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RAILWAY DEPARTMENT
GOVERNMENT OF INDIA
RAILWAY BOARD

THE
DEPTANTS OF INDIA
SOCIETY,
POONA.

Railways in India

Administration Report for the year
1913-14



VOLUME I
REPORT

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SIMLA
GOVERNMENT CENTRAL PRESS
1914

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PANORAMIC VIEW FROM BELOW BRIDGE SHOWING STATE OF PROGRESS ON
31ST MARCH 1914.



VIEW ALONG BRIDGE FROM RIGHT BANK BELOW BRIDGE.



VIEW ALONG BRIDGE FROM LEFT BANK ABOVE BRIDGE.

THE LOWER GANGES BRIDGE
— SARA-BENGAL —
SHOWING STATE OF PROGRESS ON
31ST MARCH 1914.

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ADMINISTRATION REPORT

ON THE

RAILWAYS IN INDIA

FOR THE YEAR

1913-14

(and period January to March 1913)

Introductory

THE Administration Reports on Indian Railways hitherto published have had reference to the working of each calendar year, the last report issued being that for the year 1912. Owing to the adoption, by the principal railway administrations, of the Government financial year for all accounts and statistical purposes, the reports will henceforth be published for the Government financial year which begins on the first of April; and the present report accordingly deals with the transactions of the year 1st April 1913 to 31st March 1914.

For the purposes of comparison, financial statistics have been abstracted with reference to preceding financial years as far as possible. In the case of technical statistics, however, it was found that the preparation of figures relating to financial years would involve an undue amount of labour, and for this reason technical statistics have reference in most cases to calendar years where they are given in the report for periods prior to the commencement of the year immediately under consideration. It has seemed best for purposes of comparison of the results of the year 1913-14 with those of previous years to ignore the interim period, January—March 1913, in the body of the report. Figures relating to this period will, however, be found in the appendices.

Certain minor changes in the form and substance of the report which is now issued, have also been effected with the object of rendering the representation of the facts more lucid and interesting. The Appendices have been bound in a separate volume, and their order has also been altered so as to bring into a more convenient place the general summary relating to each railway system and this "History of Railways, etc.," now constitutes Appendix No. 1. A new Appendix (No. 8), which furnishes a concise summary of the results of working each of the several classes of railway during the year 1913-14, has also been introduced.

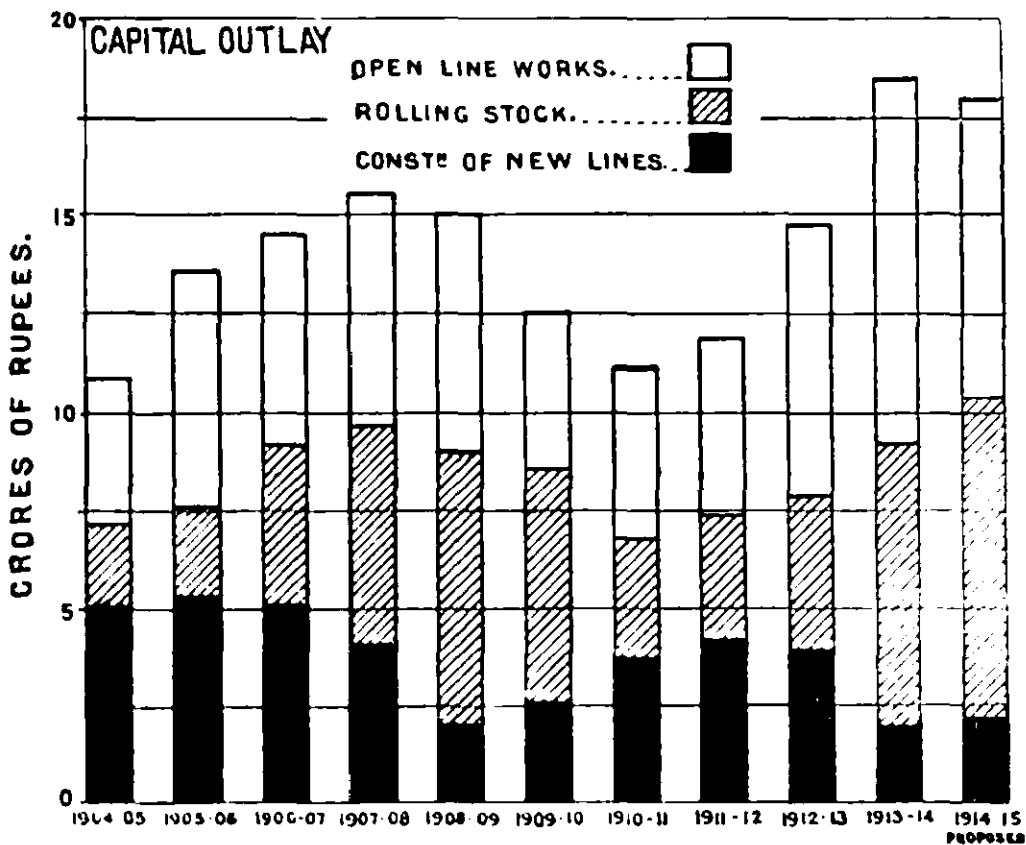
Capital

The actual capital outlay (booked cost) on lines in which the State is financially interested (excluding premia for the purchase of Companies' lines) from the commencement of operations on all lines open at the close of the year 1913-14 amounted to Rs. 4,10,15.43 lakhs, and on lines then under construction to Rs. 7,68.53 lakhs. In addition Rs. 79.34 lakhs were expended on miscellaneous items. The total outlay thus amounted to Rs. 4,48,63.30 lakhs.

The actual expenditure during 1913-14, amounted to Rs. 18,46 lakhs, distributed as follows:—

	Rs.
Open line works (excluding rolling-stock)	9,29,00,000
Rolling-stock	7,31,00,000
New lines (excluding rolling-stock)	1,86,00,000
Total	18,46,00,000

The following diagram shows graphically how these figures compare with those of past years. The distribution of the grant of Rs. 1,800 lakhs, which has been sanctioned for the financial year 1914-15, is also added for purposes of comparison.



The almost invariable experience in former years was that the sums allotted by Government for capital expenditure were not fully spent. This was due not to the amounts being larger than were necessary but to a rigid system of control,

more particularly of the expenditure in England (which may be taken as roughly half of the whole), the tendency of which was to prevent the free utilization of the grant. Revised arrangements have been introduced of late, and their satisfactory effect was clearly apparent in the year under review, the capital outlay being slightly in excess of the sum estimated and allotted.

Results of Working

The financial result of the working of the State railways during the year 1913-14 is a return of Rs. 556 lakhs. Out of this a sum of Rs. 145 lakhs (£963 thousand) was expended in the form of annuity payments in redemption of capital. The following table compares the results attained with those of previous years:—

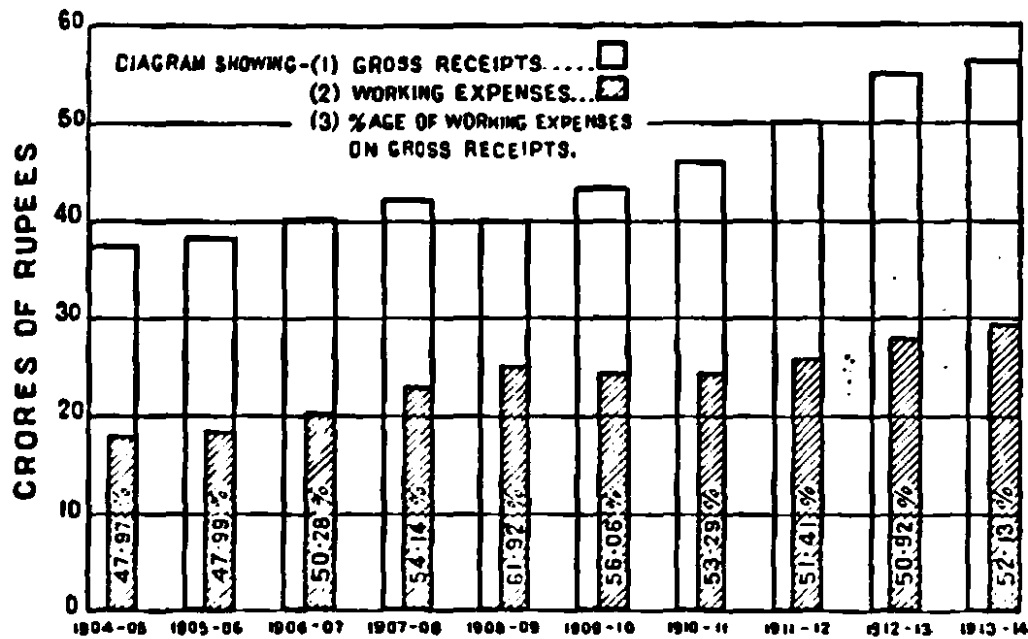
	1908-09.	1909-10.	1910-11.	1911-12.	1912-13.	1913-14.
Revenue.						
<i>Gross traffic receipts.</i> —State railways	60,19,96,320	43,39,59,967	43,94,46,326	50,39,66,938	34,02,08,690	66,31,92,039
<i>Gross traffic earnings.</i> —Guaranteed railways	3,678	...	...	...	89,719	...
<i>Repayment of advances of interest.</i> —Subsidiary railways	10,83,048	8,74,440	8,80,143	8,64,621	16,87,610	13,06,819
TOTAL REVENUE	40,31,83,010	43,47,33,907	46,00,36,321	50,45,81,677	47,14,77,777	66,34,98,851
Expenditure.						
<i>Working expenses.</i> —State railways	21,69,83,000	24,33,14,763	24,49,51,438	25,60,43,731	29,42,31,309	29,33,91,149
<i>Working expenses.</i> —Guaranteed railways	19,094	731	...	...	...	...
<i>Share of surplus profits paid to Companies, etc.</i>	4,94,973	49,37,546	69,60,154	73,30,008	1,08,64,638	66,12,634
<i>Land and supervision charges.</i> —Guaranteed railways	8,308	—26,456	—10,813	...	...	...
<i>Land and subsidy charges</i>	10,62,941	6,01,177	4,44,114	9,10,364	5,05,110	8,39,189
<i>Miscellaneous railway expenditure</i>	3,79,748	5,60,799	4,97,174	3,73,640	9,90,631	91,416
TOTAL EXPENDITURE	28,53,15,311	34,91,93,363	35,27,18,256	29,71,57,646	39,27,71,683	39,11,17,013
NET REVENUE	14,77,30,739	10,55,40,543	39,73,31,063	23,71,63,921	28,90,61,118	26,34,43,668
Ordinary interest charges.						
<i>Interest on capital outlay.</i> —State railways	8,63,50,150	8,81,26,330	8,13,16,790	8,81,62,148	7,11,99,490	7,19,17,000
<i>Interest on debt for purchase of railways</i>	2,64,49,999	2,63,79,945	3,63,14,320	3,61,13,695	3,60,69,970	3,61,73,920
<i>Interest on advances of capital to Companies</i>	71,82,031	71,04,600	63,40,368	67,77,100	66,40,790	63,39,461
<i>Interest on capital raised by Companies</i>	2,47,37,940	2,64,14,740	3,01,10,063	3,73,49,850	3,79,10,830	2,52,66,345
<i>Annuities in purchase of railways</i>	3,94,06,915	4,01,74,600	3,89,75,270	3,94,61,618	3,90,04,840	3,90,66,190
TOTAL INTEREST	15,43,66,095	16,01,97,103	16,30,56,630	16,79,11,143	17,79,95,160	17,79,79,916
Surplus of net revenue over interest	—6,34,796	2,53,43,440	4,33,70,433	7,02,79,778	8,90,61,978	8,54,63,752

The gross earnings of all Indian railways during the year 1913-14 amounted in round figures to Rs. 6,358.56 lakhs, compared with Rs. 6,170.87 lakhs in 1912-13, being an increase of Rs. 187.69 lakhs, while the working expenses were Rs. 174.80 lakhs more than in 1912-13. The net earnings amounted to Rs. 3,065.52

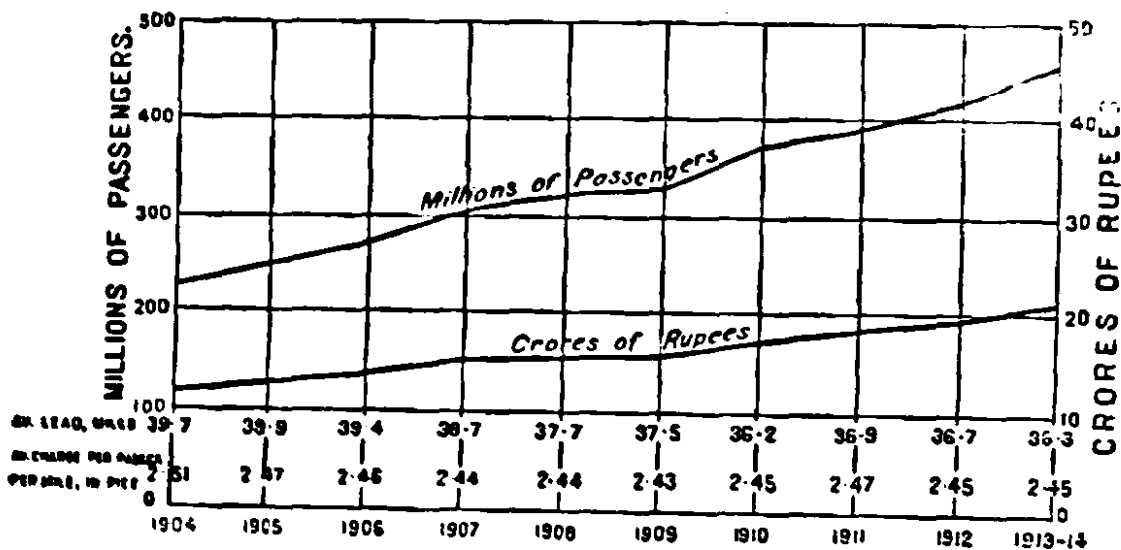
lakhs, against Rs. 3,052.63 lakhs in 1912-13, or an increase of Rs. 12.80 lakhs. These net earnings yielded a return on the capital outlay (Rs. 49,500.00 lakhs) on open lines, i.e., on mileage earning revenue, of 6.19 per cent, as compared with 6.19 per cent in 1912-13. The corresponding actual return per cent for the previous calendar years is compared as follows :—

1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913-14.
6.10	6.77	6.95	6.48	6.28	6.91	6.86	6.87	6.77	6.19

The following diagram shows graphically the ratio of aggregate revenue expenditure to gross receipts of State lines, worked by the State and Companies, for the past ten years :—

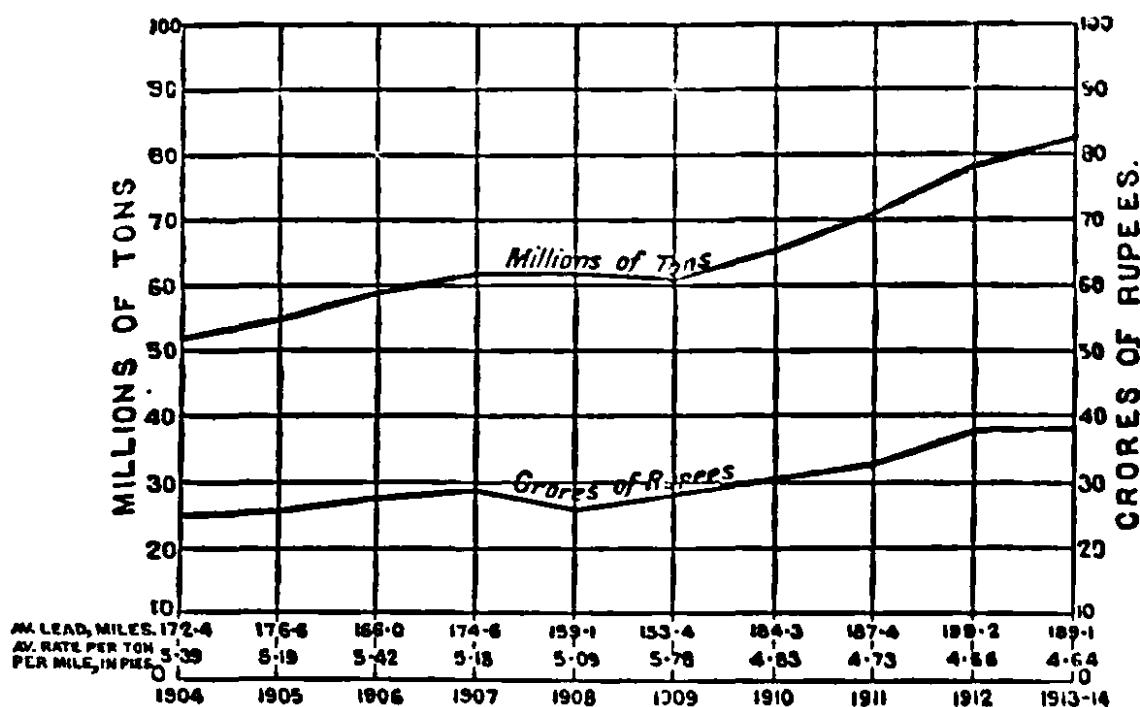


The number of passengers carried and the earnings therefrom are compared in the next diagram.



The increase in the passenger traffic during the year under review indicates a general development of traffic, brisk trade, an increased number of people attending *melas* and fairs and the result of opening new lines.

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



It will be observed that though there was a considerable increase in the tonnage carried during the year under review this was not accompanied by a corresponding growth of earnings. The explanation is that the long distance traffic to the ports fell off on account of reduced exports of grain to Europe, owing to the failure of crops in the United Provinces and some parts of Bengal.

Mileage

During the year 1913-14, 1,053.17 miles of railway were opened to traffic, bringing the total mileage open (after allowing for minor corrections due to realignments, etc.) up to 31,656 miles. The additional mileage was made up as follows:—

	5' 6" gauge.	3' 3 1/2" gauge.	2' 6" gauge.	2' 0" gauge.	Total.
	Miles.	Miles.	Miles.	Miles.	Miles.
State lines worked by the State ...	143.97	10.19	84.91	...	239.06
State lines worked by Companies ...	26.96	10.07	214.53	...	430.56
Branch line Companies' railways assisted under "State" terms	70.24	...	71.06	14.20	155.50
Assisted Companies' lines subsidized by District Boards	...	...	30.40	...	30.40
Assisted Companies' lines receiving land only from Government	...	30.20	...	...	30.20
Native State lines worked by Native States	...	104.15	10.73	...	114.88
Native State lines worked by Companies ...	...	...	23.43	...	23.43
Total	420.08	167.40	623.64	14.20	1,225.32

The mileage sanctioned for construction during the year comprised :—

	5' 6" gauge.	3' 3½" gauge.	gauge.	2' 0" gauge.	Total.
	Miles.	Miles.	Miles.	Miles.	Miles.
State lines worked by Companies	60·08	21·07	—	—	81·15
District Boards' lines	21·10	25·04	—	—	46·14
Branch line Companies' railways assisted under "relate" terms.	109·08	—	78·50	—	187·58
Branch line Companies' railways assisted under "guarantee" terms.	—	—	22·00	—	22·00
Assisted Companies' lines subsidized by the Government of India.	14·01	—	—	—	14·01
Assisted Companies' lines subsidized by District Boards.	—	—	4·08	—	4·08
Assisted Companies' lines receiving land only from Government.	—	5·31	—	—	5·31
Native State lines worked by Native States	—	191·32	23·75	25·00	240·07
Native State lines worked by Companies	28·40	192·15	63·30	—	283·85
Total	203·66	434·58	199·90	25·00	963·14

The total mileage under construction or sanctioned for construction at the close of the year ending 31st March 1914 was :—

	5' 6" gauge.	3' 3½" gauge.	3' 6" gauge.	2' 0" gauge.	Total.
	Miles.	Miles.	Miles.	Miles.	Miles.
State lines worked by the State	172·17	—	67·12	—	239·29
State lines worked by Companies	606·10	275·90	60·17	—	942·27
District Boards' lines	21·10	53·02	—	—	74·12
Branch line Companies' railways assisted under "relate" terms.	199·07	—	175·30	83·88	458·25
Branch line Companies' railways assisted under "guarantee" terms.	—	—	32·00	—	32·00
Companies' lines guaranteed by Native States	—	—	37·95	—	37·95
Assisted Companies' lines subsidized by the Government of India.	14·81	3·58	—	—	18·39
Assisted Companies' lines subsidized by local Governments.	—	—	16·50	—	16·50
Assisted Companies' lines subsidized by District Boards.	—	—	4·08	3·50	7·58
Assisted Companies' lines receiving land only from Government.	—	5·31	60·86	—	66·17
Unassisted Companies' lines	—	—	23·70	—	23·70
Native State lines worked by Native States	—	221·03	31·56	25·00	277·59
Native State lines worked by Companies	28·69	202·29	112·60	—	403·58
Total	931·95	830·79	877·81	112·38	2,752·93

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

Gauge.	MILEAGE OPEN AT THE END OF									
	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913-14
5' 6" ...	14,733	15,029	15,816	15,921	15,861	16,309	16,701	17,019	17,189	17,641
3' 3½" ...	11,662	11,859	12,169	12,613	12,903	13,323	13,520	13,758	14,165	14,390
3' 6" ...	943	990	1,071	1,234	1,394	1,443	1,496	1,632	1,692	1,776
2' 0" ...	326	326	319	343	369	415	432	433	439	456
Total ...	27,664	28,194	29,195	29,911	30,527	31,487	32,149	32,842	33,485	34,263

Lines Opened during the Year

The following are some of the more important of the lines which have been opened throughout and are included in the foregoing statement

The Jullundur-Hoshiarpur Branch of the North Western Railway. This branch line, 24 miles in length, has been constructed as an integral part of, and on the same gauge as, the parent line. It traverses a rich part of the Punjab and connects Hoshiarpur, the only district head-quarter in that province not already provided with railway communication, with the main line. Irrigation is not required in this country in which the rainfall is both ample and regular owing to the proximity of the Siwalik range; and the Jats who constitute the greater number of the inhabitants, have always been, therefore, very well-to-do. The earnings received since the line was opened on 16th June 1913, indicate that the undertaking will prove highly remunerative, and have encouraged the promotion of a company for the construction of other branches in the neighbourhood. Hoshiarpur does considerable business with the Kangra Valley. This traffic has been attracted to the railway.

The Bayana-Agra Railway. This line virtually constitutes the last section of the very important Nagda-Muttra project. By the opening of a broad gauge railway between Nagda and Muttra, the Bombay, Baroda and Central India Railway Company secured access to Delhi. By the opening of this further extension, 50 miles in length, on the 1st December 1913, access was obtained to the important centre of Agra, from which place two broad gauge routes to Bombay have thus become available. While the line is of first importance as part of an important line of through communication, a considerable local traffic will also be served, as the famous Bharatpur quarries, which provided the stone from which Agra City has been built, and the ancient town of Fatehpur Sikri, whose historical remains attract travellers from all over the world, are both situated on the new railway.

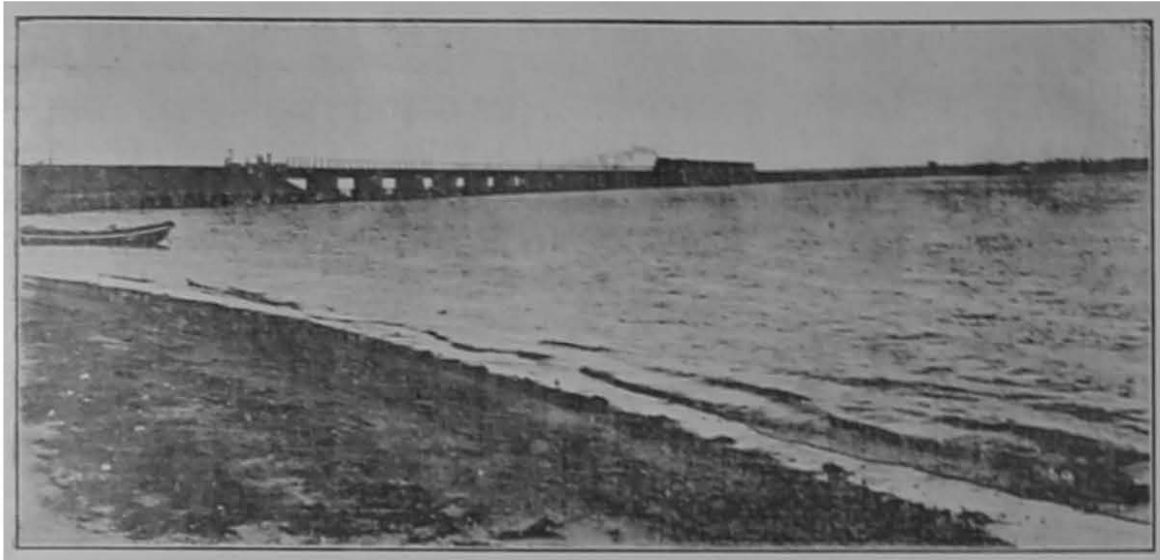
The Benares-Allahabad Branch of the Bengal and North Western Railway. This branch line, 82 miles in length, has been constructed by the Bengal and North Western Railway Company mainly with the object of securing access to Allahabad, which it reaches by a bridge over the Ganges of 40 spans of 150 feet clear. This bridge was opened to traffic on the 9th May 1913, thus completing the connection. In addition to the advantage secured by the connection of the metre gauge system with the head-quarters of the province, the line serves to open out a rich riverain tract on the north bank of the Ganges and is of great importance in connection with pilgrim traffic. The project includes a short branch to Mirzapur, from which place access to the south side of the Ganges and the East Indian Railway is secured by a bridge of boats.

The Barharwa-Azimganj-Katwa Extension of the Hooghly-Katwa Railway. This line, which is 100 miles in length and was opened throughout for traffic on 1st May 1913, runs through a riverain tract on the right bank of the Ganges and the Bhagirathi River. The country is densely populated and entirely agricultural, the chief export being rice. During construction considerable difficulties were experienced owing to flooding from the neighbouring rivers; the height of these floods exceeded any previously recorded and necessitated considerable modifications in the project.

The Singhjani-Fulchari Extension of the Eastern Bengal Railway. Though this metre gauge line is only 26 miles in length, it constitutes a most important link completing a new line of communication between the northern section of the Eastern Bengal Railway and the Bengal and North Western Railway on the one side, and the Dacca section of the Eastern Bengal Railway lying between the Brahmaputra and Megna rivers on the other. The latter area is almost solely under jute and relies on the areas further west for food stuffs and cattle, and to a large extent for labour also. Prior to the opening of this connection, no direct means of railway communication existed. The line was only opened to passenger traffic on the 1st November 1913, but it had been opened for goods traffic more than a year previously. The project included the provision of a fully equipped wagon ferry between Fulchari and Bahadurabad and the traffic which it has carried has exceeded all expectations, and has already necessitated the provision of further traffic facilities. Some trouble has been experienced owing to the shifting of the Brahmaputra at the ferry, but a "backbone" line is in course of construction, from which it will be possible to put down sidings to any point on the river bank which the movements of the river may for the time being render most advantageous.

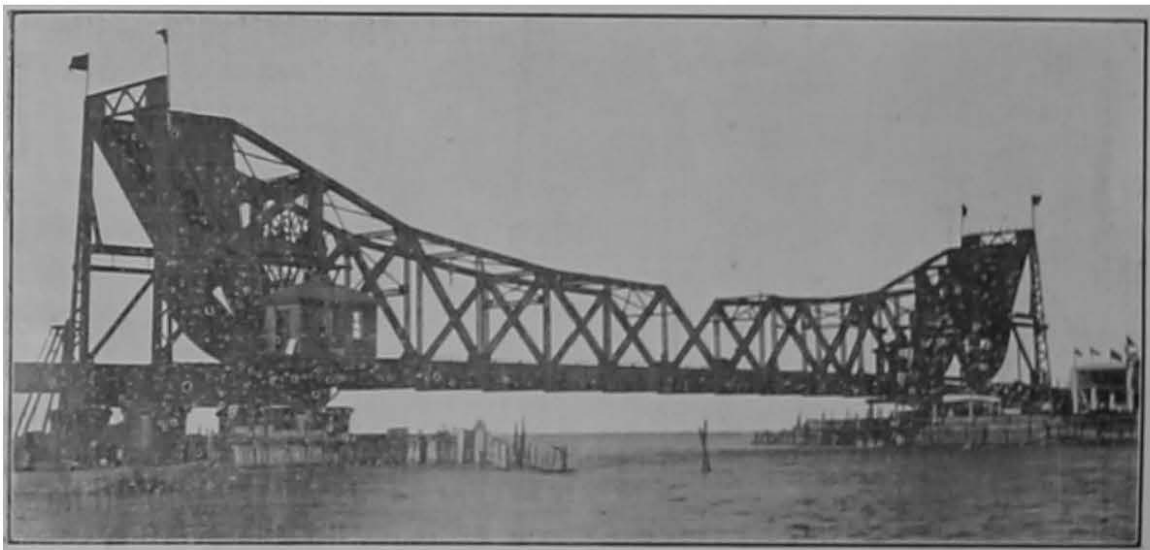
The Rangiya-Tangla Section of the Eastern Bengal Railway. This line, 2½ miles in length, forms a branch of the Gauhati extension, opened to traffic in 1910. The branch is on the metre gauge and constitutes the most north-easterly section of the parent railway. It was opened to passenger traffic on the 16th July 1913 having been opened for goods traffic more than a year. It serves a number of tea gardens at present in existence, and will encourage further development in an area which has not yet been fully exploited.

Bobbili-Salur Branch of the Bengal-Nagpur Railway. A 5' 6" gauge branch of the Bengal-Nagpur Railway, 10 miles in length, between Bobbili and Salur, was opened on the 1st May 1913. This connects with the Vizianagram-Parvatipur section and will tap the traffic of the rich Jeypur plateau.



General View of Pamban Viaduct from the South.

Indo-Ceylon Connection. Though the actual length of railway constructed in India is under 22 miles, this project is probably of greater general interest than any other which has been completed during the period under review. The entire scheme includes, in addition to this metre gauge extension, a broad gauge railway between Madawachhi and Talaimannar in Ceylon and a steamer service between Dhanushkoti on the Indian side and Talaimannar in Ceylon. It thus constitutes a line of through communication which will, it is anticipated, attract the greater part of the traffic which formerly passed between Tuticorin and Colombo. The project is also of great engineering interest, as it includes the Pamban viaduct. This viaduct comprises 115 spans of 40 feet plate girders and a single Scherzer rolling lift span of 225 feet clear span. The piers of the viaduct are founded on a sunken reef at depths varying from 5 to 9 feet below mean sea level. This reef, according to tradition, was built by Hanuman and his army of monkeys in the



Pamban Viaduct.—View of Scherzer Bridge Girders Closed.

time of Rama. The abutment piers on either side of the navigable channel spanned by the rolling bridge are, however, carried on four wells each founded on clay at a depth of over 40 feet below mean sea level, the reef being broken at this point, and the gap having been artificially enlarged to facilitate navigation.

Three turbine steamers have been obtained by the South Indian Railway Company for the ferry service. The vessels are 250 feet long with a beam of 33 feet, and are fitted with Parson's geared turbines and Yarrow water tube boilers. They draw 6 feet of water and have been designed to develop a speed of 18 knots.



View looking South along the Pier at Dhanushkodi with two of the South Indian Railway Turbine Steamers (Hardinge and Elgin) alongside.

These steamers, which have been specially designed for the service, will make the journey on what is for the time being the leeward side of the reef, and passengers will thus be able to make their journey of some two hours' duration in still water at all times. Considerable difficulties were experienced in bringing the steamers by sea from the Clyde, but these were successfully surmounted and the vessels were in service at Dhanushkodi in time to permit of the Indo-Ceylon Connection being formally opened by the Governor of Madras in the presence of the Governor of Ceylon and a number of the Company's officials and guests on the 24th February 1914.

Narrow Gauge Extensions.

Several extensions on the 2' 6" gauge have been opened during the year. Of these, the most important is the *Trans Indus (Kalabagh-Bannu) Railway*, which connects the important cantonment of Bannu with the North Western Railway system by means of a branch, 89 miles in length, and a steamer ferry

over the river Indus at Kalabagh. Bannu lies in a valley irrigated from the Kuram river, and has long lacked adequate means for the export of the rice for which it is famous. Since the branch was opened, the export traffic has been extremely heavy, already necessitating the provision of additional locomotives and other rolling-stock.

The Bengal-Nagpur Railway Company opened a branch, 29 miles long, from *Balaghat* to *Katangi* on the 1st May 1913. The line has been projected with a view to the development of the manganese properties in the neighbourhood, while the country traversed is highly cultivated in the low-lying tracts and the hills beyond carry a considerable amount of timber.

The *Murtajapur-Ellichpur Railway*, 47 miles in length, a line constructed by the Central Provinces Railways Company, is a feeder to the Great Indian Peninsula Railway passing through rich cotton-growing country in the Berars. It was opened on the 1st December 1913.



Indus Wagon Ferry—Kalabagh Bannu Railway

A branch from *Dharmapuri* to *Hosur*, 55 miles in length, was opened by the South Indian Railway on the 15th May 1913. The primary object of the construction of this railway has been famine protection, the rainfall in the low hills on the south-eastern borders of Mysore being irregular.

Mileage under Construction

Mileage under construction from Imperial funds.	The mileage of lines under construction from Imperial funds on 31st March 1914,			
of each gauge, was as under :—				
	5' 6" ...	... ..	... ..	108.63
	3' 3½" ...	... ..	... ..	196.13
	2' 6" ...	... ..	... ..	77.70
				682.46

A detailed description of each of these lines will appear in the report for the year in which it is opened throughout for public traffic. It may, however, be of interest to say something of the state of progress of a few of the more important of these lines.



THE GREAT INDIAN PENINSULA

**Bhairab Bazar-Tangi Extension
of the Assam-Bengal Railway.**

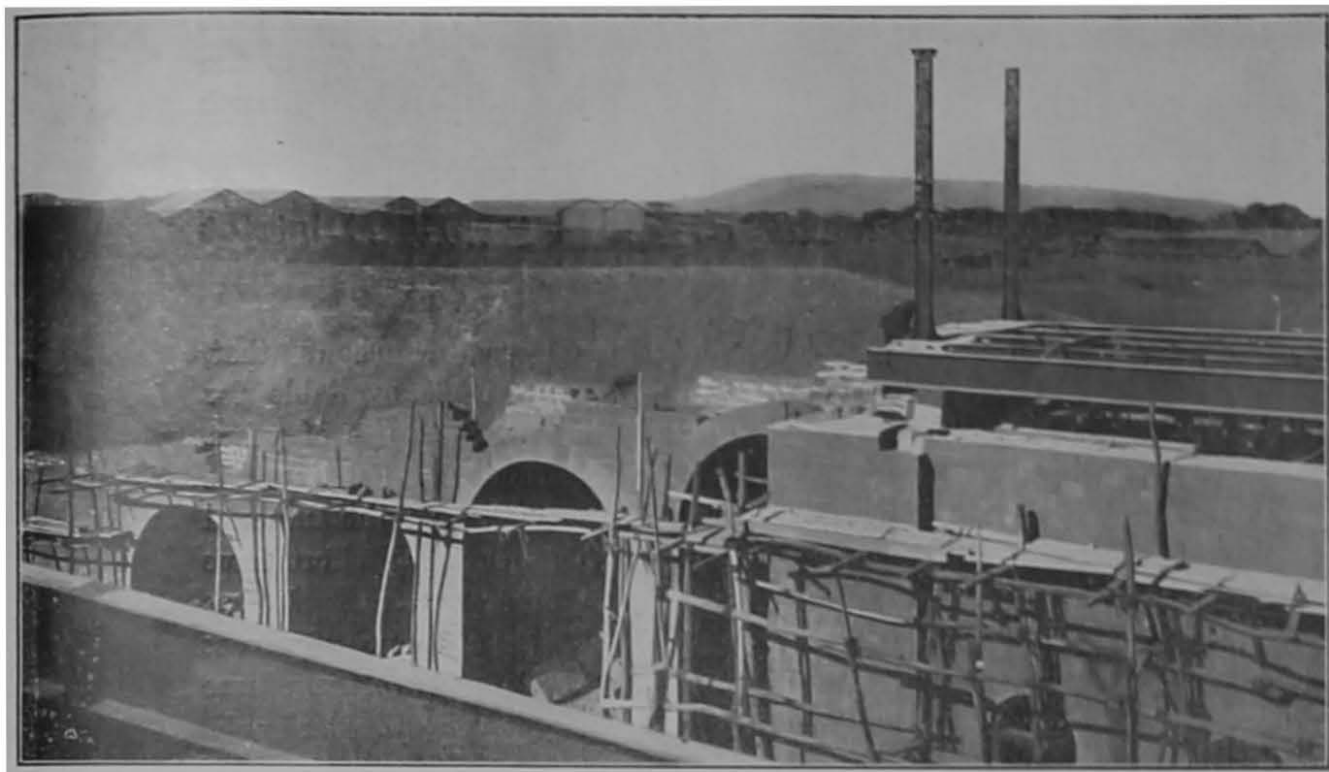
Work on this extension which connects the Assam-Bengal Railway with the Dacca Section of the Eastern Bengal Railway was begun in 1910-11, and although the progress has been slow owing to the difficulty in obtaining and keeping labour in the province of Assam, it is hoped to open the line to public traffic in the latter half of the year 1914-15. The question of bridging the Old Brahmaputra and of establishing a station and permanent ferry in the immediate vicinity of Bhairab Bazar is under consideration; meanwhile, a temporary Ghat to the south of the confluence of the Old Brahmaputra and the River Megna is under construction.

Burdwan-Howrah Chord.

The construction of this chord line, which is urgently required in order to relieve congestion between the coal-fields and Calcutta, was begun in September 1913. Work is however confined to the length between Burdwan and Kumarkunda, a station on the Tarkessur Railway, the precise alignment to be followed beyond that point being under examination. This section is expected to be finished about the beginning of the year 1915-1916.

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

The whole project, 226 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. The section between Itarsi and Budnoor was opened on 1st May 1913. Construction has been proceeded with section by section; the last section to be begun, that between Amla and Pandhura, having been put in hand towards the



RAILWAY-HARBOUR BRANCH EXTENSION.

end of the year under review. It is expected that the lines comprised in the project will all be opened to public traffic by about the close of 1916.

Cawnpore-Banda Railway.

The section of this railway between Julhi and Hamirpur Road was opened to public traffic on 21st April 1913. The remaining section has been opened on 20th July 1914.

Lower Ganges Bridge.

Work on the Lower Ganges Bridge has proceeded rapidly during the year; only seven spans remained to be erected at the end of the period under review, and it is hoped that the bridge will be opened to traffic on the 1st January 1915.

Southern Shan States Railway.

So far work has been confined to the section between Thazi and Aungban, a point on the Kalaw plateau. The sections between Thazi and Kwedatson and between Kwedatson and Yinnabin were opened to public traffic in June 1912 and August 1913, respectively. It is expected that the section between Yinnabin and Aungban will be opened shortly. While, unfortunately, it has not been found possible to commence work on the remaining section, it is hoped that any delay may prove merely temporary and that opportunity may be found for introducing economies by the improvement of the location of this difficult part of the line.

**Great Indian Peninsula Railway—
Overhead Connection at Bombay.**

Rapid progress is being made with the construction of the Bombay Overhead Connection, a line which though short, involves much heavy work and will, when completed, provide an easy and rapid communication for traders, passing

between the business centre of Bombay in the vicinity of the Victoria Terminus, across the Great Indian Peninsula Railway goods yard at Wadi Bander, to the grain warehouses and cotton market near Mazagaon on the Harbour Branch Railway.

New Construction financed by Private Enterprise, District Boards and Native States

Private enterprise.

The diagram on page 2 shows that, though the amount made available for capital expenditure on railways has been increasing over a series of years, the balance available from Imperial funds for the construction of new lines has tended on the whole to diminish very rapidly. Since 1909, when the Imperial funds devoted to new construction reached a low ebb, increasing efforts have been made to augment the supply of funds from other sources. It has been found in India to be practically impossible to enlist the assistance of private enterprise without substantial aid from Government. Terms have from time to time been framed on which Government would be prepared to consider applications to form companies for the construction of new lines, and as a result of the consideration given to the matter in 1909, a Resolution was issued in June 1910, offering terms which were considerably more liberal than those previously conceded. Under these terms private enterprise was offered two alternative forms of assistance :—

(1) A rebate paid by the parent line from its net earnings from traffic brought to it by the feeder railway, sufficient to make up 5 per cent. on the *capital outlay*, thus limiting the liability of the main line railway, but holding out a fair prospect of a 5 per cent. return.

(2) A firm guarantee from Government of $3\frac{1}{2}$ per cent. on *capital outlay*.

It is patent that the capital raised by a company may at times be considerably more than that for the time being expended, and that even under the second of the above alternatives shareholders in branch line companies were not assured of any definite return. For this reason, in November 1913, a revised Resolution was issued offering terms which differed from those of 1910, mainly in the substitution of *paid-up capital* for *capital outlay*.

The result of offering these very liberal terms has been apparent during the period under review. Up to the end of the year 1912, 127½ lakhs had been raised under the Branch line terms of 1910 for the construction of 30½ miles of railway. During the period under review, Rs. 22½ lakhs of capital was raised for the construction of 3½ miles.

Of the ten companies which have been floated since 1911 under these terms, eight have taken advantage of the first alternative, the rebate terms, while two only have availed themselves of the guarantee terms. The guarantee terms, however, offer one very distinct advantage in so far as the shares of these companies are available for the investment of trust funds. In order to encourage investments of this class, one of the modifications introduced in 1913, was a clause in the terms which rendered it possible for companies to be floated partly on the rebate and partly on the guarantee terms, a concession of which advantage has been taken since the close of the period under review.

The table below shows the concessions that have been granted during the period under review.

Name of Railway.	Gauge.	Length.	Capital sub- scribed.	Financial Assistance.	Working Agency.	Promoters.	
						Rs.	
	Ft.	Inch.	(Miles.)	(Lakhs.)			
Burdwan-Katwa Railway ...	2	6	33	17	Guarantee terms of 1913 ...	Branch Line Company ...	Messrs. M. Lest & Co. and Mr. S. C. Ghose.
Mandya-Bhon Railway ...	5	6	47	27	Rebate terms of 1913 ...	North Western Railway	Messrs. Killok, Noyon & Co.
Jacobabad-Kashmore Railway ...	3	6	77	20	Rebate terms of 1910 ...	North Western Railway	Messrs. Forbes, Forbes Campbell & Co.
Sara-Sirajganj Railway ...	3	6	40	10	Rebate terms of 1913 ...	Eastern Bengal Railway ...	Messrs. Gillanders, Ar- buthnot & Co. and Killok, Noyon & Co.
Hoshiarpur-Doab Railways ...	5	6	74	45	Rebate terms of 1913 ...	North Western Railway	Messrs. Gillanders, Ar- buthnot & Co.
Bankura-Damoodar River Railway	2	6	61	34	Guarantee terms of 1913 ...	Branch Line Company ...	Messrs. M. Lest & Co.

Apart from concessions actually granted, there were under negotiation at the close of the year 1913-14, proposals for the construction of 22 miles of railway on the 2'0" gauge, 1,648 miles on the 2'6" gauge, 413 miles on the 3'3½" gauge and 274 miles on the 5'6" gauge, or an aggregate of 2,357 miles of railway involving a capital outlay of at least 12 crores of rupees, equal to £3 million sterling. It will be observed that light railways on the 2'6" gauge, have so far proved most attractive to those interested in this class of enterprise.

Another agency for the financing of feeder railways, has been found in the District Boards. These local bodies have become fully alive to the advance in the general welfare of a district which is to be anticipated from the improvement of communications. Since the year 1884, District Boards in Madras have been empowered to levy a special railway cess not exceeding 3 pies per rupee of land revenue, and advantage had been taken of this to collect, up to 31st March 1914, a sum of Rs. 96,31,820, the greater part of this sum having been accumulated since 1903. During the period under review, it has been decided that all local Governments who may wish to do so, may legislate for the levy of a similar cess, by which means it is hoped that much encouragement may be given

to the construction of local feeder railways at the cost of local funds. Between the 1st January 1913 and the 31st March 1914, the following lines were sanctioned for construction at the cost of local funds:—

(1) Polanur-Pollachi Railway (3' 3 $\frac{1}{2}$ ") by the District Board of Coimbatore, 25 miles in length, and estimated to cost Rs. 11 $\frac{1}{2}$ lakhs.

(2) Tenali-Repali Railway (5' 6") by the District Board of Guntur, 23 miles in length, and estimated to cost Rs. 14 lakhs.

In the former case, the District Board were permitted to raise a debenture loan of 5 lakhs to supplement the funds in hand from the proceeds of the cess.

Native States are also recognising to an increasing extent the indirect as well as direct advantages likely to accrue from further railway development. The following list of railways under construction at the cost of these States, furnishes an index of the activity which is now being displayed by them in the matter:—

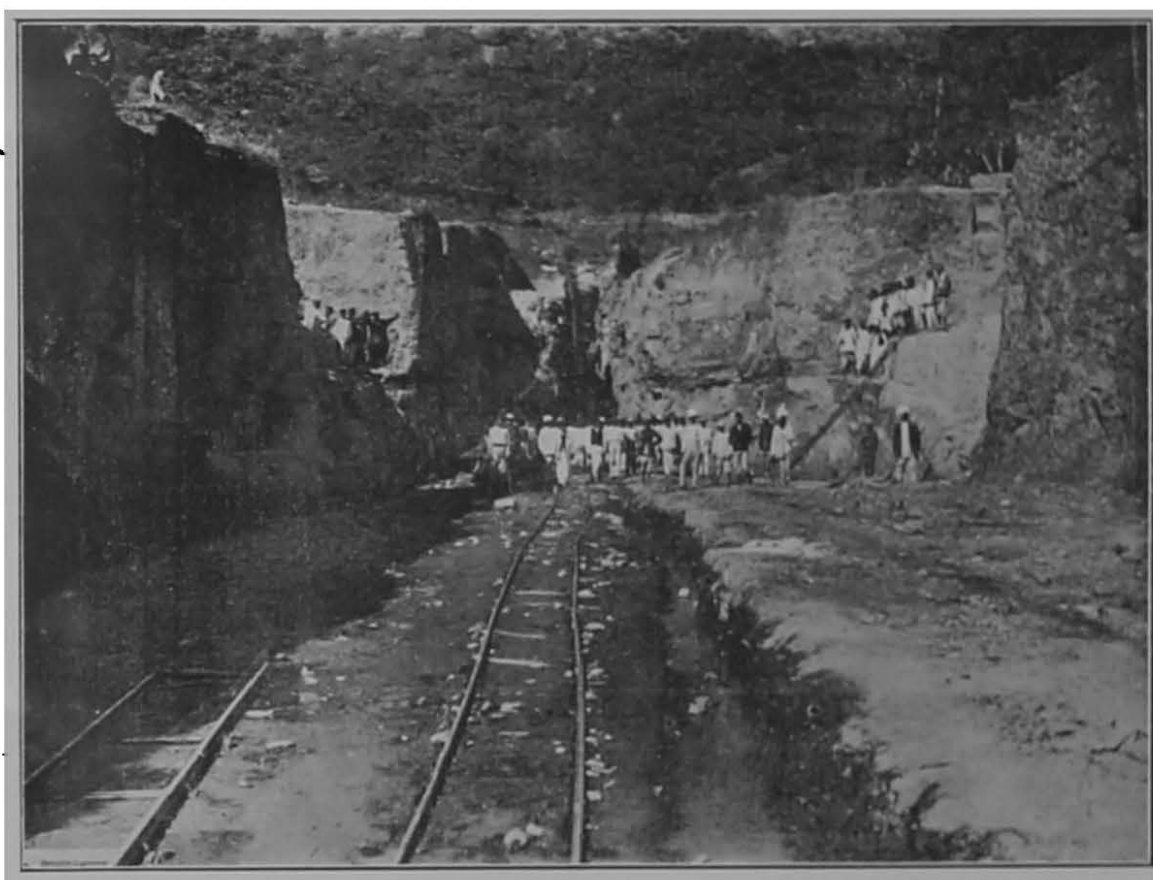
	Length.
Baroda.	
1. Billimora-Sara-Kalamba, 2' 6" gauge	35.00 miles.
2. Jarod-Samlaya, 2' 6" gauge	5.35 "
3. Khijulia-Dhari, metre "	37.24 "
4. Okhmandal, metre "	37.02 "
5. Patan-Kakooli with Branch from Khalipur to Khakal, metre gauge	42.13 "
6. Motipura-Tankhala, 2' 6" gauge	27.16 "
7. Pethal-Vaso, 2' 6" gauge	15.50 "
Cutch.	
Anjar-Bachan, 2' 6" gauge	23.75 "
Dholpur.	
Bari-Tantpur, 2' 6" gauge	16.62 "
Hyderabad.	
Secunderabad-Gadwal, metre gauge	117.00 "
Jaipur.	
Jaipur-Rongus, metre gauge	36.00 "
Jodhpur.	
Jodhpur-Phalodi, metre gauge	79.09 "
Mysore.	
1. Bangalore-Chikballapur, 2' 6" gauge	37.95 "
2. Mysore-Arsikere, metre gauge	106.50 "
3. Tarikere-Yad-halli tramway, 2' 0" gauge	25.00 "
Travancore.	
Quilon-Trivandrum, metre gauge	39.15 "

Aerial Ropeways.

A few proposals for the construction of aerial ropeways have been received by the Railway Board, and there are indications that this form of transportation is likely to find increasing favour in mountainous tracts where the cost of railway construction is necessarily high. The Government of India have under consideration the question of undertaking legislation for the control of ropeways, to which neither the Indian Railways Act nor the Indian Tramways Act applies.

Improvement of Open Line Equipment**Necessity for improvement.**

It would be tedious to enumerate the works of open line improvement which have been in progress or have been completed during the year under



Parsik tunnel, Great Indian Peninsula Railway, under construction, Eastern Portal.

review, but in order to show at a glance the nature and disposition of the more important works, a map has been prepared which will be found in the pocket at the end of the Report. This map shows in a striking manner the extent to which open line works of improvement have been directed towards the increase in capacity of the main through routes, particularly those leading towards the ports of Calcutta, Bombay and Karachi. Owing to the congestion experienced on more than one Indian railway, there has been a general public demand for the provision of additional rolling-stock. The Railway Board and in-

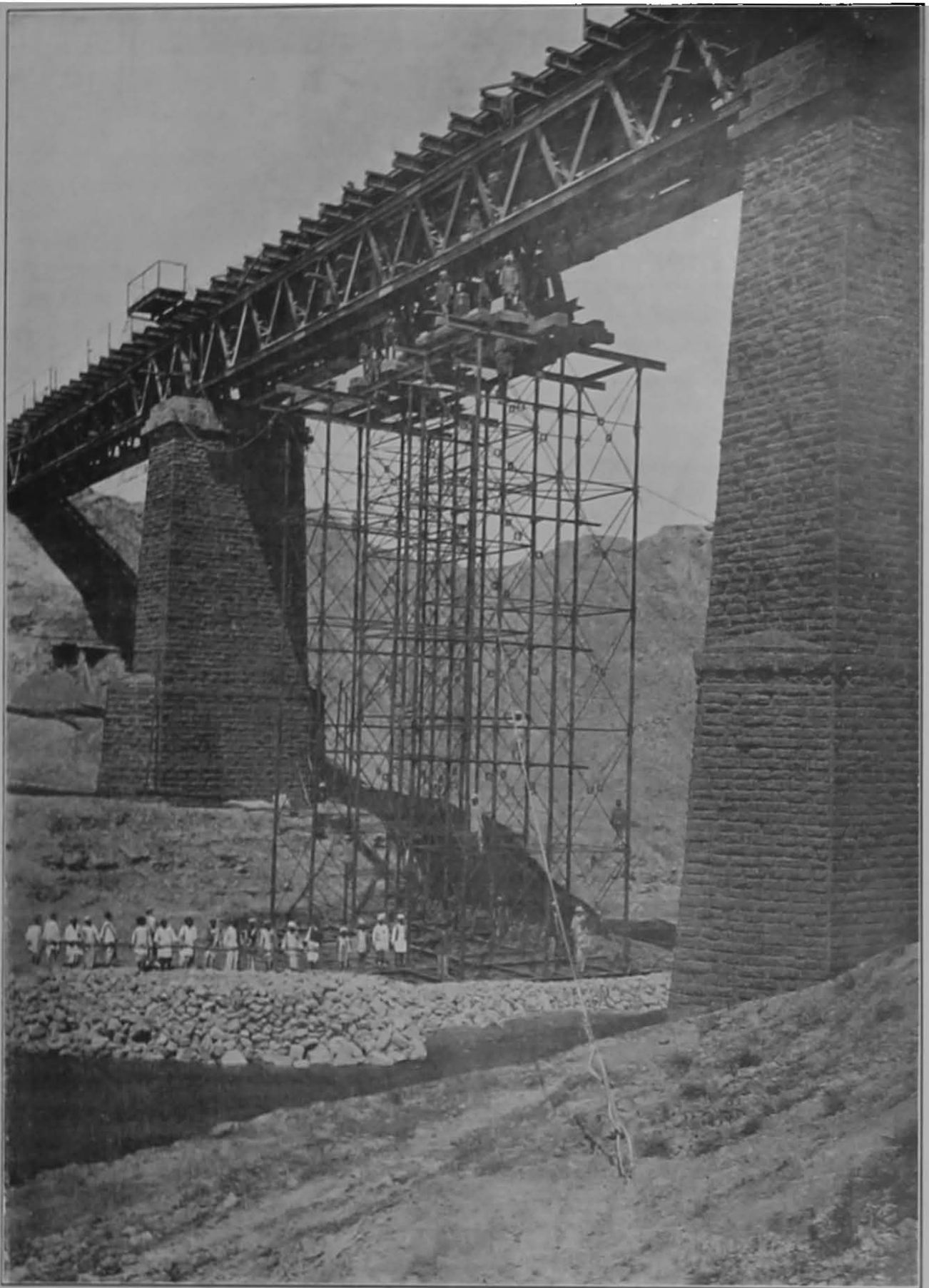
dividual railway administrations have felt, however, that the provision of additional rolling-stock would be almost useless, unless steps are taken to improve the capacity of the lines on which that additional rolling-stock will be employed. Capital funds have been devoted, and must for some time continue to be devoted, towards the provision not only of additional rolling-stock, but of stronger permanent-way, additional tracks, enlarged marshalling yards, new crossing places, more adequate watering arrangements and workshops and other works incidental to the increase in the carrying capacity of the more important routes throughout the country.



Parik tunnel, Great Indian Peninsula Railway, under construction, view from Eastern Portal.

Bombay.

The Great Indian Peninsula Railway Company have made rapid progress on the important improvements which have been undertaken in the neighbourhood of Bombay, including the construction of two additional tracks between Curry Road and Kalyan and the realignment on the Thull Ghat which is to take the place of 3.33 miles of the existing line, which includes the Thull Ghat reversing station. This latter improvement, besides reducing the through distance by 1.29 miles, will abolish the delays incidental to the working of a heavy traffic through a reversing station.



BISHENDORE BRIDGE-NORTH WESTERN RAILWAY
STRENGTHENING THE BRIDGE UNDER TRAFFIC BY INTERPOSING A THIRD AND DEEPER GIRDER
BETWEEN THE MAIN GIRDERS OF EACH SPAN.

Between Thana and Diva stations on the Curry Road-Kalyan section, the existing pair of tracks follow a somewhat circuitous route round the Parsik Hill. The new pair of tracks, which will be used for through traffic, are to follow a more direct alignment, the Parsik Hill being pierced by a tunnel which will be 1,300 yards in length, thus reducing the through distance by $1\frac{1}{2}$ miles. This tunnel will be the second longest in India, the only longer tunnel being that through the Khojak Range between Quetta and Chaman, the length of which is 4,200 yards.

Calcutta.

On the Calcutta side, particularly rapid progress has been made on the improvement of goods accommodation at Howrah station, while both the East Indian and the Bengal-Nagpur Railway Companies have had in hand many improvements, particularly between the coal-fields and Calcutta, which must lead to a very great improvement of carrying capacity. The efforts of the Eastern Bengal Railway administration are at present mainly directed towards the alterations and additions necessary to meet the changed conditions which will arise when the Lower Ganges Bridge has been opened to traffic. In this connection, the broad gauge (5 feet 6 inches) is being extended to Santahar, the first junction to the north of the Bridge, and the question of its further extension has formed the subject of detailed enquiry.

An Engineering Problem.

The difficulties attending the carrying out of works of improvement on open lines with the minimum of interference with traffic, are often overlooked by those who demand the rapid improvement of the capacity of existing lines. They present, however, many problems to the engineers entrusted with the actual work. The bridge of which an illustration faces this page is a case in point. The particular bridge shown is on the Jhelum-Rawalpindi Section of the North Western Railway. This is a single line section, and the loads which have now to be carried exceed those which the bridges were designed to bear. As the illustration clearly indicates, no diversion of the line was practicable and the bridge had therefore to be strengthened under traffic. This was effected by building up a third girder between the existing pair. In order to permit of this it was necessary in the first place to substitute for the rivetted bracing between the original girders a temporary system of bracing bolted in position, so that individual sections of it might be removed while members of the central girder were being placed in position, the bracing being again bolted up immediately the new member was in place. Finally a new permanent system of bracing connecting the old girders with the new central girder was rivetted up and the temporary bracing removed. Nice adjustment of the new bracing was essential in order that the required amount of load might be transferred to the new girder. The new girder being deeper than the old pair, is clearly seen in the completed span to the left of the picture.

Passenger Accommodation

The type of passenger carriage in use on Indian railways has become more or less standardised. The great length of journeys which have to be undertaken in India under trying climatic conditions necessitates the adoption of a standard of comfort for the ordinary first and second class passenger which is higher than that ordinarily attained in more temperate climates. The need for as large a space as possible in the compartment rules out the corridor system of construction except for certain special services, and the type most generally appreciated, both from the point of view of comfort and privacy, is the four bunk compartment having two upper berths which fold up in the daytime. Improvements, therefore, take the form of an increase of comfort and convenience in the details of the



Interior of 1st-Class Compartment showing Folding Berth.—East Indian Railway.

carriage, and are not usually such as to attract the attention of the travelling public in any striking manner. For example the construction of the bogie truck is one on which the smooth running of a carriage depends, and many improvements such as the duplex and triplex bolster bogie are being introduced with beneficial effects. The fact that on a long journey the same bunk has to be used during both day and night makes it a matter of some difficulty to construct a berth which will be a comfortable seat by day and a satisfactory bed at night. Various forms of folding berth have been tried at one time and another, but after a little wear and tear they nearly all developed certain defects. However, a satisfactory design has now been evolved and is being fitted in

many carriages. This type forms a comfortable reclining sofa which is easily converted into a spring bed nearly three feet wide. For intermediate class passengers the standard of comfort on long journeys is also being increased and many bogie carriages are now running in which intermediate accommodation is provided similar to that which was accorded to second class passengers in recent years.

The third class passenger prefers a carriage fitted with as few obstructions as possible in which he can accommodate himself with all his belongings. This demand is being met by the construction of long bogie coaches with lavatory accommodation and an ample supply of water and with a plentiful provision of racks for stowing away baggage.

Appendix 21 shows the number of carriages fitted with passenger communication with the driver and guard of the train; it will be seen that practically all carriages are so fitted. The type of communication employed applies the vacuum brake to the entire train and engine and shows, by an indicator to the train crew, in which compartment assistance is needed.

The method of constructing railway carriages has for many years been to erect a timber body on an underframe of steel. The timber almost exclusively employed in India is teak and the system on the whole has been satisfactory although timber is liable to suffer from the effects of the Indian climate. Changes of temperature and humidity at different seasons and in different localities result, after a time, in a certain absence of proper rigidity in the superstructure which eventually causes cracking of internal panelling and the jamming of doors and windows. A new situation has, however, been created by the rapid rise in the price of teak which has led to a trial being made of "all-steel" coaches. The steel car offers certain advantages in its superior rigidity and in its immunity from fire and splintering in a collision. One difficulty which will have to be overcome is the problem of keeping an all-steel car cool by means of non-conducting layers: in this respect the timber body has the advantage. It is too early, however, to make any definite pronouncement upon the comparative merits of the two types of construction for railway carriages in this country.

Train Lighting by Electricity

The Railway Board have issued orders to all State-worked railways to equip all passenger stock with electric light and to discontinue the use of gas for train lighting. For some years these railways have been carrying out the policy of fitting all first and second class carriages and all dining cars with electric light and fans and the resultant comfort and cleanliness has been so marked that it has been now decided to extend the use of electricity to intermediate and third class carriages. Reference to Appendix 19 will show that many of the metre and narrow gauge railways have already adopted electric lighting exclusively.

Catering

For some years the requirements of European passengers have been met by the provision on the more important through trains of bogie dining cars, passengers by other trains being served at station refreshment rooms where trains halt for the necessary periods.

The requirements of Indian passengers have not been lost sight of and measures have recently been adopted, for the more liberal provision both of refreshment rooms at stations and, on certain lines, of special refreshment cars for Indians, the convenience of which has been generally much approved.

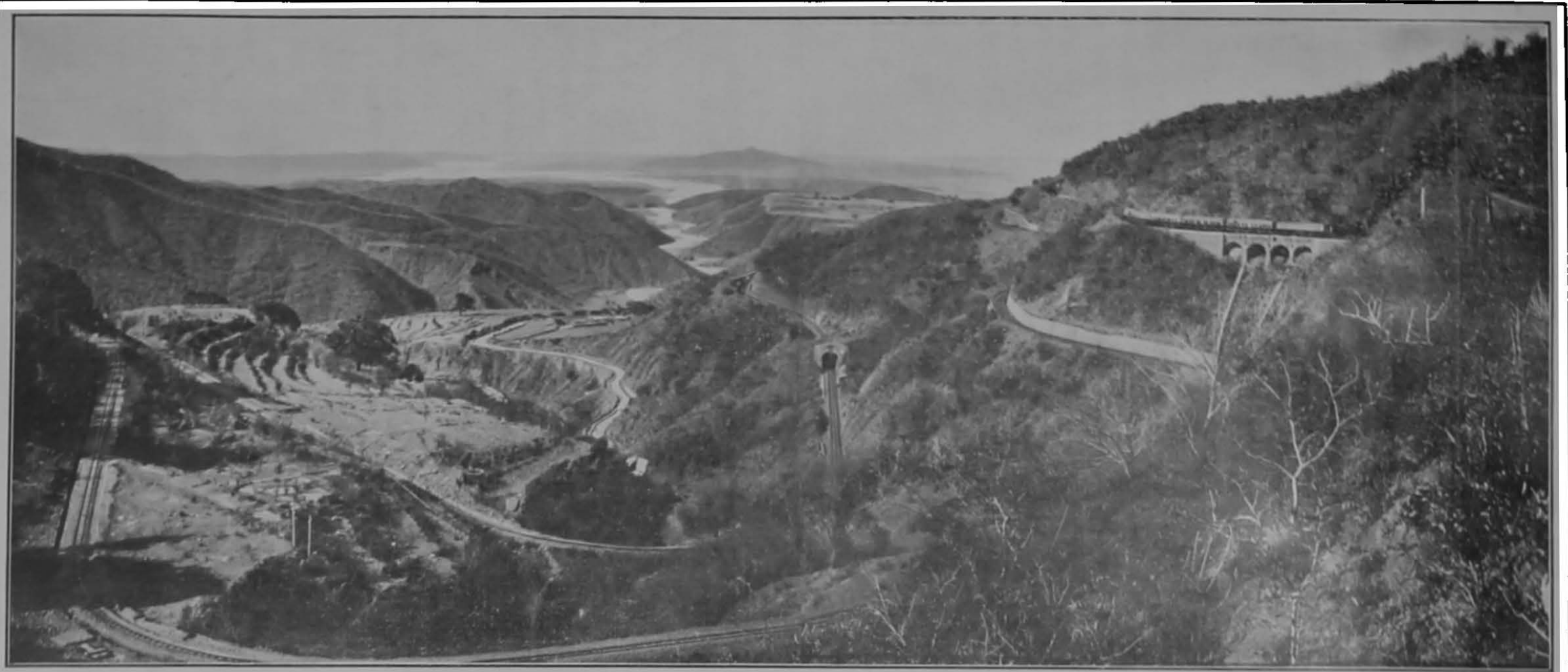


Interior of Restaurant Car.—East Indian Railway.

Train Control System

A "Train Control" system of working traffic, which may be described as an economical way of increasing the capacity of an overcrowded section and so postponing the necessity for adding more tracks to it, has been introduced on certain lengths of the Great Indian Peninsula Railway during the year under review.

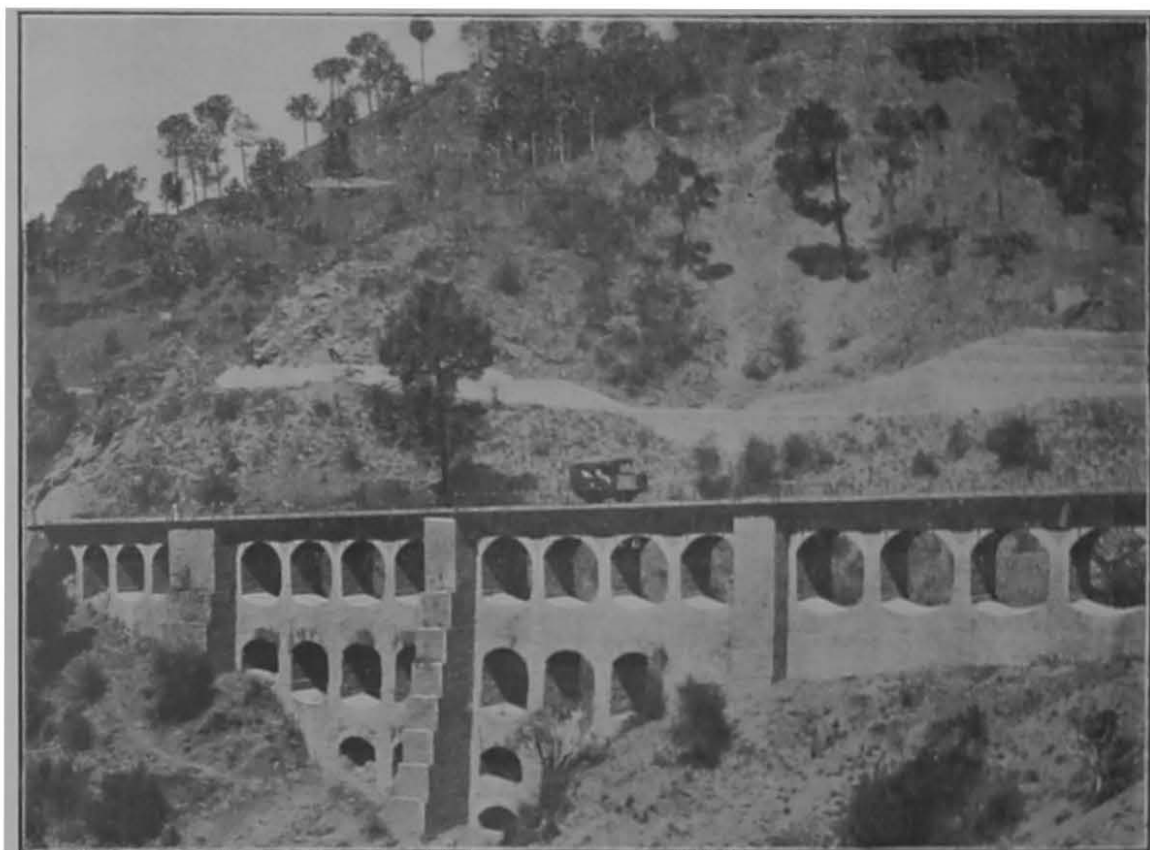
This system, which was used for the first time in India for controlling the heavy traffic on the railways at Delhi on the occasion of the Durbar in 1911, is a modification of one well known in other countries, notably America, and consists, on the Great Indian Peninsula Railway, in the placing of a Controlling



PANORAMIC VIEW OF THE KALKA-SIMLA RAILWAY.

Officer in a central office, in direct telephonic communication with every station on the section, who is in a position to advise authoritatively when a train should be pushed on or held back at a station in the interests of the sectional train-working as a whole.

The Controller on the Great Indian Peninsula Railway, it will be observed, is not concerned with the actual block working, which remains, as hitherto, in the hands of the local station masters. But the knowledge which the Controller has of the position of each train on his section tends to reduce greatly the delays, and consequent long hours of duty of the running staff, which are otherwise inevitable on crowded sections of a railway.



Rail Motor Car on Viaduct.—Kalka-Simla Railway.

As, with the steady increase in trade movements throughout India, sections of railways tend to become overcrowded with traffic, this adaptation to Indian conditions of the American Train Control System may be expected to come into more extended use; and the North Western Railway Administration, are about to introduce it on the Lahore-Lalamusa section of their main line, and the Eastern Bengal Railway on certain sections of that line near Calcutta.

Rail Motor Cars

The use of small rail motors and trollies by railway officers for inspection purposes is extending but there is not much scope for passenger rail motors in India.

In two instances, however, railway administrations have decided to place them in service. The South Indian Railway have purchased three rail motors for maintaining a passenger service over the Pamban Viaduct and on other short runs, and the Kalka Simla Railway have started a limited service of rail motors between Kalka and Simla. The latter service is one which is likely to be much appreciated by the public as the journey over the 2' 6" gauge mountain railway is at present somewhat trying, both on account of the cramped accommodation in the narrow gauge carriages and the discomfort caused by the continuous series of curves on the line. No inconvenience is experienced when travelling in the rail motor cars. There is the further advantage that the duration of the journey by motor is about two hours less than by train and that a better view of a most interesting line is afforded.

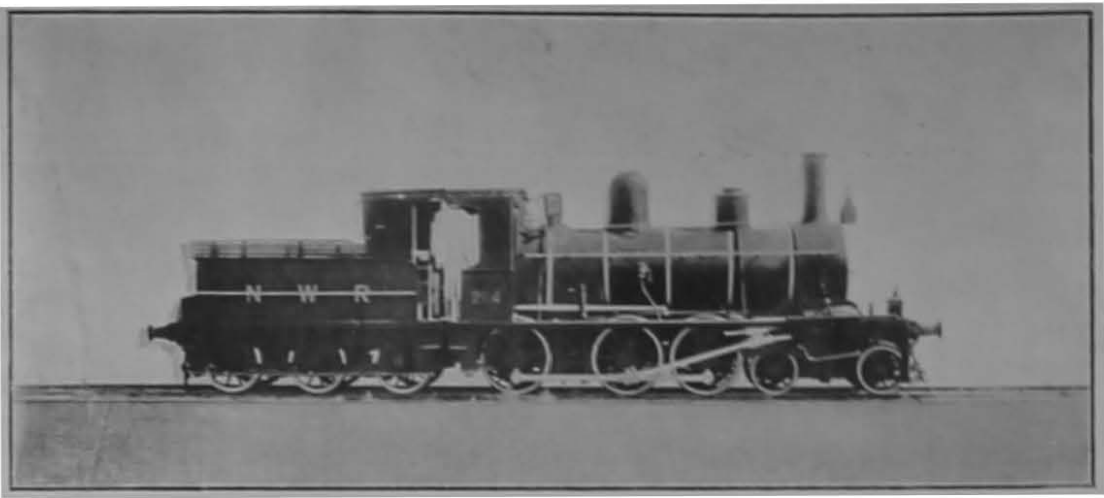
Locomotives

The most important development in the Locomotive Department has been the fitting of superheaters to locomotives. This is a world-wide movement which has been made possible by the commercial production of a lubricant which will work satisfactorily at the high temperature of superheated steam. The resulting economy in coal is about 15 per cent., and, as the total annual consumption of coal on Indian Railways is about five million tons, the enormous quantity which would be saved by the extensive use of superheaters is apparent. The opening up of the Persian Oil-fields has made possible the use of oil fuel on the west coast of India in competition with coal. Although oil fuel has been in successful use for years in other countries, its use in India presents certain special problems, and extensive trials with various systems are now in progress on the North Western and Great Indian Peninsula Railways.

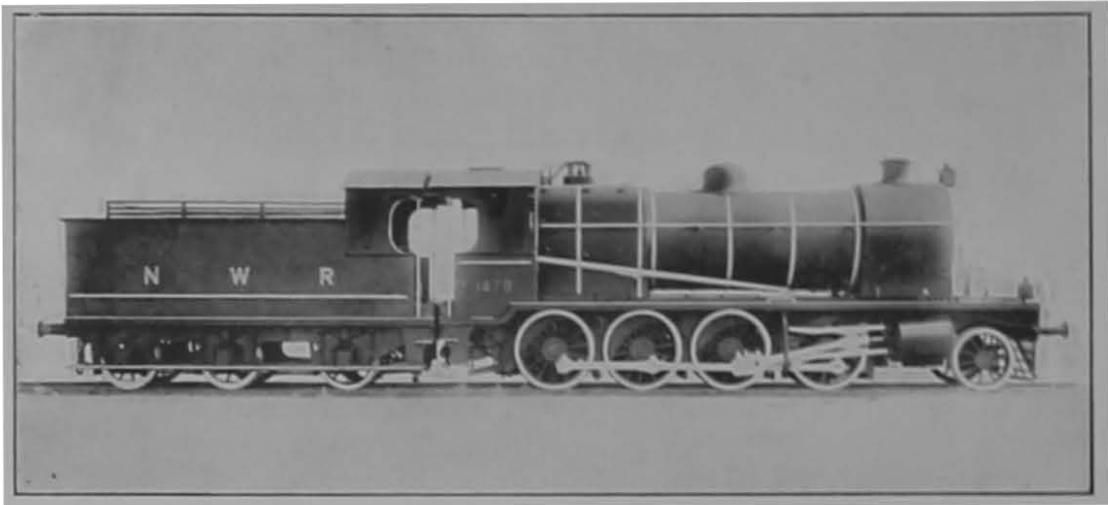
Goods Wagons, etc.

No new departure of any very special interest can be recorded as having taken place in the year under review. The type of steel covered goods wagon in use on Indian Railways tends to become standardised though there are difficulties in the way of actually adopting a standard design for all railways, owing to differences in the class of traffic carried and in the standard of the permanent-way on different lines. In the case, however, of the two adjoining State-worked Railways—the North Western and the Oudh and Rohilkhand Railways—the Railway Board have decided to adhere to a standard type of wagon for periods of three years at a time.

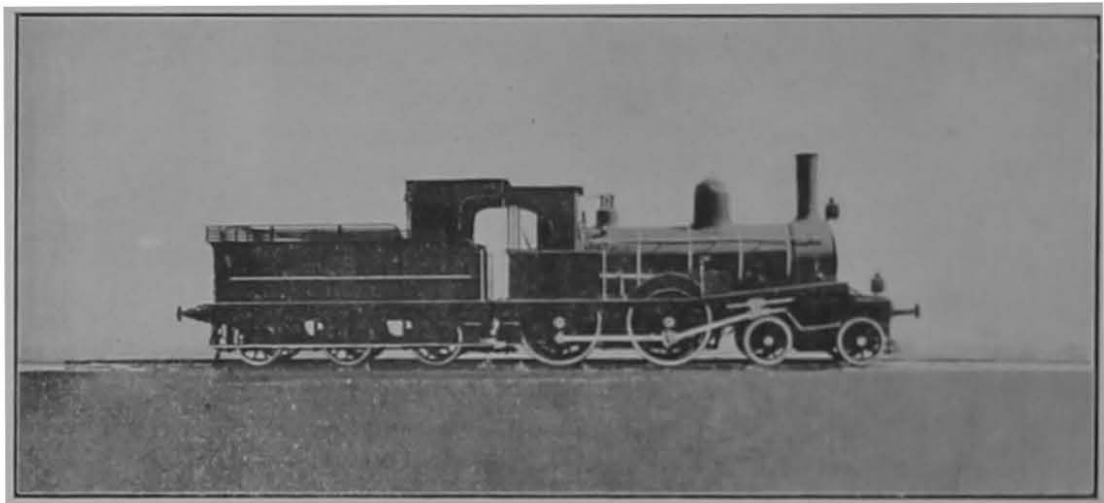
The growing number of motor-cars requiring to be transported by rail has necessitated the construction of special trucks. The usual method of carrying carriages, on open trucks covered by a tarpaulin, is unsuitable to the carriage of motor-cars which require better protection from the weather than the old method gives. Special covered carriage trucks are therefore being built by several lines for this class of traffic. They allow the car to be loaded from an end-loading platform through end opening doors.



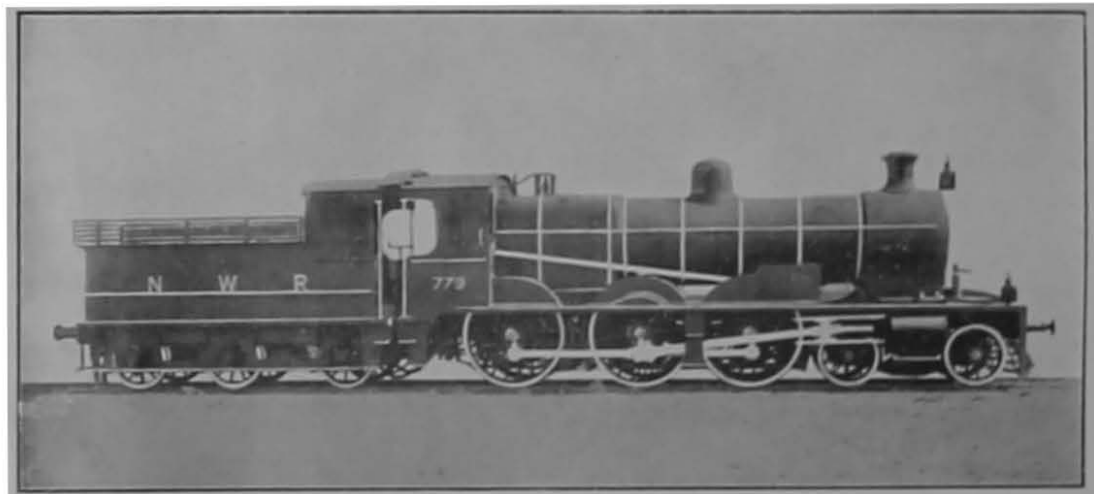
OLD GOODS ENGINE.—NORTH WESTERN RAILWAY



MODERN HEAVY GOODS ENGINE.—NORTH WESTERN RAILWAY



OLD PASSENGER ENGINE —NORTH WESTERN RAILWAY



MODERN HEAVY PASSENGER ENGINE —NORTH WESTERN RAILWAY

Railways have occasionally to deal with unusually bulky and heavy loads and with the commercial development of India the number of heavy machine parts, etc., offered for traffic is on the increase. It has therefore become necessary to build special trucks to deal with this class of traffic. Another class of special traffic which may be mentioned is the fruit traffic from the Quetta District for which a large number of insulated refrigerator cars are under construction by the North Western Railway.

Sleeper Supply

The supply of sleepers for Indian railways is a matter of great importance which continues to engage the attention of the different administrations. Owing to the increasing demand for, and diminishing supply of, timber there has been a continual rise in the price of sleepers during the last few years. The result has been to direct attention to the possibility of substituting steel, cast iron or reinforced concrete for timber. Steel and cast iron sleepers have been in use for many years in India and have been found to be quite successful in certain parts of the country and under certain classes of traffic, but until recently, owing to their relatively high price compared with timber, they did not come into very general use. Under the changed conditions now prevailing it seems likely, however, that their use will be greatly extended. The probability is that each kind of sleeper will have its sphere of usefulness depending on the cost and life of the sleeper at destination.

There are a number of Indian timbers which are entirely useless in the form of sleepers, unless treated in some manner so as to preserve them from the ravages of white ants and decay. In conjunction with the Forest Department, the Railway Board are carrying out experiments on a very extensive scale with treated indigenous timbers, and tenders have been called for in the open market for the annual supply to the State-worked railways of a large number of sleepers of various kinds to be treated by one of a number of alternative processes. There is no doubt a large field for this class of sleeper, and the establishment of a new industry for treating sleepers and miscellaneous timber parts for buildings, etc., may be anticipated.

Strikes

During the year under review strikes took place on three of the Indian railways, *viz.*, the Madras and Southern Mahratta, the Bombay, Baroda and Central India and the Great Indian Peninsula Railways. On the Madras and Southern Mahratta Railway a strike commenced on the 26th May 1913 and by the end of the month sympathetic strikes occurred on the Bombay, Baroda and Central India and the Great Indian Peninsula Railways. On the South Indian Railway there was some unrest, which did not, however, develop into a strike.

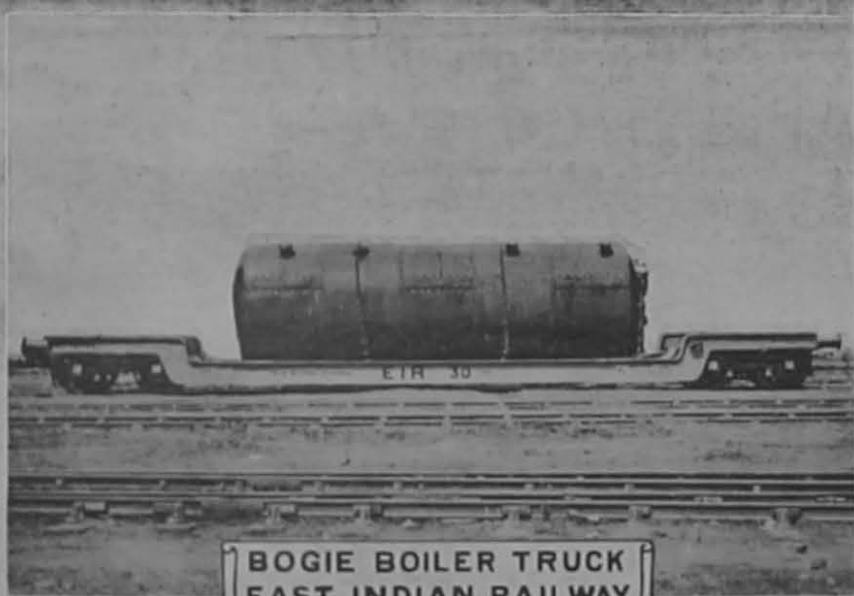
The strikes did not have the effect of completely stopping traffic on any one of the three railways, though there was considerable disorganisation for a short time on the broad gauge section of the Madras and Southern Mahratta

Railway and also in the neighbourhood of Bombay and on the broad gauge section of the Bombay, Baroda and Central India Railway system. Normal conditions were practically restored on the Madras and Southern Mahratta Railway by the 6th, on the Great Indian Peninsula Railway by the 8th and on the Bombay, Baroda and Central India Railway by the 15th of June 1913.

Accidents

A statement of the accidents of all descriptions, to persons, which have occurred during the last five years, is given below :—

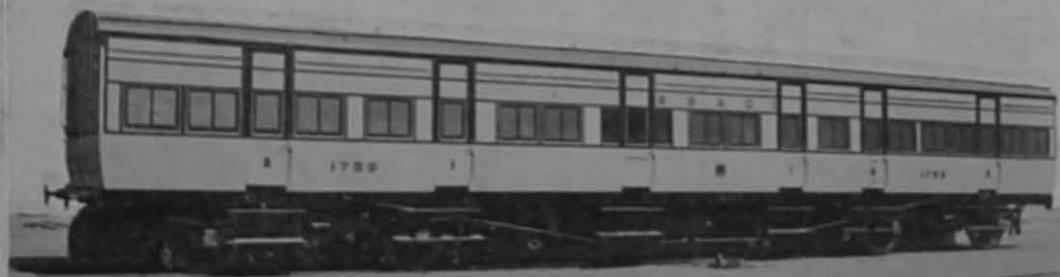
Particulars.			1909.	1910.	1911.	1912.	1913-14.
Passengers ...	Killed	By accidents to trains, rolling-stock, permanent-way, etc.	20	3	12	7	59
		By accidents from other causes, including accidents from their own want of caution or misconduct.	161	184	198	199	210
		Total killed ...	190	187	210	206	268
"	Injured	By accidents to trains, rolling-stock, permanent-way, etc.	127	184	174	159	104
		By accidents from other causes, including accidents from their own want of caution or misconduct.	487	475	565	635	711
		Total injured ...	614	659	690	794	815
Railway servants.	Killed	By accidents to trains, rolling-stock, permanent-way, etc.	31	37	27	20	86
		By accidents from other causes, including accidents from their own want of caution or misconduct.	334	361	396	385	444
		Total killed ...	365	398	423	405	480
"	Injured	By accidents to trains, rolling-stock, permanent-way, etc.	131	108	125	130	133
		By accidents from other causes, including accidents from their own want of caution or misconduct.	531	545	666	736	712
		Total injured ...	662	653	791	866	845
Other persons	Killed	At level crossings ...	47	37	49	44	58
		Trespassers ...	1,116	1,036	1,126	1,173	1,303
		Suboles ...	187	157	223	234	208
		Miscellaneous ...	28	42	47	83	23
		Total killed ...	1,378	1,272	1,445	1,534	1,592
"	Injured	At level crossings ...	30	26	39	42	49
		Trespassers ...	290	268	301	353	304
		Suboles, attempted ...	12	8	8	7	8
		Miscellaneous ...	30	50	31	47	31
		Total injured ...	347	352	379	449	482
Total of all classes.	Killed	.....	1,931	1,857	2,078	2,145	2,339
"	Injured	.....	1,623	1,664	1,869	2,109	2,142



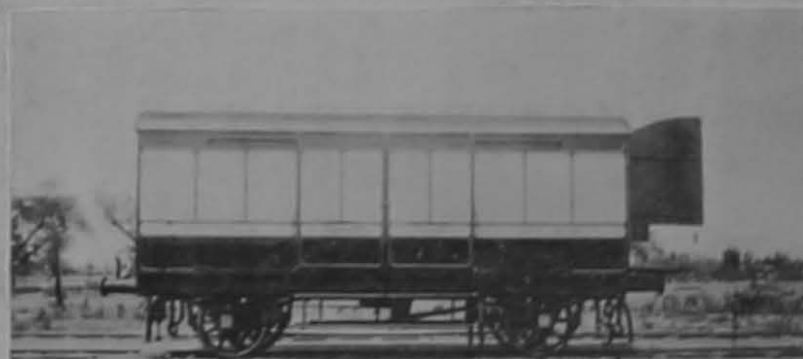
**BOGIE BOILER TRUCK
EAST INDIAN RAILWAY**



**SUPERHEATER CHAT TANK ENGINE
GREAT INDIAN PENINSULA RAILWAY**



**BOGIE CORRIDOR 1st AND 2nd CLASS CARRIAGE
BOMBAY BARODA AND CENTRAL INDIA RAILWAY**



**CARRIAGE OR MOTOR CAR TRUCK
NORTH WESTERN RAILWAY**

The number of passengers killed from causes beyond their own control was 0.12 per million of passengers travelling, which gives an average of 1 in 286.45 millions of miles travelled.

The large increase in the number of passengers killed by accidents during the year 1913-14, compared with the number killed during previous years, was due to the serious accidents, accounts of which are given below and which occurred on the Great Indian Peninsula Railway on the 30th April 1913 and on the East Indian Railway on the 28th June 1913.

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

A goods train which was held up by the signals outside Bargaon Station, *Great Indian Peninsula Railway*, was run into on the 30th April 1913, by a passenger train moving in the same direction from Katepurma. Three third class carriages were completely wrecked and 33 persons were killed and 20 seriously injured. The direct cause was the defective working of the block instruments which would, if in order, have prevented the admission of the second train on the section until the goods train had reached Bargaon.

The accident should have been averted by the adoption of the precautions enjoined by rules. Observance of those rules in this case would have led the goods train staff to protect the train by sending a man back to warn any following train by means of hand signals and of detonators placed on the line. The case was the subject of exhaustive departmental and judicial investigation as a result of which the responsible members of the inspecting, station and train staff were sentenced to varying terms of imprisonment.

Another disastrous accident, in which 23 persons were killed and about the same number injured, occurred on the Ondal-Sainthia branch of the *East Indian Railway*. Owing to abnormally heavy rain, the Salko river rose rapidly to an unprecedented extent and washed away the railway embankment just behind the south abutment of the bridge near Panchra station early in the morning of the 28th June 1913. A passenger train left Panchra at six o'clock and fell into the gap caused by the breach; ten out of the eighteen vehicles on the train were completely destroyed, the engine and other vehicles also being badly damaged. The impact of the train at the back of the abutment destroyed this and wrecked the bridge which had not itself been directly injured by the flood.

A careful examination of this part of the line had been made only shortly before the date of the accident, and the occurrence can only be attributed to causes which could not have been foreseen; the flood level is reported to have been eight feet above any previously recorded. On the same occasion a light engine ran into a breach caused by a washaway in the railway embankment near the Bukleswar bridge; the engine crew, with the exception of the fireman who was killed, fortunately escaped.

In these cases it was not possible for the drivers to have seen the breaches, in time to have pulled up, as it was raining at the time the disasters occurred and the breaches would in any event not have been easy to notice at a distance owing to the dark masses of the bridge, etc., in the background.

Six carriages of a fast passenger train were derailed near Sirsa station on the *Bombay, Baroda and Central India Railway* (metre gauge) on the 25th September 1913. The driver and both firemen were killed and another railway servant was injured. The accident is attributed to a combination of circumstances. The train was a fast one worked by a heavy six-wheeled coupled engine and the permanent-way on the section on which the accident occurred was light, and the track in indifferent order. The departmental enquiry resulted in the decision to use a lighter engine and to reduce the train loads and speeds on this section until the road should have been brought up to a higher standard.

A bullock cart was knocked over by a train at a level crossing near Chandrakona station, on the *Bengal-Nagpur Railway*, on the 25th February 1914. It is believed that the occupants of the cart were asleep and that the bullocks strayed on to the line through a gap between the gate, which was locked, and the gate lodge. The three occupants of the cart were killed.

An explosion took place at Jetalsar station on the *Gondal-Porbandar Railway*, on the 14th February 1914, in a railway wagon containing 10 casks of gunpowder. Various breaches of the rules regarding the carriage of explosives had been committed, with the result apparently that the fact that the casks contained gunpowder became obscured during the transit of the consignment, which involved two transshipments. The casks were finally loaded in an open wagon together with other articles of general merchandise. The explosion is believed to have been caused by a spark from an engine falling on to the casks. Three railway servants were killed and the rolling-stock was badly damaged. The matter is still under judicial investigation.

Railway Staff

The total number of servants in railway employ at the close of the year was 633,694, of which number 7,988 were Europeans, 10,437 Anglo-Indians, 615,269 Indians. Of the Europeans and Anglo-Indians 15,606 were enrolled as Volunteers. At the close of 1913-14 there were 10,992 children and 8,943 apprentices and workmen attending the Railway Schools.



TRANSPORTING A HEAVY LOAD ON SPECIAL TRUCK
GREAT INDIAN PENINSULA RAILWAY



PARLOR CAR
GREAT INDIAN PENINSULA RAILWAY



RESTAURANT & SLEEPING CAR
GREAT INDIAN PENINSULA RAILWAY



CALCUTTA MADRAS MAIL TRAIN
BENGAL NAGPUR RAILWAY

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.			
1904	6,280	8,749	404,143	419,172	12,806	7,777	3,197
1905	6,529	9,181	436,723	452,433	12,989	6,907	6,100
1906	6,840	9,354	462,759	478,953	13,805	6,806	6,201
1907	7,186	9,984	490,083	517,153	13,816	7,140	7,338
1908	7,344	9,951	508,188	525,483	13,911	8,719	6,513
1909	7,278	9,685	487,933	510,896	13,924	7,922	8,012
1910	7,406	9,554	522,741	539,701	13,723	8,280	8,552
1911	7,685	9,872	545,337	562,894	14,632	8,679	8,280
1912	7,850	10,066	571,506	589,422	15,014	9,682	9,301
1913-14	7,968	10,437	615,260	633,665	15,006	10,902	8,943

Fares and Rates

Famine traffic.

Owing to a partial failure of the monsoon there was scarcity of fodder in certain parts of the United Provinces, the Punjab, Ajmer-Merwara and the Bombay Presidency. With a view to stimulating the flow of fodder into the affected areas the Government of India sanctioned the payment as a charge against "Famine Relief" of the difference between the ordinary tariff rates and sums realised from the consignor or consignee at the rate of half an anna per four-wheeled, nine pies per six-wheeled and one anna per bogie wagon per mile, in the case of consignments booked to specified stations. At the instance of certain Native States in Central India and Rajputana Agencies similar concessions were extended to stations in their territories, the States concerned being responsible for the expenditure incurred. As conditions improved the concession was gradually withdrawn.

Increased rate for the haulage of postal vans on the railways in India.

The Government of India sanctioned, with effect from 1st April 1913, the payment for the haulage of broad gauge postal vans at the increased rate of 24 pies per four-wheeled van per mile in supersession of the rate of 18 pies per mile, which was fixed in the Government of India, Public Works Department, Circular No. XIV Railway, dated the 23rd May 1884. The existing rate of 18 pies per mile for the haulage of postal vans on other than the broad gauge was considered equitable and continued in force. The existing special arrangements for hill and other railways also remained unchanged.

State Railways Coal Department

The Report of the State Railways Coal Department for the calendar year 1913 is published separately. It need only be mentioned here that the coal inspected by the department for some of the Indian railways during the calendar year 1913 amounted to 2,928,120 tons out of a total of 15,486,318 tons of coal mined in India during the same period. In addition to railways, the department inspected coal for the Madras Port Trust and the British India Steam Navigation Company, and during 1914 inspection of coal for the Ceylon Government Railway, Bombay Port Trust and Bombay Electric Supply and Tramways Company is being undertaken. This will bring the total coal inspected by the department to approximately one quarter of the coal mined in India. The constantly increasing demand for the assistance of this department both on the part of company-worked railways and of private bodies, etc., affords ample testimony to the value of its services.

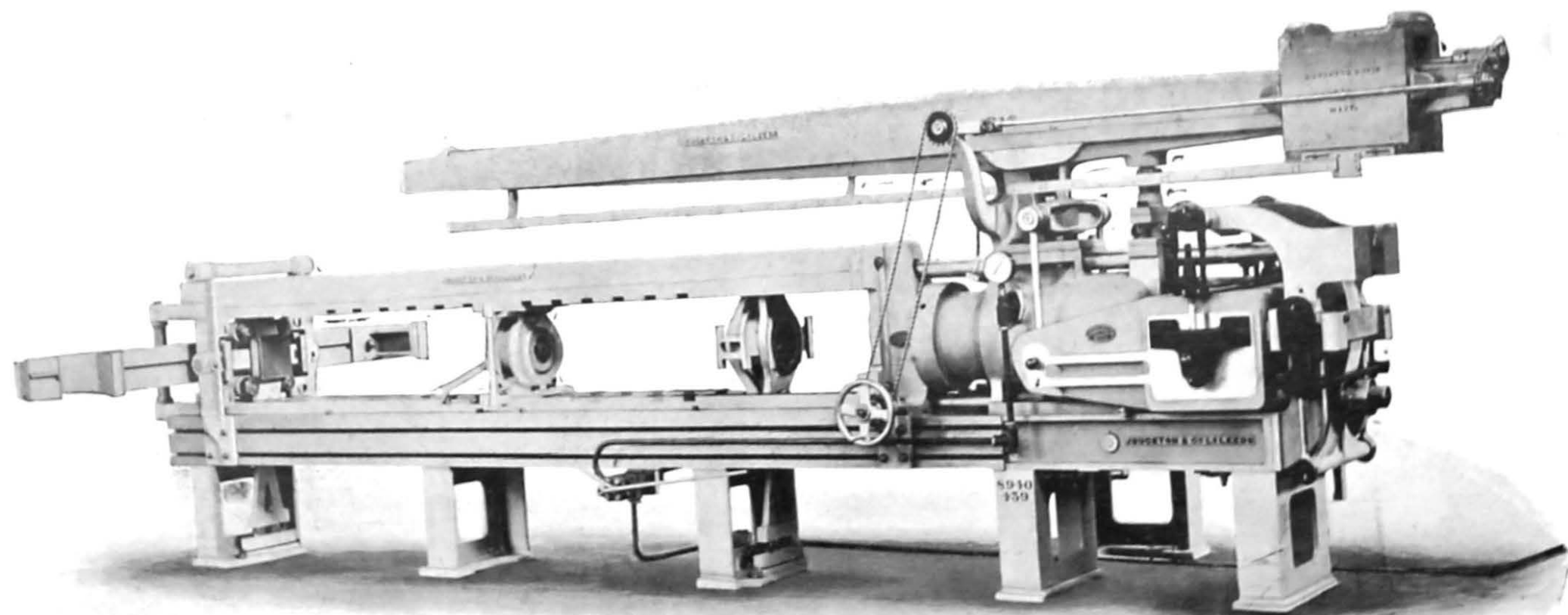
Inspection of Local Manufactures

The Railway Board's Laboratory and Test House under the control of the Superintendent of Local Manufactures, Calcutta, is now fully equipped, and the importance and extent of the work undertaken has necessitated the appointment of two officers for Physical and Chemical tests respectively. The inspection work of this department has been very heavy and is increasing according as the wide scope of its capabilities becomes more generally known. A descriptive book showing the nature of work which can be undertaken in the Laboratory and Test House together with the fees charged for analysis, testing, etc., or for the inspection of work carried out by Calcutta firms, may be obtained on application to the Superintendent of Local Manufactures, Calcutta. The quantity of work inspected during 1913 is indicated by its cost which amounted to Rs. 41,06,276, and comprised a great variety of articles such as Carriages, Wagons, Girders and Bridges, Well-curbs, Points and Crossings, Barges, Steamers, Steel structural work, etc., etc. This work was mainly on behalf of the State-worked Railways.

Contracts

The general adoption of the financial instead of the calendar year for the accounts of the Indian railways was one of the results of the Railway Conference held in Calcutta in January 1912, under the Presidency of Lord Inchcape, between the representatives of the Government of India and of most of the important Indian Railway Companies.

The object of the change was to render it easier to ensure adequate financial control over expenditure, by eliminating the difficulties which were experienced owing to the fact that the railway working expenditure estimates were regulated by calendar years, while the Government budget grants were necessarily allotted by the Government financial years ending on the 31st March.



100-TON HORIZONTAL TEST MACHINE.- GOVERNMENT TEST HOUSE, CALCUTTA.

Supplementary agreements were entered into, during the period under review, with all the Indian Railway Companies; under these the accounts kept by the Companies, for the purposes of their principal contracts, are now prepared for the financial year.

The only important contract entered into during the year was the agreement, dated the 24th October 1913, between the Secretary of State for India and the Bombay, Baroda and Central India Railway Company the effect of which is to establish a new basis for the working of that railway by the company. The chief points of interest in the new arrangements are that (a) for purposes of dividing the nett receipts of the undertaking the capital interest of the Secretary of State and of the Company, as on the 31st December 1911, were taken at £38,500,000 (£28,000,000 Preferred and £10,500,000 Deferred Capital) and £2,000,000 respectively; (b) Government guarantee interest at the rate of $3\frac{1}{2}$ per cent. on the existing debenture stock of £1,000,000 and 3 per cent. on the Company's capital of £2,000,000 and on any further stock issued by the Company with the approval of the Secretary of State; (c) further capital to be either advanced by the Secretary of State or provided by the Company with the Secretary of State's approval, the Company having the right to apply for power to raise additional ordinary stock so as to maintain as nearly as possible the ratio of 14 to 1 established on the 31st December 1911 between the Government Preferred Capital and the Company's Capital; (d) surplus profits are arrived at after deducting from net receipts all interest charges on debentures and on the Company's and Secretary of State's capital, and divided between the Secretary of State and the Company in the ratio of their respective capital interests in the undertaking.



Type of Country encountered in a recent Survey for a railway between Tank and Fort Bandomen.

The Ghat Defile.

Provision is also made in this contract for the distribution of special revenue expenditure on the improvement of the line, up to an aggregate of Rs. 2,00,00,000, so that the accounts of any one half year may not be unduly burdened.

Maps, etc.

In the pocket inside the back cover of this volume will be found, in addition to the special map referred to on page 17 *ante* under the head "Improvement of open line equipment", a general map of India shewing railways open and under construction on the 30th June 1914; also one prepared by Mr. J. H. Trott,* and a diagram shewing comprehensively the gross capital outlay, gross earnings, working expenses, mileage, etc., of the Indian railway system.

* *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, Kilpauk House, Kilpauk, Madras, who holds the copyright.