The guarantee to the Indian Midland and Bengal-Nagpur Railway Companies was 4 per cent., and the Secretary of State was entitled to three-quarters of the surplus profits in excess of all interest charges. The lines constructed by the three companies last mentioned were declared to be the property of the Secretary of State, who had the right to determine the contracts at the end of approximately 25 years after their respective dates, or at subsequent intervals of 10 years, on repaying at par the capital provided by the companies.

The Assam-Bengal Railway Company was formed on similar lines in 1892, except that any surplus profits were to be divided between the Secretary of State and the company in proportion to the capital provided by each. The rate of guarantee in the case was  $3\frac{1}{2}$  per cent. for the first six years and thereafter 3 per cent. The Burma Railways Company was formed in 1897 to manage and develop the line in that Province that had been constructed by the State. Interest at  $2\frac{1}{2}$  per cent. was guaranteed on the share capital raised by the company, and the surplus profits were originally divisible in the proportion of four-fifths to the Secretary of State and one-fifth to the Company, but since 1908 the division has been proportional to the capital invested by each in the undertaking. The contract with the Burma Company is terminable by the Secretary of State in 1928 or on subsequent occasions, on repayment of the company's capital at par.

The terms of guarantee given to the companies formed since 1860 have thus been much more favourable to the Government than in the case of those formed before 1869.

In dealing with the guaranteed companies formed before 1869 and with those formed in 1881 and subsequently, it has been the practice (except in the cases mentioned above, when the purchase of some of the old guaranteed lines was postponed in order to secure to the Government a share in surplus profits) to use in some way or other at the earliest possible date the right reserved by the Government of terminating the contracts of the various companies. The method of making use of this right has deferred in different cases. The Eastern Bengal, Oudh and Rohilkhand, and Scinde, Punjab and Delhi lines were purchased and transferred to State management, the last named now forming part of the North Western Railway. Similarly, the Bengal Central line was purchased and made part of the Eastern Bengal Railway. The Madras and the Indian Midland lines were acquired but left, after acquisition, under the management of companies working other lines with which it was advantageous to amalgamate them. In all other cases (East Indian, South Indian, Great Indian Peninsula, Bombay, Baroda and Central India, Southern Mahratta, and Bengal-Nagpur), the course adopted has been to arrange for the continuance of management by the original company (or by a new company closely related to the old one), but to secure more favourable financial conditions for the State by one or more of the following methods:—reduction of the amount of capital retained by the companies in the undertakings, reduction of the rate of interest guaranteed by the State on such capital, and modification in favour of the Government of the clauses relating to the division of surplus profits.

Particulars of the contracts now existing with Guaranteed companies will be found in Appendix 1 of Volume II of this Report. But the relations between the Government and the Guaranteed companies now working railways may be summarised as follows:—

The lines that they work are the property of the State.

The greater part of the capital is the property of the Government, either through having been originally supplied by it or through the acquisition by the Government of the greater part of the companies' interests on the termination of old contracts.

When funds are required for further capital expenditure, the Government has the option either of providing them or of calling on the company to provide them. The company receives guaranteed interest at a fixed rate on its capital; and similar payments out of the earnings are made to the Government. If, after these have

been made, surplus profits remain, they are divided between the Government and the company in the various proportions provided for by the contracts. The company's share is in all cases only a small fraction of the Government's share.

All the contracts, except one, which is for a fixed term of 25 years, are terminable at the option of the Secretary of State, at specified dates ; and on termination the company's capital is repayable at par (except in the case of the East Indian Railway Company, which is for special reasons to receive a terminable annuity instead of a cash payment).

The administrative control exercised by the Government over the companies is as follows :—

The company is bound to keep the line in good repair, in good working condition, and fully supplied with rolling-stock, plant, and machinery ; to keep the rolling-stock in good repair and in good working condition ; and to maintain a sufficient staff for the purposes of the line ;—all to the satisfaction of the Secretary of State.

The Secretary of State may require the company to carry out any alteration or improvement in the line, or in the working that he may think necessary for the safety of the public or for the effectual working of the line.

The Secretary of State may require the company to enter into agreements, on reasonable terms and conditions, with the administrations of adjoining railways for the exercise of running powers, for the supply to one another of surplus rolling-stock, for the interchange of traffic and rolling-stock and the settlement of through rates, and for additions and alterations to or the redistribution of existing accommodation in junctions or other stations in view to their convenient mutual use.

The train service is to be such as the Secretary of State may require. In order to secure a general control over the rates quoted by companies the Secretary of State has retained power to settle the classification of goods and to authorise maximum and minimum rates within which the companies shall be entitled to charge the public for the conveyance of passengers and goods of each class.

The company has to keep such accounts as the Secretary of State may require, and these are subject to audit by the Secretary of State.

In all other matters relating to the line the company is made subject to the supervision and control of the Secretary of State, who may appoint such persons as he may think proper for the purpose of inspecting the line, auditing the accounts, or otherwise exercising the power of supervision and control reserved to him. In particular the Secretary of State has the right to appoint a Government Director to the Board of the company, with a power of veto on all proceedings of the Board. All the moneys received by the company in respect of the undertaking, whether on capital or revenue account, have to be paid over to the Secretary of State.

All expenditure by the company has to be stated and submitted for the sanction of the Secretary of State.

Thus the Government has the preponderating financial interest in the lines worked by the two classes of Guaranteed companies, those formed before 1869 and retained as working agencies with reduced capital after purchase, and those formed on terms more favourable to the State after 1880; it has exceedingly wide control over the methods of working; and it has the right of taking possession of the lines at specified times on repayment at par of the capital of the companies.

In addition to the lines referred to above, and apart from lines constructed by branch line companies, District Boards and Native States, two lines of some importance have been constructed by companies which receive no direct

**Other lines worked by companies.** assistance by the Government, namely, the Bengal and North-Western Railway and the Rohilkund and Kumaon Railway. (The Rohilkund and Kumaon Railway Company was guaranteed interest at 4 per cent. during construction and received for 10 years thereafter a subsidy of Rs. 20,000 per annum. This ceased in 1894.) While, however, these companies have no guarantee or other direct payment from the Government, they derive some advantage (partly through direct participation in profits and partly through reduction of expenses) from the fact that the working of certain State lines has been entrusted to them, the Tirhoot Railway to the former company and the Lucknow-Bareilly Railway to the latter. Their lines can be purchased by the State in 1932 on terms which are different in respect of the different sections of the lines, but are, on the whole, much more favourable to the companies than those provided for in the contracts with the Guaranteed companies. Failing purchase in 1932, the lines will become the property of the State in 1981 on terms much less favourable to the companies. The general administrative control exercised by the State over these companies and the control over expenditure are similar to that which is exercised, as explained above, over Guaranteed companies.

The greater number of the powers for the detailed control of railways as described in the foregoing paragraphs are vested in the Railway Board. The Board consist of a President and two

**Controlling Authority.** Members with a Secretariat establishment.