

RAILWAY DEPARTMENT
GOVERNMENT OF INDIA
RAILWAY BOARD

Railways in India

Administration Report for the year
1917-18



VOLUME I
(REPORT)

SIMLA
GOVERNMENT CENTRAL PRESS
1918

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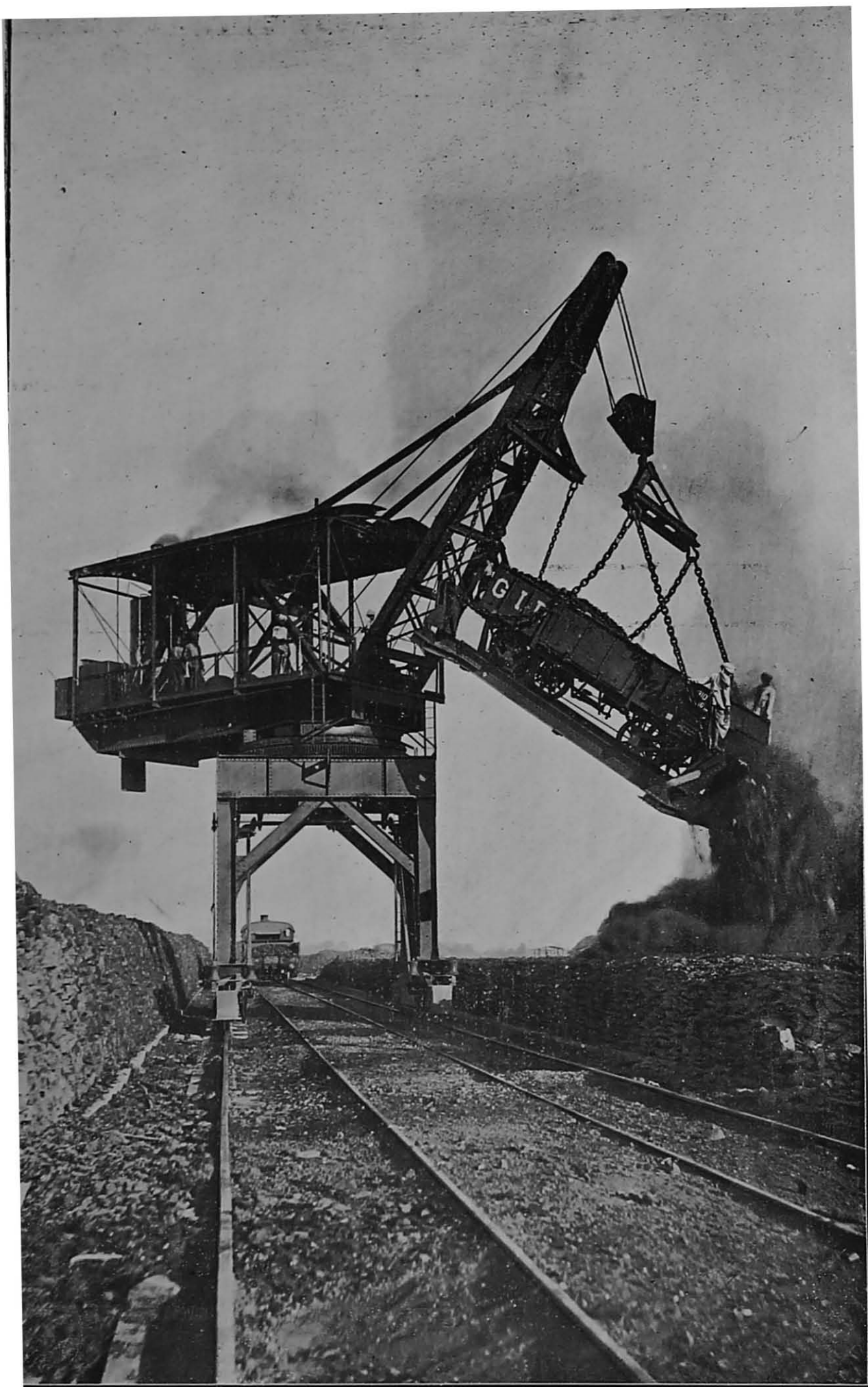
- (a) Original descriptions of Railway Works in India and elsewhere.
- (b) Reprints of articles from foreign Engineering Magazines.
- (c) Reprints or abstracts of reports received by the Government of India on subjects connected with Railways.

A complete list of the papers can be obtained *gratis* from the Chief Engineer with the Railway Board, Simla.

The books and papers can be bought from the Superintendent, Government Printing, 8, Hastings Street, Calcutta.

The prices of the papers vary from Annas Four to Rupees Eight.

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**Mechanical unloading Coal Crane in use at Bhusawal.
Great Indian Peninsula Railway.**

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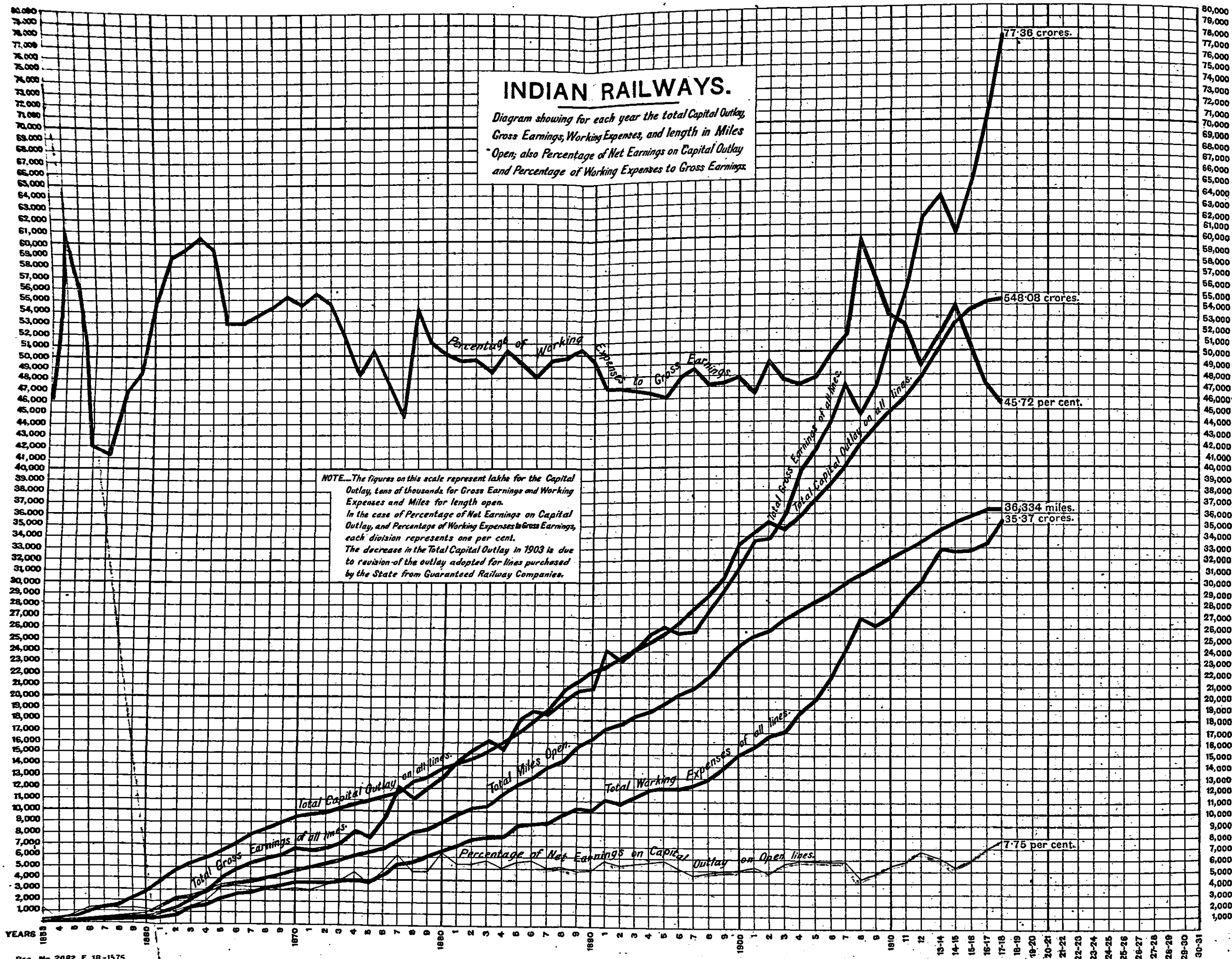
Note on Indian Currency.

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

1917-18

INTRODUCTORY.

The year under review has been one of peculiar difficulty in every department of Railway Administration.

The shortage of supplies of Railway materials to which reference was made in last year's report has again seriously interfered with works on all lines. The difficulty in this respect was still further accentuated by the fact that railways have been called upon to furnish from their already depleted stocks considerable quantities of locomotives, rolling-stock, permanent-way and other materials required for War purposes.

As an inevitable result the programme of renewals has again been restricted within the narrowest possible limits and the standard of both rolling-stock and permanent-way has unavoidably deteriorated owing to the impossibility of making good the results of wear and tear combined with the necessity for carrying an increased traffic.

In addition to these difficulties the Administrations of most lines have had to contend on occasions with a serious shortage of coal. Labour troubles which have more or less affected the whole world have also caused considerable anxiety.

In these circumstances it is a matter for congratulation that with a staff considerably depleted railways have generally been able to meet the very heavy calls made upon them.

Judged by the standard of earnings the year has constituted a record and altogether the Railway Administrations and the staff concerned may well be proud of the results attained in the face of unprecedented difficulties.

An important change has been made in Volume II of this Report. With a view to reduce bulk and cost of printing, the first Appendix which gave brief histories of all railways and comprised nearly half the Volume is

being printed as a separate publication, which it is proposed to issue only to Railway Administrations and others to whom the subject matter is of practical interest. A reprint of this Volume will be made every five years.

Appendix 26 which gave the statistics of the old Volunteer force has now been discontinued, as this force has been merged in the Indian Defence Force. Appendix 29 which contained the statistics of Railway Schools has been omitted, as the matter was not of general interest and it was difficult in practice to preserve uniformity in information which necessarily related to widely different sets of conditions.

It is hoped in subsequent issues to revise and re-arrange some of the remaining Appendices of Volume II with a view to still further reducing its bulk, while retaining all figures which are of general interest.

The note on the relation of 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 27 under the head "Open Line Improvement," a general map of India showing railways open and under construction on the 31st March 1918; also one prepared by Mr. J. H. Trott*.

* *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.

CHAPTER I.

THE WAR AND INDIAN RAILWAYS.

This report on Indian railway administration for the year 1917-18 must naturally be coloured throughout by the effect on India of the prolongation of the War resulting in (a) the restriction of the funds available for the development of railways, (b) the difficulty of obtaining materials for the proper maintenance of their works and rolling stock, (c) the congestion of traffic consequent on the diversion of the coasting trade to railways and on the large and perpetual movements of troops and military stores and supplies. These matters are dealt with more in detail in succeeding chapters; this chapter is designed to give a small indication of the direct assistance rendered to overseas military railways in personnel and materials; it must, however, not be forgotten that the further large increase in earnings over the previous year (though that year itself beat all previous records), and the large tonnage carried in spite of the hindrances to efficient maintenance, have necessarily caused a severe strain on the staff of all departments, largely depleted as it has been by the loan of large numbers for constructing and working overseas railways, and taking up Military Service. It may here be mentioned that when the urgent demand for all possible men for Military service was first made, the position was very different from that now ruling. It not being then anticipated that the war would last so long, or the demands on Indian railways be so great and prolonged.

As in the previous three years, the construction and working of military railways in the East has depended almost entirely on the Indian Railway System for providing staff and materials; during the year under review in fact it became clear that some of the larger railways, on which the strain of the increased military traffic fell most heavily, had been somewhat too generous in lending staff, but this difficulty will, it is hoped, be relieved to some extent by the conclusion of operations in East Africa, which is setting free a number of officers and subordinate staff either to return to India or for Mesopotamia. It has, however, also been considered desirable to ask for the return of as many men as possible from Military service.

To cope with the continual demands for technical personnel of the lower grades it has been necessary—in view of previous depletion, the increasing pressure of traffic in India, and the consequent difficulty of releasing from their home lines a sufficient number of qualified men—to make special arrangements for recruiting and training raw material. To this end, the authorities of the larger railways have given the military authorities great help in forming training camps and schools at suitable centres. These include :—

- (a) camps for training permanent-way maintenance gangs,

- (b) schools for training assistant station masters and railway telegraph signallers. Of the staff turned out by such schools some are sent direct overseas, while some are used to replace more experienced men who volunteer for service on military railways:

The extension of military railways in the East has caused a further and very serious drain upon the material resources of Indian railways. The metre

Materials. gauge lines particularly had, by the end of the year under review, given up so many units of locomotive and goods stock that any further considerable call on them would, it was recognised, in spite of reduced passenger train services, endanger the interior economy of the country and the efficiency of the Indian railway system as a line of communications for the overseas forces.

Very great assistance has been given by railways not only in constructing hospital trains, ambulance cars and new goods stock for military railways, but also in supplying for military purposes all manner of transport and other accessories such as pontoons, portable huts, transport carts, aeroplane parts, harness and saddlery, camp furniture, etc. It may be mentioned in order to give some idea of the magnitude of these operations that one workshop on the North Western Railway has supplied numbers of such articles (individually small) to the value of 45 lakhs of rupees.

In addition to the supply of very large quantities of metre gauge rolling stock to overseas military railways, Indian railways have been called upon for assistance in other ways; as instances of special works it may be mentioned that (i) a complete 5' 6" gauge train of 11 bogie carriages was converted by the North Western railway in 7 weeks for use as a hospital train on the 4' 8½" gauge in



Carriage for 4' 8½" gauge Hospital Train being shipped at Karachi.

Mesopotamia — the photograph illustrates the shipment of these carriages at Karachi; (ii) a complete 2' 6" gauge hospital train was constructed by the same railway consisting of 11 ward cars, one officers' ward car, one store car, one dispensary and kitchen car, and

one car for the medical staff ; (iii) other railways built many additional broad gauge military cars for the troop traffic to and from Bombay, also 150 "all wooden" wagons on the 4' 8½" gauge for Mesopotamia, etc.

New permanent-way could not be obtained rapidly enough to meet military demands during 1917-18 with the result that Government has reluctantly been compelled to dismantle over 420 miles of open lines of railway in various parts of India to meet these demands.

In respect of these and of all other forms of assistance rendered, the Board desire to record their appreciation of the whole-hearted co-operation received from all railways.

At the close of the year 1916-17 the Railway Board lost the services of one of their Members, Mr. A. R. Anderson (now Sir Arthur Anderson) who went over with their War Branch to join the Indian Munitions Board as a Member of that body. In his place Mr. G. C. Godfrey, Agent of the Bengal-Nagpur Railway, was appointed a Member, but from the autumn of 1917, the Board were partly deprived of his help as it became necessary to alter the system of controlling the coal output, and the duties of Coal Controller were undertaken by Mr. Godfrey (See Chapter VII); these practically required him to reside continuously in Calcutta.

Important changes also took place on the North Western Railway. Sir Robert Gales, recently employed (after completion of his work as Engineer-in-Chief of the Sara Bridge) as Chief Engineer with the Railway Board, was appointed Agent of that line in April 1917 in succession to Colonel Craster, who reverted to Military employ on attaining the age of 55. Two months later, in order to enable the Board to deal more efficiently with the congestion of traffic, which was one of the direct results of the War in its effect on Indian railways, a new post of Controller of Traffic was created and Colonel H. A. Cameron, R. E., Traffic Manager of the North Western Railway was selected to fill the post.

CHAPTER II.

FINANCIAL RESULTS OF THE YEAR.

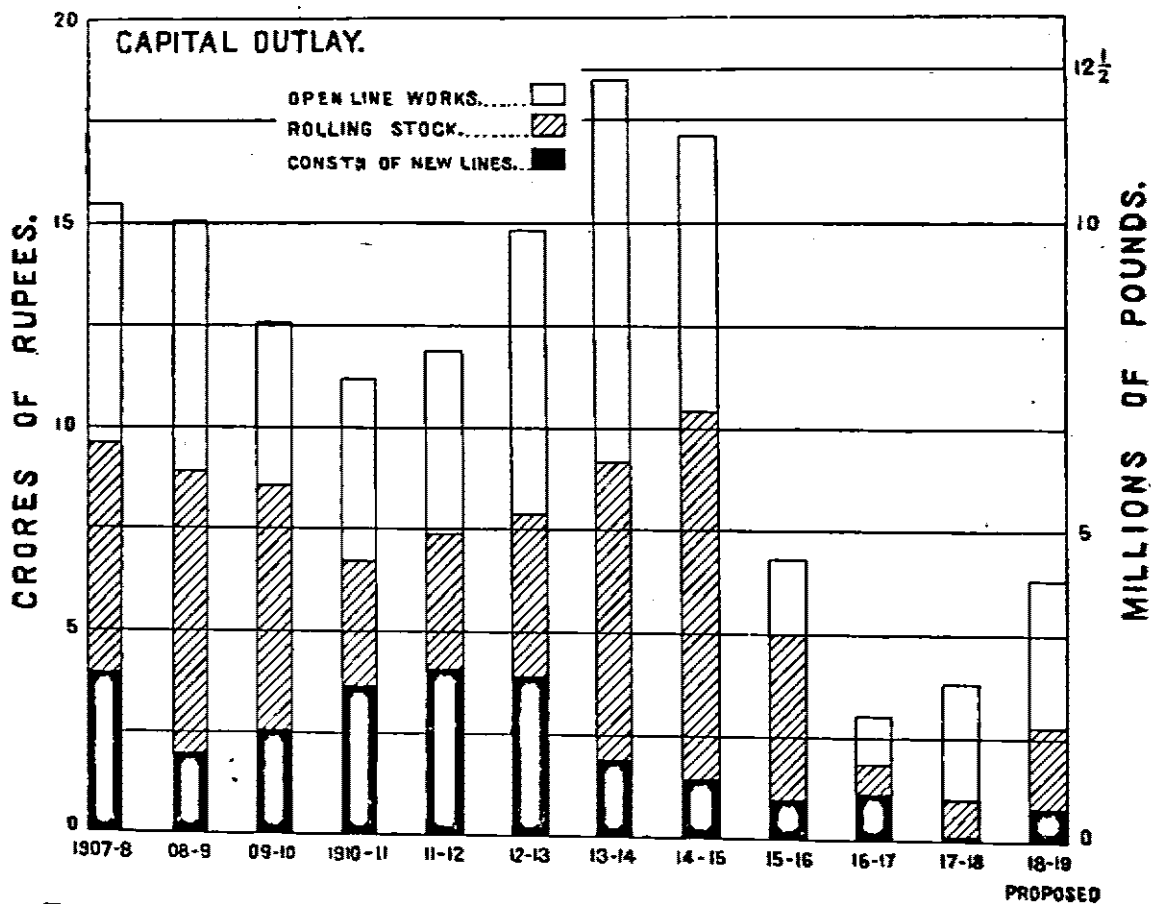
(a) Capital.

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 1917-18 to £367,438,689.

The outlay incurred during 1917-18 was £2,528,571 distributed as follows:—

				Rs.
Open Line Works including suspense	...	...	...	2,81,74,571
Rolling-stock	...	...	...	90,47,000
New Lines	...	...	...	7,07,000
Total				3,79,28,571
Equivalent at Rs. 15=£1 to				£2,528,571

The following diagram shows graphically how these figures compare with those of past years. The distribution of the grant of £4.2 millions (Rs. 6.30 lakhs) which has been sanctioned for the financial year 1918-19 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. 311 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 1918-19 is £4·2 millions. In preparing the programme it was found necessary, in the interests of economy and owing to the impossibility of procuring English materials, to defer a great deal of very necessary work. The heavy traffic which has resulted from the partial closing of sea routes and the movement of troops and military stores has put a very severe strain on both rolling-stock and permanent-way. Railways have at the same time had to meet a heavy demand for stock and material for military requirements outside India. English materials necessary to enable deficiencies to be made good are only procurable on a very limited scale, and the programme has therefore had to be restricted to bare necessities which will enable the traffic to be kept going. Wherever possible efforts are being made to utilize the resources of India in place of English supplies but this is only at present possible to a limited degree.

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 1917-18 to Rs. 68,22,16,000. The capital expenditure on such lines during the year was as follows :—

				Rs.
Branch Line Companies' Railways=...	...	...	...	51,44,000
District Board Lines	...	...	...	3,36,000
Native State Lines	...	...	...	76,70,000
			Total	<u>1,61,50,000</u>

(b) Results of Working.

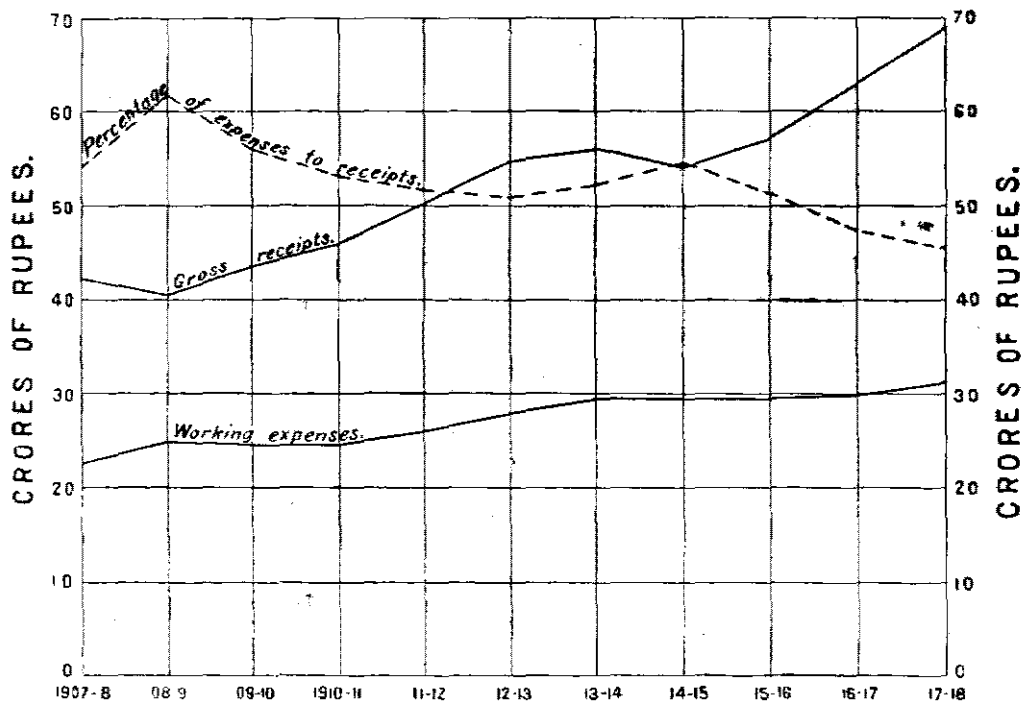
The following table compares the financial results attained in the working of the State Railways during the year 1917-18 with those of previous years (in the case of money the figures are shown in thousands) :—

	1912-13.	1913-14.	1914-15.	1915-16.	1916-17.	1917-18.
Capital at charge at end of each year...	£	£	£	£	£	£
	340,103	351,302	361,500	364,878	365,463	360,433
Revenue.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Gross traffic receipts.—State Railways	55,02,05	56,31,02	54,15,78	57,20,43	62,01,60	68,02,13
Deduct—Working Expenses	28,02,31	29,33,01	29,52,87	29,63,00	29,90,86	31,35,81
NET RECEIPTS	27,00,04	26,98,01	24,62,91	27,73,41	32,07,63	37,56,32
	£	£	£	£	£	£
Equivalent in sterling Rs. 15=£1	18,004	17,973	16,410	18,480	21,083	25,042
Percentage of return on capital at charge	5·28	5·12	4·54	5·00	6·02	6·83

The net working profit from State Railways, after meeting interest and other miscellaneous charges, amounted in the year 1917-18 to £ 9,992,134. It would have been more, had it not been for the method of accounting adopted in

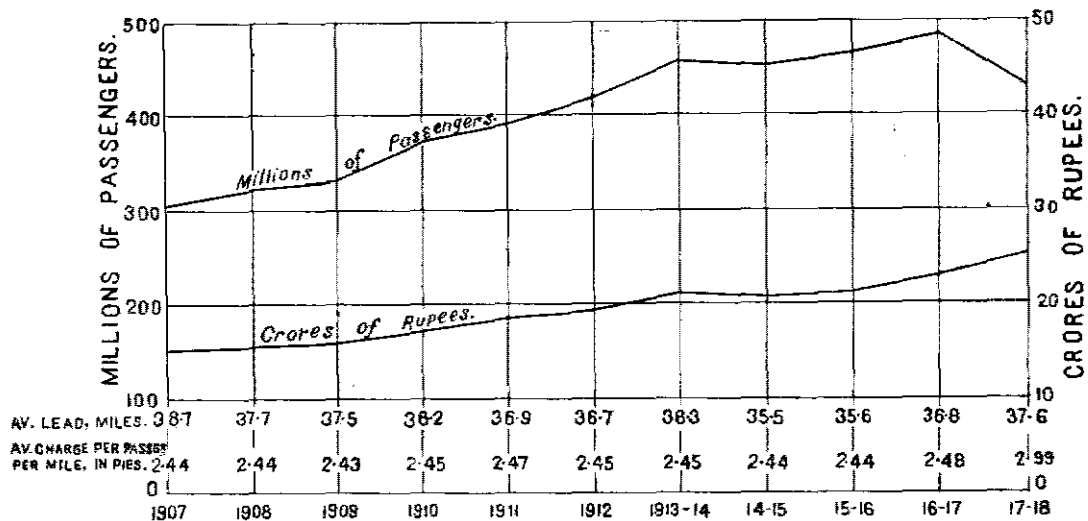
accordance with instructions of the Secretary of State for India under which certain Annuity and Sinking Fund payments which really go to the discharge of debt are included in the Railway Revenue Account.

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 :—



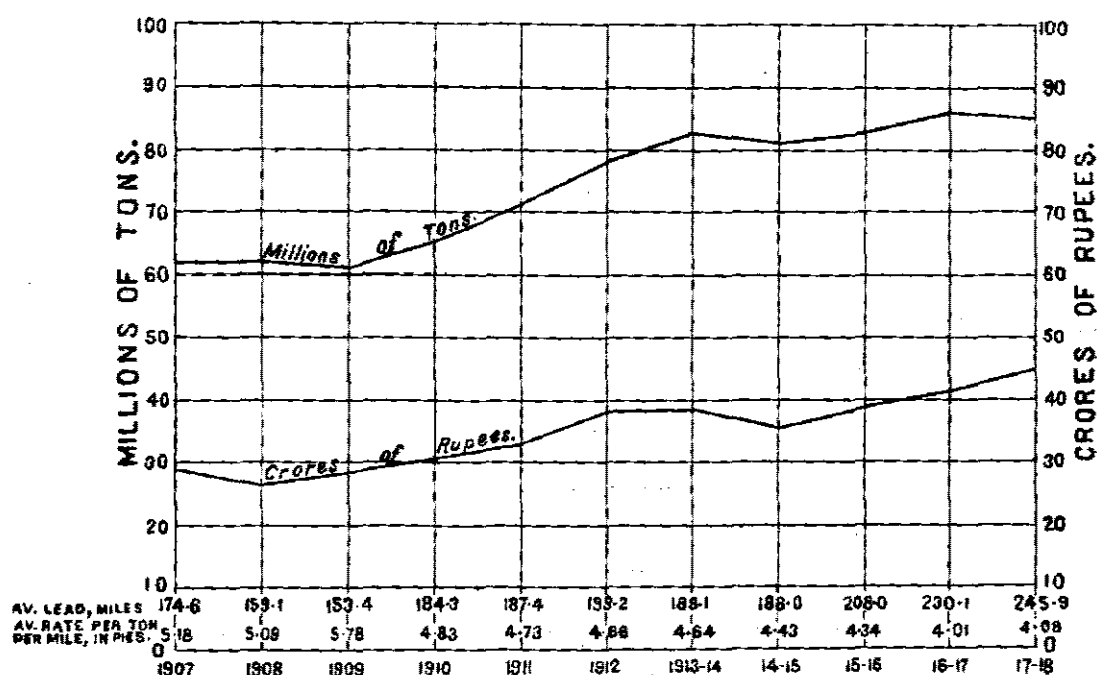
The working expenses during the year 1917-18 amounted to Rs. 31.36 crores or only 1.39 lakhs more than the actual working expenses of 1916-17. This result is remarkable seeing that the receipts of the year exceeded those of 1916-17 by nearly 6 crores. It was due to the increasing difficulty of obtaining 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 :—



These figures, which show a sharp drop in the number of passengers carried and at the same time an increase in the earnings are the result of two causes ; first, the reduction of train services consequent on war conditions, secondly an enhancement of fares, which, with a view to discourage travelling, this reduction necessitated.

The tonnage of, and earnings from, goods traffic are compared in the following diagram :—



The tonnage carried fell off somewhat, as the result of restrictions imposed on local short distance traffic. There was no appreciable change in the average rate per ton per mile, which has in the last few years gone down greatly, owing to the very largely increased proportion of coal which pays very low rates. On the other hand the same circumstances—principally the haulage of coal across the continent—have very substantially increased the average lead, and the revenue has been rising.

The gross earnings of railways other than State lines, such as District Boards' lines, Native State lines, etc., during 1917-18 amounted to Rs. 835.24 lakhs, as compared with Rs. 783.37 lakhs in 1916-17, being an increase of Rs. 51.87 lakhs, and as the working expenses were more by Rs. 40.47 lakhs than the previous year, the net earnings showed an improvement of Rs. 11.40 lakhs only, having risen from Rs. 403.23 lakhs in 1916-17 to Rs. 414.63 lakhs in 1917-18. These net earnings yielded a return on the Capital outlay (Rs. 6,604.58 lakhs) on open lines, that is on mileage earning revenue, of 6.28 per cent as against 6.39 per cent in 1916-17.

CHAPTER III.

TRAFFIC WORKING.

(a) Statistics.

In Chapter II (b) the main results of working Indian railways during 1917-18 as compared with previous years have been indicated, and the diagrams there shown illustrate the fact that a gradual increase in both passenger and goods earnings has been uninterfered with by the War, though there was a temporary set back in 1914-15. It will be seen that the rise in passenger earnings in 1917-18 took place in spite of a considerable drop in number of passengers and was due to an increase of about 20 per cent in the average charge per passenger-mile.

General.

Certain additional "graphs" appear in this report which are specially designed to indicate the effect of the War on Indian railways, namely :—

- (i) diagram marked "A" showing that the increase of earnings has been in spite of a large reduction in the number of officers employed ;
- (ii) diagram marked "B" illustrating the rise of ton-mileage of coal and ordinary traffic carried ;
- (iii) diagram marked "C" showing how the ordinary passenger train-mileage (as distinct from troop train-mileage) and the number of ordinary passengers have varied since the year before the War.

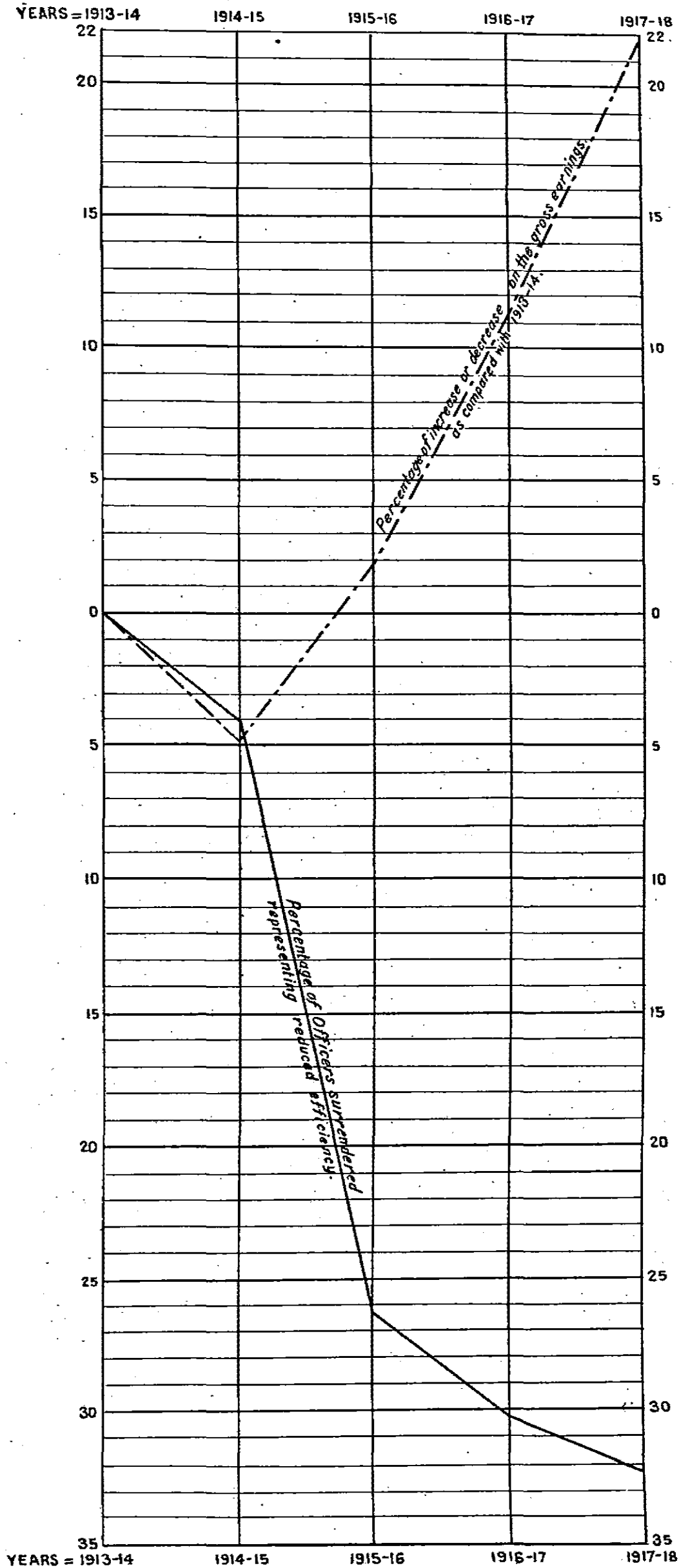
(b) Congestion of Traffic.

In last year's report mention was made that at the beginning of the year now under review the Railway Board had decided to appoint a Controller of Traffic, and a brief outline of his duties was given. This appointment was necessitated by War conditions, which had resulted in largely increased demands for movement of goods traffic on Indian Railways, the position being further accentuated by the transfer of locomotives and rolling-stock to overseas railways for Military purposes and by the fact that since the outbreak of war, railways in

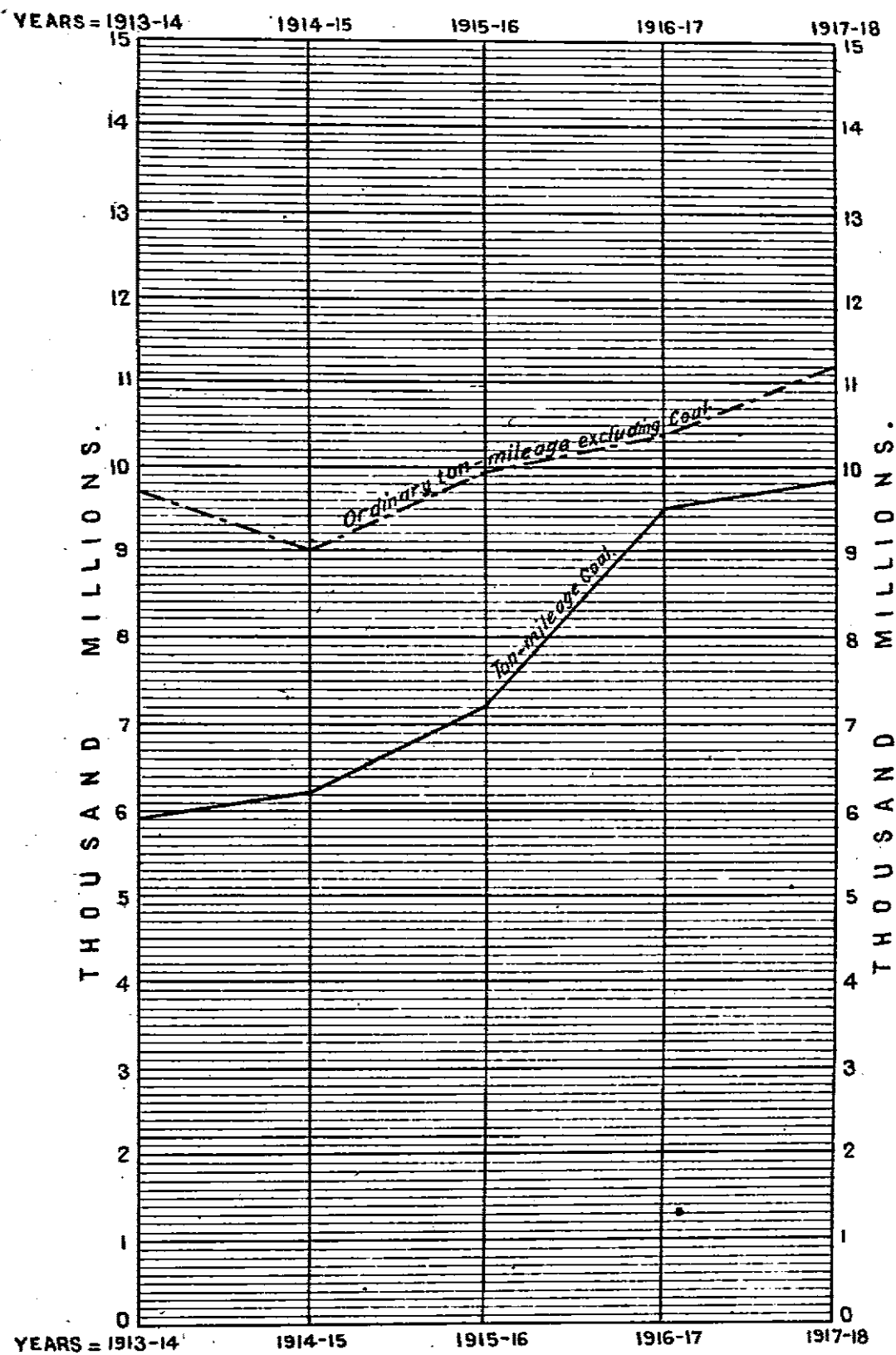
Controller of Traffic.

DIAGRAM PERCENTAGES OF GROSS EARNINGS AND
 REDUCED EFFICIENCY AS REPRESENTED BY PERCENTAGES
 OF OFFICERS SURRENDERED.

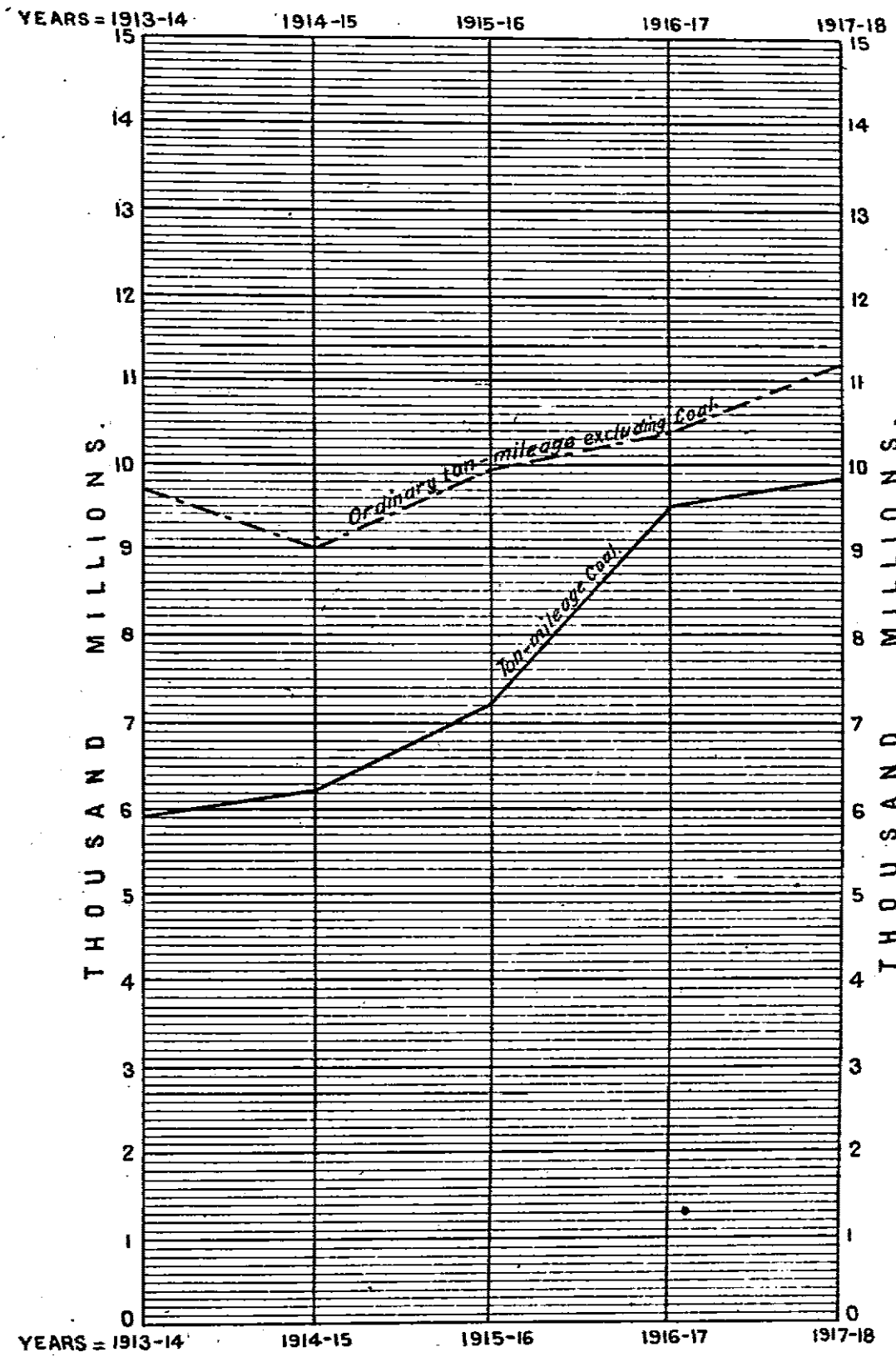
Diagram A.



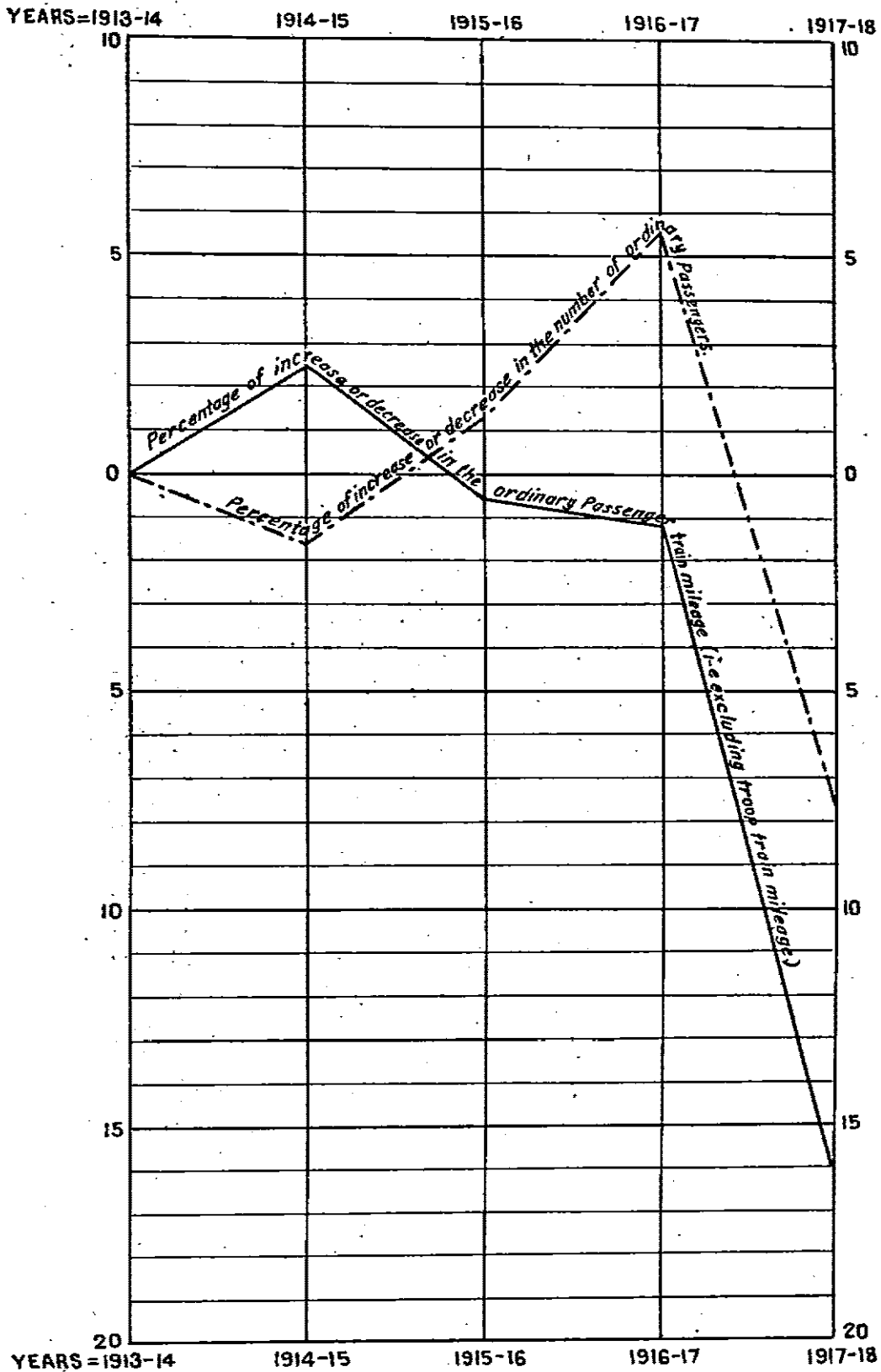
RISE OF TON MILEAGE COAL & ORDINARY.



RISE OF TON MILEAGE COAL & ORDINARY.



PERCENTAGE OF INCREASE OR DECREASE IN THE
NUMBER OF ORDINARY PASSENGERS & ORDINARY
PASSENGER TRAIN MILEAGE
COMPARED WITH 1913-14.



India had been practically cut off from supplies of additional locomotives and stock from England.

The Controller took up his appointment towards the end of June 1917 and Railway Administrations, Local Governments and the different Departments of the Government of India were addressed by the Railway Board explaining the reasons that had led to the appointment and asking these bodies to co-operate with him in the closest manner possible in order to make the Central Control of Traffic a success. Among the measures adopted to give effect to this control it was found necessary, owing to the fact that essential traffic requiring to be moved urgently on behalf of the different departments together with the coal traffic was steadily increasing, to draw up a list of commodities in order of priority to act as a guide to the railway administrations as to the order in which they were to despatch the different classes of traffic, at times when it was found impossible to deal with all that was offering. During the earlier part of the season these methods proved fairly effective, mainly because during the monsoon, as usually happens due to insufficient labour remaining in the coal mines the raisings of coal fell off and the demand on railways was reduced accordingly, but later on with the usual revival of trade in the autumn the pressure again increased and the trouble in dealing with the traffic offering was aggravated by the fact that owing to the smaller output of coal during the monsoon, the stocks at mills and other industrial concerns, as well as on railways, had been greatly reduced and the necessity for rebuilding them became very urgent. All these facts combined to bring about an acute situation as regards railway transport and the Railway Board with the help of the Controller of Traffic immediately undertook a comprehensive review of the position. It was found that the increase in coal traffic brought about by greater demands from the Admiralty, Railways, etc., combined with a great expansion of Military movements, the conveyance of supplies and stores for overseas, as well as of munitions traffic, had raised the demand on the railway transport capacity to such an extent as to leave a very small and decreasing proportion, estimated to be little more than 20 per cent, of the rolling-stock available for the conveyance of ordinary public traffic. It was obviously necessary that provision should be made to meet certain civil demands and the Railway Board again addressed all Local Governments inviting their co-operation in arriving at some arrangement for the closer control of traffic claiming preferential treatment (in which it was clear that the food supplies and other necessities for the civil population would in future have to find a place) so as to keep the bulk of this preferential traffic at the absolute minimum and thereby, if possible, to increase the margin of capacity available for ordinary trade movements. Replies from Local Governments to this reference were being received and considered when the year under review came to a close. Since then

**Formation of Central Priority
Committee.**

interests of Military, Shipping,

the matter has been discussed and it was resolved (i) that a Central Priority Committee be formed representative of the Munitions, Agriculture, Commerce and

Industry ; (ii) that this committee should be the final authority for ordering special preference for railway traffic and for deciding questions brought up at its regular meetings, for the guidance of the Controller of Traffic and Railways. Formerly, Military traffic had been given precedence over civil traffic in all cases but the Military authorities agreed that this precedence was not necessary in every case as all Military traffic is not of an urgent nature. The Committee proceeded in the first place to classify goods traffic over railways for the purpose of priority as :—“Urgent”, “Preferential” and “Ordinary”—Each of these classes being subdivided into (a) Military and (b) Civil—the first two classes to be moved only, under distinctive priority-certificates issued by certain authorised officers. They took steps also to set up an organisation in the provinces having for its object the reduction of unnecessary traffic and in particular the elimination of cross traffic on railways. With this object in view the various

Directors of Civil Supplies.

Local Governments were invited to nominate in each province an officer as Director of Civil Supplies. Directors were accordingly appointed in all the provinces and the more important Native States. Their duties are to consider the stocks of food-stuffs and other necessaries of life in their respective provinces, to receive and examine applications from merchants and others for the movement of traffic and to consult freely with the representatives of railways in their provinces as to the possibility of moving particular traffic. The Central Priority Committee was subsequently merged in the Central Communications Board, formed in accordance with the Delhi Conference, and this Board has since been perfecting the machinery thus set up.

The scheme for a general pool of goods stock on broad gauge railways referred to in the last year's report was not introduced in its entirety. The indiscriminate use of all foreign railways' rolling-stock in the colliery districts for the despatch of coal had already afforded a very marked relief and enabled coal traffic to be dealt with more efficiently. Further it was found that the suspension of certain Conference rules as ordered by the Controller of Traffic, who in addition advises railways of anticipated heavy demands, diverts traffic in order to quicken transport or to remove congestion, and diverts rolling-stock from one railway to another as considered best to improve the general situation, had brought about an effective alternative giving practically the same results as if such a pool had been adopted without the introduction of the elaborate machinery necessary for bringing the same into force. The measures enumerated above have resulted in the attainment of the object in view.

(c) Reduction in Train Services.

The difficulty in obtaining materials from England continued during the year and at the instance of the Railway Board railways were obliged to make

further reductions in their passenger train services; these now amount to 44,407,000 train miles as compared with 55,972,000 in 1913-14. To adjust as far as possible demands to the reduced accommodation available, in the first place as noticed elsewhere, fares have been raised and there is no doubt that the enhancements have had their effect in checking travel. Secondly, the load of the remaining trains has been considerably increased. The percentage by which the number of coaching vehicles per train has increased varies considerably on different systems, but broadly speaking, it has been from 10 to 20 per cent.:

(d) Hardships of Third Class Passengers.

The question of third class travel is one which has continued to attract much public attention in the Press and in Legislative Councils; a fact which is to be welcomed since criticism and discussion help both to the definition of requirements and the recognition of difficulties. Railways on their side and the Railway Board have equally given the matter their careful consideration. It is unquestionable that much has been done of recent years in the improvement of stock, station premises and third class waiting halls, etc., as well as in providing for a better water supply and better food at stations. It must equally be admitted that there is room still for improvements of various kinds. As regards overcrowding that is a matter mainly of stock and cannot be prevented under present conditions. In other respects the chief need is for careful and constant supervision and this resolves itself into a question of staff. The various aspects of the question continue to receive attention.

(e) Kumbh Mela at Allahabad.

In last year's report it was mentioned that steps had been taken to curtail pilgrim and festival traffic; in the year under review it was considered necessary to take strong measures to reduce the attendance at the Allahabad Kumbh Mela during January and February 1918 when the occasion was one of special sanctity and normally two or three million people would have attended the celebration. At the time the East Indian Railway and the connected lines were experiencing very great difficulty in working through the essential coal and Military traffic to the North and West of India and there was great danger of serious results if this were interfered with by running special trains for the pilgrim traffic. The sale of tickets to intending pilgrims from all stations in India to Allahabad and the neighbourhood was therefore prohibited between the 3rd January and 26th February 1918 but it was found possible to suspend this prohibition during the week before the most important day; although no special trains were run this allowed nearly 70,000 pilgrims to travel to Allahabad during the week.

(f) Waziristan Expedition.

An expedition against the Mahsuds on the North-West Frontier took place in the hot weather of 1917 and deserves mention in this report owing to the special difficulties experienced by the North Western Railway in its function as a line of communications.

The broad gauge line terminates at Mari Indus. On the east bank of the Indus, the river is crossed by a steam ferry and a narrow gauge line connects Kalabagh Ghat on the west bank with the rail-heads at Bannu and Tank. Troops, transport and supplies, etc., consequently not only had to undergo transshipment from broad gauge to narrow gauge, but had in the course of this transshipment to be ferried across the Indus, at a site where it is liable to severe floods in the summer time. Moreover the narrow gauge line west of the river is peculiarly susceptible to flood damages, and during the operations the line was actually breached no less than 47 times.

The operations started in March, but it was not till May that the Waziristan Field Force was fully constituted. The Force was a large one for a line of communications of the nature described, and in addition to fighting troops included miscellaneous units, such as British and Indian Stationary Hospitals, Field Ambulances, Army Bearer Corps, Supply Columns, etc. The rolling-stock of the 2' 6" line was not sufficient to meet this large call and it was necessary to supplement it by obtaining 60 goods-vehicles and 6 Locomotives from the Bengal-Nagpur Railway 2' 6" lines in the Central Provinces; additional coaching stock had also to be requisitioned from the same source, and 14 of these carriages were expeditiously converted by the North Western Railway into an Ambulance Train, which owing to the severe climatic conditions had to run as a regular service for the evacuation of the sick. A second ferry steamer belonging to the Punjab Government was brought up from Ghazi Ghat and put into commission at the Mari-Kalabagh Ferry, to assist in transshipment across the river.

A total of 17,000 tons of supplies, etc., was carried to Tank and Bannu during the operations, and the necessity for providing additional railway facilities at rail-head threw an extra strain on the line of communications; materials for these works were, however, carried without interfering with the programme of movements for troops and supplies. The dispersal of the Force commenced on the 16th August, and was completed on the 21st September. It has given great satisfaction to the Board that the Military Authorities expressed their appreciation of the manner in which transport of troops and supplies was carried out by the railway, especially on the Trans Indus portion of the line, where it was acknowledged to be due to the unceasing efforts of the railway personnel that the heavy Military traffic was dealt with, in spite of the frequent interruptions due to flood damages.

(g) Accidents.

The number of persons killed and injured in the working of Indian Railways during 1917-18, as compared with previous years, was as follows :—

Particulars.			1913-14.	1914-15.	1915-16.	1916-17.	1917-18.
Passengers ...	Killed	By accidents to trains, rolling-stock, permanent-way, etc.	58	16	4	15	54
		By accidents from other causes, including accidents from their own want of caution or misconduct.	210	217	243	229	214
		Total killed ...	268	233	247	244	268
	Injured	By accidents to trains, rolling-stock, permanent-way, etc.	104	140	81	241	237
		By accidents from other causes, including accidents from their own want of caution or misconduct.	711	731	740	858	792
		Total injured ...	815	871	821	1,099	1,029
Railway Servants.	Killed	By accidents to trains, rolling-stock, permanent-way, etc.	36	36	19	22	40
		By accidents from other causes, including accidents from their own want of caution or misconduct.	444	407	414	403	368
		Total killed ...	480	443	433	425	408
	Injured	By accidents to trains, rolling-stock, permanent-way, etc.	133	160	109	138	206
		By accidents from other causes, including accidents from their own want of caution or misconduct.	712	699	687	659	686
		Total injured ...	845	859	796	797	892
Other persons ..	Killed	At level crossings ...	56	52	40	48	44
		Trespassers ...	1,303	1,327	1,315	1,363	1,350
		Suicides ...	208	245	256	239	235
		Miscellaneous ...	23	67	127	81	89
		Total killed ...	1,590	1,691	1,738	1,731	1,718
	Injured	At level crossings ...	49	37	35	39	55
		Trespassers ...	394	361	425	454	453
		Suicides, attempted ...	8	9	6	9	8
		Miscellaneous ...	31	39	68	38	52
		Total injured ...	482	446	536	540	568
Total of all classes.	Killed	.....	2,338	2,367	2,418	2,400	2,394
	Injured	.....	2,142	2,176	2,153	2,436	2,489

The total number of persons of all classes killed by causes beyond their control was 110 against 69, in 1916-17, the increase was chiefly due to the large number of persons killed in the accidents between Benapur and Khargpur and Ghunsore and Pindrai stations on the Bengal-Nagpur Railway, referred to below, and also to several other minor accidents; the number injured amounted to 490 against 424 in the previous year, the increase being chiefly attributable to the accidents referred to above and to the collision at Yermaras station on the Great Indian Peninsula Railway and at Itwari station on the Bengal-Nagpur Railway referred to below. Out of a total of 430 millions travelling 268 were killed and 1,029 injured, while of the former only 54 were killed through causes beyond their own control.

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

On the 17th January 1918, a passenger train collided with a derelict brake-van between Benapur and Khargpur stations on the Bengal-Nagpur Railway, resulting in the death of 16 persons and injury to 33.

In conformity with a practice which has existed for a number of years, but which was entirely unauthorised, this brake-van had been attached to a banking engine which was placed in the rear of a goods train to assist it up a heavy grade just outside Khargpur.

When the engine reached the customary place for shutting off steam, none of the staff appear to have taken notice of the brake-van which had become detached from the engine, and this brake-van, it appears travelled, behind the train so far as its impetus allowed it, gradually coming to a stand. How it became detached is not known.

The staff at fault have been dealt with departmentally.

On the 27th January 1918, a collision took place between a shunting engine and a passenger train in Itwari Station Yard on the Bengal-Nagpur Railway, resulting in injuries to 40 persons, and considerable damage to rolling-stock.

The accident was due to the negligence of the assistant station master for allowing shunting in the face of an approaching train and also for allowing the dead-end trap key to be with the shunting jemadar when a train was approaching instead of keeping it in his possession.

The assistant station master at fault was prosecuted and fined Rs. 50. He has been dismissed from the service of the railway.

A serious accident occurred on the 23rd July 1917, between Ghunsore and Pindrai stations on the 2' 6" gauge section of the Bengal-Nagpur Railway in which 20 persons were killed and 56 injured.

The accident was due to a passenger train being held up between these two stations by a breach in the line. The train staff, after sending to the nearest station to ask for assistance, temporarily repaired the breach and permitted the train to proceed at an excessive speed without taking any of the precautions laid down in the rules. After running about five miles, the passenger train met and collided with the train which had been sent out to its assistance.

The guard of the passenger train who was primarily responsible for the accident was prosecuted and sentenced to 3 months' rigorous imprisonment.

On the 13th August 1917, a serious collision took place at Yermaras station on the Great Indian Peninsula Railway between an Up Troop Special and a Down Goods train. In the troop special five British soldiers were killed and five British and two Indian officers and thirty British soldiers and one Indian soldier injured. A fireman and three brakemen in the troop special were also injured. No one was injured in the Goods train. The rolling-stock was also considerably damaged.

The accident was due to the driver of the troop special running against the Outer and Home signals.

The Driver who was in fault was prosecuted and sentenced to 6 months' rigorous imprisonment and a fine of Rs. 300 or in default to a further three months' rigorous imprisonment.

On the 29th September 1917, the engine of a goods train ran into and was derailed by a boulder in the Parsik Tunnel on the Great Indian Peninsula Railway which had fallen from the roof of the tunnel on to the up road. The stationary train was subsequently run into by an Up Local which was following, resulting in the death of four porters who were travelling in the front brakevan of the goods train and injuries to two others. Two passengers in the local train also received slight injuries.

The goods train and the local train were running on " Authorities to proceed without line clear " owing to a failure of the block instruments. The Great Indian Peninsula Railway rules, subject to certain precautions which include a warning to drivers not to enter tunnels till it is ascertained that the line is clear, permit trains to follow one another, on the section between Bombay and Kalyan at intervals of 5 minutes. The case was the subject of exhaustive departmental and judicial investigations as a result of which the driver of the Up Local was fined Rs. 100.

CHAPTER IV.

NEW CONSTRUCTION AND ENGINEERING WORKS.

(a) Mileage.

During the year 1917-18, 402·56 miles of railway were opened to traffic bringing the total mileage open (after allowing for dismantlements, and minor corrections due to realignments, etc.) up to 36,333 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 ...	8·32	...	...	...	8·32
State lines worked by Companies ...	...	2·29	...	...	2·29
Branch line Companies' railways under guarantee terms, worked by the Branch line Companies.	...	...	75·20	...	75·20
Branch line Companies' railways under guarantee terms, worked by the main line.	...	...	8·31	...	8·31
Branch line Companies' railways under rebate terms, worked by the main line.	19·42	...	21·83	...	41·25
Branch line Companies' railways under guarantee and rebate terms.	...	56·68	...	...	56·68
Unassisted Companies' lines ...	...	...	7·70	...	7·70
District Board lines ...	3·86	...	...	...	3·86
Native State lines worked by Native States.	...	102·95	...	14·72	117·67
Native State lines worked by the main line	...	37·91	39·87	...	77·78
Companies' lines guaranteed by Native States.	...	...	3·50	...	3·50
TOTAL ...	31·60	199·63	156·41	14·72	402·56

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

Gauge.	MILEAGE OPEN AT THE END OF									
	1909.	1909.	1910.	1911.	1912.	1913-14.	1914-15.	1915-16.	1916-17.	1917-18.
5' 6" ...	15,951	16,379	16,701	17,016	17,159	17,641	17,827	18,060	18,182	17,876
3' 3½" ...	12,863	13,323	13,530	13,759	14,165	14,389	14,552	14,871	14,806	14,089
2' 6" ...	1,394	1,443	1,436	1,632	1,692	2,174	2,402	2,539	2,683	2,839
2' 0" ...	368	415	432	431	438	452	504	563	615	629
TOTAL ...	30,576	31,490	32,079	32,839	33,484	34,656	35,285	35,833	36,286	36,333

The decrease in the 5'6" gauge mileage during the year is due to the dismantling of the whole of the Sutlej Valley railway and small portions of the North Western, East Indian, Madras and Southern Mahratta and Oudh and Rohilkhand Railways, the materials of which were required by Government in connection with the prosecution of the war.

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' 0" gauge.	Total.
	Miles.	Miles.	Miles.	Miles.	Miles.
State lines worked by Companies ...	389.07	53.37	9.01	...	451.45
Branch line Companies' railways under guarantee terms, worked by the Branch line Companies.	...	...	45.50	...	45.50
Branch line Companies' railways under guarantee terms, worked by the main line.	...	74.11	...	...	74.11
Branch line Companies' railways under rebate terms, worked by the main line.	14.30	...	168.44	...	182.74
Branch line Companies' railways under guarantee and rebate terms.	...	13.17	...	...	13.17
Companies' lines subsidized by the Government of India.	...	5.31	...	...	5.31
Unassisted Companies' lines ...	...	...	20.50	...	20.50
District Board lines ...	...	91.69	...	...	91.69
Native State lines worked by Native States.	...	379.16	23.75	10.00	412.91
Native State lines worked by the main line.	...	167.23	131.79	...	299.02
TOTAL ...	493.37	781.01	398.99	10.00	1,598.40

Work on most of the new lines comprised in this statement 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.

(b) Lines Opened during the Year.

This railway, 6.88 miles in length on the 2' 6" gauge, is an extension of the Gaekwar's Dabhoi Railway from its terminus at Masor Road to Jambusar, and thus connects the Bombay, Baroda and Central India Railway, Broach-Jambusar Line (2' 6" gauge) with the Gaekwar's Dabhoi system.

This branch line, 34.93 miles in length, on the 2' 6" gauge connects Bilimora station on the Bombay, Baroda and Central India Railway in the Narsari district of the Baroda State with the village of Kala-Amba in the Vana taluka. It will serve a considerable pilgrim traffic to the "Unai Mata" temple and the hot water springs of Unai, while it also passes through a considerable amount of forest land from which timber, fuel, grass, etc., will be exported.

Bilimora-Kalamba Railway.

The Suramangalam-Salem Railway, 3.86 miles in length, on the 5' 6" gauge, was built by the South Indian Railway Company from funds furnished by the Salem District Board. It connects Suramangalam (Salem Junction) on the broad gauge system of the South Indian Railway with the important town of Salem, a weaving centre with a population of about 59,000 inhabitants.

Suramangalam-Salem Railway.

The Kalighat-Falta Railway, 2' 6" gauge, 25.33 miles in length, has been constructed under the guarantee terms of the Branch Line Terms Resolution. The point of commencement is, at present Goleshapur, a temporary station on the Budge-Budge branch of the Eastern Bengal Railway, but the Branch Line will eventually be connected with the latter railway at Majherat station, the provision of a new site for which is under consideration. The Kalighat-Falta Railway will serve an important suburban passenger traffic in the outskirts of Calcutta.

Kalighat-Falta Railway.

The Bankura-Damoodar River Railway, 2' 6" gauge 59.95 miles in length was financed and constructed by a private Company under the guarantee terms of the Branch Line Terms Resolution No. 457-R.P., dated 14th November 1913. The Branch line forms a feeder to the Bengal-Nagpur Railway, which it joins at Bankura station, running thence in a general south easterly direction parallel to the Damoodar River. It will provide with railway communication a rich and densely populated tract, hitherto practically cut off from all important marts by the river Damoodar. Construction was sanctioned by the Railway Board in May 1914, and the Bankura-Indas section, 42.34 miles in length, was opened to traffic in December 1916, and the third and last section from Fakirpur to Rainagar in June 1917.

Bankura-Damoodar River Railway.

The opening of this extension in the Punjab completes the Phagwara-Rahon branch of the Hoshiarpur Doab Railways. It starts from Nawashahr, a station 22 miles east of Phagwara, on the main line of the North Western Railway, and runs in a northerly direction for 19½ miles to Jaijon, which is situated at the west of a much frequented pass through the Siwalik hills, on the route for pilgrim traffic to Hardwar and Thanesar.

Nawashahr-Jaijon Extension.

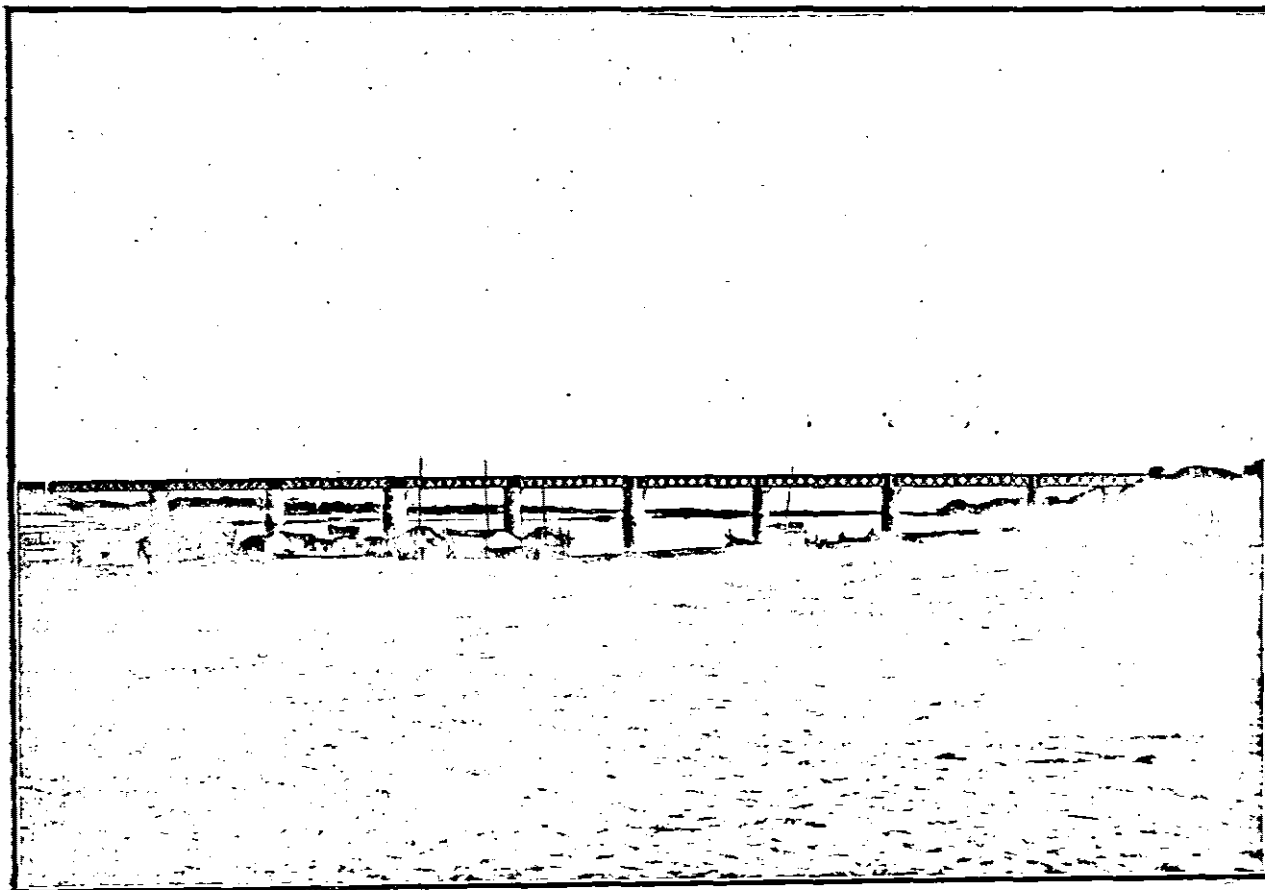
Jaijon is an important collecting and distributing centre for trade from the Sohan and Upper Sutlej valleys and a considerable traffic both in passengers and goods is anticipated.

The Mohari-Barauli Railway, 15·25 miles in length on the 2' 6" gauge, was originally constructed by the Imperial Delhi Committee for the carriage of stone from Barauli in Sirmattua State for use on works in connection with the Delhi City Project. Subsequently in March 1917 the Government of India accorded sanction to its being used for public traffic and it is now worked in conjunction with the Dholpur Durbar's Dholpur-Bari Railway of which it forms a branch.

The Mymensingh-Bhairab Bazar Railway, 101·10 miles long on the metre gauge, is the only line hitherto constructed under the combined guarantee and rebate terms of the Branch Line Terms Resolution which were introduced in Resolution No. 969-R.P., dated 13th March 1914, see Appendix No. 33.

The railway which is being worked by the Assam-Bengal Railway Company commences at Bhairab Bazar, a station on the Assam-Bengal Railway, situated on the right bank of the Megna river, which is connected by wagon ferry with Ashuganj station on the left bank.

From Bhairab Bazar the alignment proceeds due north for 61·46 miles to Gaurigram Junction, when it turns due west for 11 miles to Mymensingh, a station on the Eastern Bengal Railway, crossing the old Brahmaputra river near Mymensingh by a bridge of 9 spans of girders of about 100 feet span.



General view of the old Brahmaputra Bridge—Mymensingh-Bhairab Bazar Railway in Eastern Bengal.

From Gaurigram Junction, the line from Bhairab Bazar continues due north for 5 miles to Shamganj Junction, and then turns north-east for 10 miles to Netrakona, a trading centre on the Mogra river. There is also a branch 13·17 miles in length from Shamganj Junction running due north to Jaria Jhanjail on the Kongsa river. The country traversed by the railway is everywhere flat and low lying, being densely populated, and completely cultivated, chiefly with jute and rice, the jute crops being of exceptional importance.

The Dasghara-Jamalpurganj Railway, 8·31 miles in length, on the 2'6" gauge has been constructed by the Bengal Provincial Railway Company, under a concession granted under the Branch Line

Dasghara-Jamalpurganj Branch.

Terms Resolution. It will tap the country lying on either side of the Damoodar River from Mohunpur (about 3½ miles from Dasghara) to Hubatpur (at the bend of the river near Rasulpur), and will open up the important marts at Kalna, Jamalpur and Kalera which are situated on the banks of the river.

The Ahmadpur-Katwa Railway commences at Ahmadpur station, East Indian Railway, and takes an easterly course with a southern tendency until it joins the branch of the East Indian Railway running from Azimganj to Katwa, at a point about 2½ miles from Katwa. From this point the two gauges are carried over the existing Adjai Bridge, separating again when entering Katwa Junction, where the narrow gauge terminates in the existing narrow gauge station of the Burdwan-Katwa Railway. The line was made chiefly for the purpose of developing passenger traffic, the density of the population of the tract which it serves being 600 per square mile.

The Pulgaon-Arvi Railway (2' 6" gauge), length 21·83 miles, was built under the Branch Line Terms by the

Pulgaon-Arvi Railway.

Agency of the Great Indian Peninsula Railway for the Central Provinces Railway Company. It was opened to traffic on the 25th September 1917.

The construction of a line from Laki to Tank, as a branch of the Kalabagh-Bannu Railway, was undertaken with the object of linking up the important frontier station of Tank with the North Western Railway System. The line which is 46·48 miles was opened to passenger traffic in October 1917.

The Bodeli-Chhota Udaipur Railway is an extension of the Miyagam-Bodeli Section of His Highness the Gaekwar's

Bodeli-Chhota Udaipur Railway.

Dabhoi Railway and connects Bodeli with the town of Chhota Udaipur, the capital of the State of that name. It has been constructed by the Bombay, Baroda and Central India Railway on behalf

of the Baroda and Chhota Udaipur Darbars who have contributed equally to the cost of the work. For 10 miles from Bodeli the soil of the country traversed is rich and under cultivation. Beyond that it is sparsely cultivated and is mostly covered with jungle consisting principally of teak, mowra, mangoe and temburni trees.

The Mysore-Arsikere Railway, 102·95 miles in length, is the first metre-gauge line to be financed and constructed by the Mysore State since the formation of that state of its own Railway Department in 1912. It connects Mysore, the capital of the State, with Arsikere, a station on the Bangalore-Haribar main line worked by the Madras and Southern Mahratta Railway Company. The line provides railway communication with the important trade centres of Hassan, Holeversipur and Yedatore.

The Quilon-Trivandrum Railway, 37·91 miles in length, is an extension of the Travancore State Section of the Quilon Branch of the South Indian Railway, and connects Trivandrum, the capital of the State, with the South Indian Railway system. The line has been constructed by the Agency of the South Indian Railway on behalf of the Travancore Durbar.

The construction of a light railway between Bangalore and Chikballapur, in Mysore State, was undertaken by the Bangalore-Chikballapur Railway. Mysore Durbar for a private company. The line is notable as being the first example of a railway in Mysore territory to be financed by local private enterprise and constructed under a guarantee from the Government of the State.

It provides a narrow gauge connection between Bangalore City *via* Yesvantpur and Yelahanka stations on the Madras and Southern Mahratta Railway and Chikballapur, an important town of some 12,000 inhabitants situated about 35 miles northwards of Bangalore; it will there link up with the Kolar-Chikballapur extension of the Kolar District Railway, the two lines together forming a loop between Bangalore and Bowringpet of over 100 miles in length.

The section between Yelahanka and Chikballapur was constructed by the Mysore Durbar on behalf of the Bangalore-Chikballapur Light Railway Company and that from Bangalore to Yelahanka by the Madras and Southern Mahratta Railway Company on behalf of the Mysore Durbar.

The section from Yelahanka to Devanballi was opened for passenger traffic on the 7th April 1915, that between Devanballi and Chikballapur on the 1st August 1915, and the mixed gauge section between Yesvantpur and Yelahanka was opened on the 1st February 1917. The last section between Bangalore and Yesvantpur was opened on the 7th January 1918.

(c) New construction financed by Private Enterprise and District Boards.

The construction of branch lines with capital provided by companies floated in India and by District Boards or other local bodies is governed by the terms of the Resolutions reproduced as appendices Nos. 32 to 34 of Volume II of this report. The Branch line terms, as they are now generally called, have undergone no change during the year under review, but the question of their revision will have to be considered when the war is over. As they stand at present their main feature is the grant by the Government of India of financial assistance to Companies or local bodies obtaining concessions for the construction of feeder lines to existing railways in one or other of the following forms:—

- (1) a firm guarantee by Government of a return of $3\frac{1}{2}$ per cent on share capital as actually paid up;
- (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.

Concessionaires are also given the option, 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, in consideration 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 share capital. There is however little doubt that these concessions will not be sufficiently attractive to investors under the altered conditions which would govern the money market, and that revised terms will have to be drawn up.

As was explained in the report for last year, it was found to be necessary during 1916, owing to unfavourable conditions in the money market and the impossibility of obtaining rails and other materials either locally or from England, to prohibit generally the construction of railways under the Branch Line Terms. This prohibition must necessarily remain in force till the end of the war, and it has only been relaxed in the case of projects considered to be of sufficient urgency to be undertaken in spite of the unfavourable circumstances at present existing.

No concessions have therefore been granted during 1917-18 either to Companies or to local bodies for the construction of new railways; but it has

been the policy of the Railway Board, in order that there may be no delay in resuming a full programme of new construction on the return of normal conditions after the war, to carry on negotiations with Branch line promoters so far as is possible during the war in regard to projects which were already under consideration or might be put forward. In accordance with this policy the Railway Board had under their consideration when the year closed, proposals for the construction of a number of railways in all parts of India covering an aggregate mileage of 3,708 and involving a total expenditure of close upon 14½ millions sterling.

(d) **Important Lines Under Construction.**

The whole project 238 miles in length, will when completed form part of a direct through North and South broad gauge connection but as so far constructed it furnishes an additional outlet for the traffic of the Pench Valley Coal Fields, an important source of coal supply in the present difficulties caused by the war.

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 traffic in September 1914.

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

On the Southern Section, Amla to Nagpur (103·74 miles), the work on tunnels, earthwork and bridgework is in hand only on Division No. 3 (Amla to Pandhurna), the remaining work on this Division and all works on Division No. 4 (Pandhurna to Nagpur) being postponed till the end of the war.

The construction of the Bombay Overhead Connection involves much heavy work in the heart of the city and will when completed provide an easy rapid communication for traders, passing between the business centre of Bombay in the vicinity of Victoria Terminus across the great Indian Peninsula Railway Goods Yard at Wadi Bunder to the grain warehouses and cotton market near Mazagaon on the Harbour Branch Railway.

Owing to the difficulty of obtaining girder work it is not possible to say when this line will be opened.

The Secunderabad-Gadag Railway which is being constructed by the Nizam's Guaranteed State Railways Company, is the property of His Exalted Highness the Nizam's Government. When completed it will afford an outlet to the port of Mormugoa from the southern parts of the 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.

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 Road, 33·10 miles, on the 1st April 1917. Owing to the non-delivery of permanent-way material the construction of the remaining section has been deferred till the end of the war.

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

(e) New Construction in Native States.

The progress of new construction in Native States has also been retarded partly owing to the difficulty in obtaining permanent-way materials and rolling-stock, and partly owing to 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. A line of railway, 11·68 miles in length, from Choranda to Koral in the Baroda territory, and a tramway, 10 miles in length, from Tadasa to Hebbe in Mysore have, however, been sanctioned during the year under review. The following table gives a complete list of railways which were under construction in Native States during the year:—

Railways.		Baroda State.	Length in miles.
1.	Choranda-Koral (2' 6" gauge)	...	11·68
2.	Bhoyani Road-Bechraji (metre gauge)	...	21·30
3.	Motipura-Tankhala (2' 6" gauge)	...	26·29
4.	Okhamandal (metre gauge)	...	37·02
5.	Samlaya-Timba (2' 6" gauge)	...	33·34
Bhavnagar.			
	Savar Kundla-Mahuva with branch to Port Albert Victor (metre gauge)	...	54·30
Cutch.			
	Anjar-Bachan (2' 6" gauge)	...	23·75
Hyderabad.			
	Wanaparti Road-Gadwal (metre gauge)	...	13·45

			Length in miles.
Jaipur.			
1. Reengus-Sikar (metre gauge)	...	...	30.97
2. Sikar-Jhunjuu (metre gauge)	...	...	39.85
Junagad.			
Veraval-Una (metre gauge)...	...	...	56.91
Mysore.			
1. Tadasa-Hebbe (2' 0" gauge)	...	...	10.00
2. Chickjajur-Chitaldrug (metre gauge)	...	...	21.07

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, Malerkotla, 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 5,027 miles, distributed between the various gauges as under :—

	Miles.		Miles.
5' 6" gauge	... 962	2' 6" gauge	... 562
3' 3½" gauge	... 3,201	2' 0" gauge	... 302

(f) Open Line Improvements.

The special map which accompanies this report shows where the larger open line works were in progress during the year under review. The conditions which have made it necessary to keep down Capital expenditure since 1915 still prevailed during the year under review, but the larger volume of traffic which Indian Railways have been called upon to deal with in their function of a line of communications for military operations overseas has necessitated a partial withdrawal of this restriction. The more important works now in hand are noted in the following paragraphs.

The quadrupled lines from Bombay to Kalyan were, as was mentioned in last year's report, opened throughout just before the commencement of the year under review, and the work is now nearing completion; two further sections of the Shegaon-Nagpur doubling were opened during 1917-18, namely, from Dhamangaon to Dahegaon, 22.24 miles on the 10th May 1917, and Dahegaon to Dhatra, 3.11 miles on the 12th March 1918. The work on the Bombay-Kalyan quadrupling will, it is hoped, be finally completed before long.

An important project for doubling the East Indian Railway Grand Chord line from Dhanbad to Moghal Sarai was started during the year; for some time it

has been realised that this would be necessary before long but the difficulties that have arisen from the diversion of the coal traffic from the sea coast to the rail route have shown that it could not be further deferred. It is, however, unlikely that permanent-way will be available for some time to come. The total estimated cost of this doubling from Dhanbad to Gya is put at Rs. 71,61,082, but it has been calculated that the effect will be to save over 20 million vehicle miles on the coal traffic alone, which is equivalent to the addition of about 1,000 wagons to the stock of the line. It is also estimated that the reduction in ton mileage which will result will save nearly 11 lakhs per annum in working expenses. On the same railway the difficulties of dealing with the coal traffic in the immediate neighbourhood of the coal-fields have made it necessary to undertake at once the provision of certain additional facilities (such as the improvement of junction stations, doubling of congested sections, etc., etc.) estimated to cost Rs. 28,33,340, between Dhanbad, Katrasgarh and Gomoh.

In the last report it was mentioned that it had been decided to convert to the broad gauge the Santahar-Parbatipur Section of the Eastern Bengal Railway and that work had been put in hand on formation and masonry of bridges. The work is still in progress; meanwhile plans and estimates which were prepared some years ago are being brought up to date in order to allow of the entire project being completed as soon as circumstances permit.

On the Burma Railways the construction of a loop line estimated to cost over 3 lakhs of rupees on the east side of the Pazundaung Creek from Togyauungalle station to the Dawbon Lift Bridge was put in hand during the cold weather to provide against the possibility of a break in the main line near Rangoon by the failure of the existing bridge over the Pazundaung Creek, a movement in the piers of which has given rise to considerable anxiety. The renewal of the bridge itself is necessarily postponed owing to the dearth of steel.

The site for the proposed bridge over the Ganges at Mokameh, mention of which was made in the last report is still under investigation, but orders have been given for the preparation of estimates for this work, as it is realised that this project must take an early place in the larger schemes of improvement to be undertaken after the war.

Only one scheme of some magnitude was sanctioned during the year under review, *viz.*, certain additions and alterations in the goods yard at Bhusawal, Great Indian Peninsula Railway, at an estimated cost of Rs. 8 lakhs; but progress was made with the following important remodelling schemes previously sanctioned:—

- (i) Bezwada on the Madras and Southern Mahratta Railway.
- (ii) Amritsar on the North Western Railway.

- (iii) Bandra and Ahmedabad on the Bombay, Baroda and Central India Railway.
- (iv) Nagpur and Nangaon on the Great Indian Peninsula Railway. The work on the remodelling of Kalyan station and yard is almost completed.

The extensive work of remodelling the Lahore station yard on the North Western Railway is practically complete, but the alterations to the station building have had to be held in abeyance at present for want of materials.

The existing accommodation at Madras Beach Station being very limited, it has been decided to enlarge this station so as to meet the joint requirements of the Madras and Southern Mahratta and South Indian Railways. The required land has already been acquired, and the preparation of detailed estimates of the cost of the project is now in hand.

The workshops provided at Kanchrapara at the time of the original construction of the Eastern Bengal Railway, having been found to be inadequate, separate shops have been erected for Carriage and Wagon Work. A scheme for the improvement of the Locomotive shops at an estimated cost of Rs. 27½ lakhs, was put forward by the Eastern Bengal Railway Administration, but sanction has been accorded to the construction of only a new Smithy and Foundry, the necessity for which was immediate, and the complete project is still under consideration.

This has been subject to breaches almost throughout its length since it was opened 5 years ago. It has therefore been decided to provide additional waterways and protection works to render the line immune from damage by floods in future, and the work is being pushed on as rapidly as possible.

During the year under review the telephone system of train control was introduced on the following sections :--

- Train control.**
- (i) Chakardharpur to Jharsuguda on the Bengal-Nagpur Railway,
- (ii) Bhusawal to Harda on the Great Indian Peninsula Railway, 141 miles.

There are proposals for the extensive adoption of this system on long lengths of the Great Indian Peninsula, North Western, Bengal-Nagpur, and Madras and Southern Mahratta Railways, but owing to the difficulty of obtaining copper wire and the special instruments required, the progress can only be slow.

Four hundred and twenty-three miles of open line track were dismantled during the year under review, in order to provide rails for military railways.

Dismantling of Open Lines.

CHAPTER V.

ROLLING-STOCK AND MATERIALS.

(a) Construction of Rolling-Stock in India.

In view of the difficulty of obtaining new rolling-stock or complete materials for it from abroad, and of the embarrassment caused to railways by the large demands for transportation of coal and military traffic, particular attention was paid during the year to possibilities of relieving the situation by the construction of additional stock in India. In addition to the 150 "all wooden" wagons built on the 4' 8½" gauge for Mesopotamia as mentioned in Chapter I, 100 similar wagons were built by the Bengal-Nagpur and Eastern Bengal Railways for broad gauge coal traffic, all these being built entirely of Indian material with the exception of wheels, axles, springs and draw and brake gear. Orders were also placed with Messrs. Burn & Co. for the construction of 1,500 broad gauge covered goods wagons with wooden bodies; wheels and axles for these wagons had to be arranged for from England and certain other fittings such as plates, springs and draw gear, etc., from America, but the remaining material is all being obtained in India; none of these wagons were completed during the year under review, but good progress is now being made and the first 500 will, it is anticipated, be in use before the end of December 1918.

(b) Carriage of Kerosine Oil in bulk.

Towards the end of the year 1916-17, the supplies of tin required for the distribution of kerosine oil began to run short and urgent measures became necessary to allow of a largely increased quantity of oil being carried in bulk from the ports to depots up-country. The larger railways immediately undertook a considerable programme of construction of bulk-oil wagons and the East Indian Railway alone turned out 181 of these during the year.

(c) Cold Storage Transportation.

In the last report it was indicated that certain preliminary steps had been taken with a view to improving the carriage of perishable commodities in cold storage by rail. The trials on the Eastern Bengal Railway then referred to, have resulted in the production of two efficient types of cold storage cars, one for the conveyance of fish, meat and similar commodities, and the other for fruit and vegetable perishables. Ice compartments are provided at one or both ends of these cars, but in those designed for the transportation of fruit, it is also necessary to provide specially for adequate ventilation as, apart from temperature, the carbon dioxide given off by fruit hastens its decomposition.

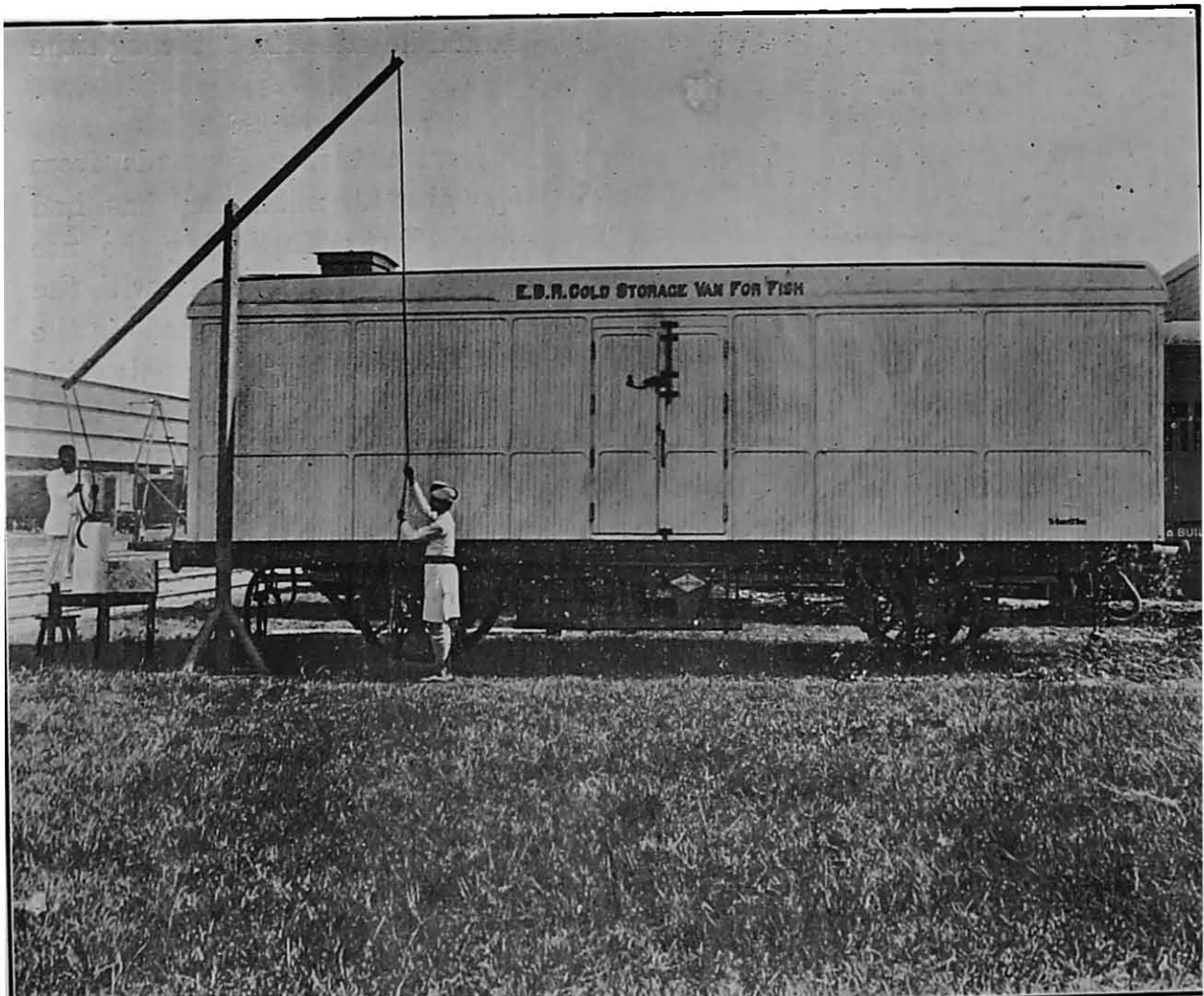
The insulation of these vans is effected by packing a layer of Simul or tree cotton 8" thick between the inner and outer bodies of the vans. This insulating

material has proved superior to, and more efficient than, numerous others tried. In these vans fruit can now be sent from Quetta and Peshawar to Calcutta and over other distances of equal length; the fruit arriving at its destination in excellent condition, whilst fish also has been satisfactorily carried over distances of 600 miles and upwards.

During the hot weather the cost of carriage of fish in cold storage vans is about 50 per cent higher than the full parcel rate for the same weight of the fish itself, but it is about 18 per cent lower than that for fish in boxes and ice in ordinary vans, and in addition insures the full value of the fish being obtained at its destination.

In the cold weather fish can normally be railed without ice in ordinary vans, with no very great risk of decay *en route*, at about four-fifths of the cost of sending it in insulated vans, so that although the 20 per cent extra freight definitely insures arrival in perfect condition, it is doubtful if merchants will pay this rate of insurance. The extended adoption of these cold storage vans is now being encouraged as far as possible and considerable development is anticipated.

A photograph of the cold storage van for fish is reproduced in this report and shows the opening in the roof of the van through which the ice is introduced.



Cold Storage Transportation—Fish Van built by the Eastern Bengal Railway.

(d) **Rail Motor Coaches.**

Working of the Simplex Rail Motor Cars on the South Indian Railway has continued to show satisfactory results. The cost per mile run has risen from Re. 0-4-4 to Re. 0-5-2, but when it is considered that the cost of spirit has risen from Re. 0-15-0 to Re. 1-6-7 (these being averages for the years under consideration)—the working costs may be considered to have slightly improved. The total mileage run by the two cars has risen from 24,699 to 33,371, but the number of failures has remained the same, namely seven, whilst the mileage per gallon of spirit has risen from 6·59 to 6·99.

(e) **Supply of Materials from the United Kingdom.**

The last two reports indicated the difficulty experienced in obtaining supplies of essential materials for railway repairs and showed that an organization had been set up which required all railway indents for materials

Scrutiny of Railway Indents.

from the United Kingdom to be submitted for the Railway Board's scrutiny before

transmission to England.

A similar procedure had been adopted in the case of priority applications from firms, the general rule being that these should be submitted through the Agent of the railway placing the order.

This system has worked well, and, apart from reducing demands from abroad to an absolute minimum, has had the beneficial effect of furthering the use of indigenous materials. As the Railway Board are in constant touch with the Indian Munitions Board, they are fully aware of the latest progress made in the local manufacture of materials and substitutes and are able to apply this knowledge to indents under scrutiny with the result that no demand is passed for which any possible substitute can be found in India. The dissemination of this knowledge to all railways naturally tends to foster local enterprise.

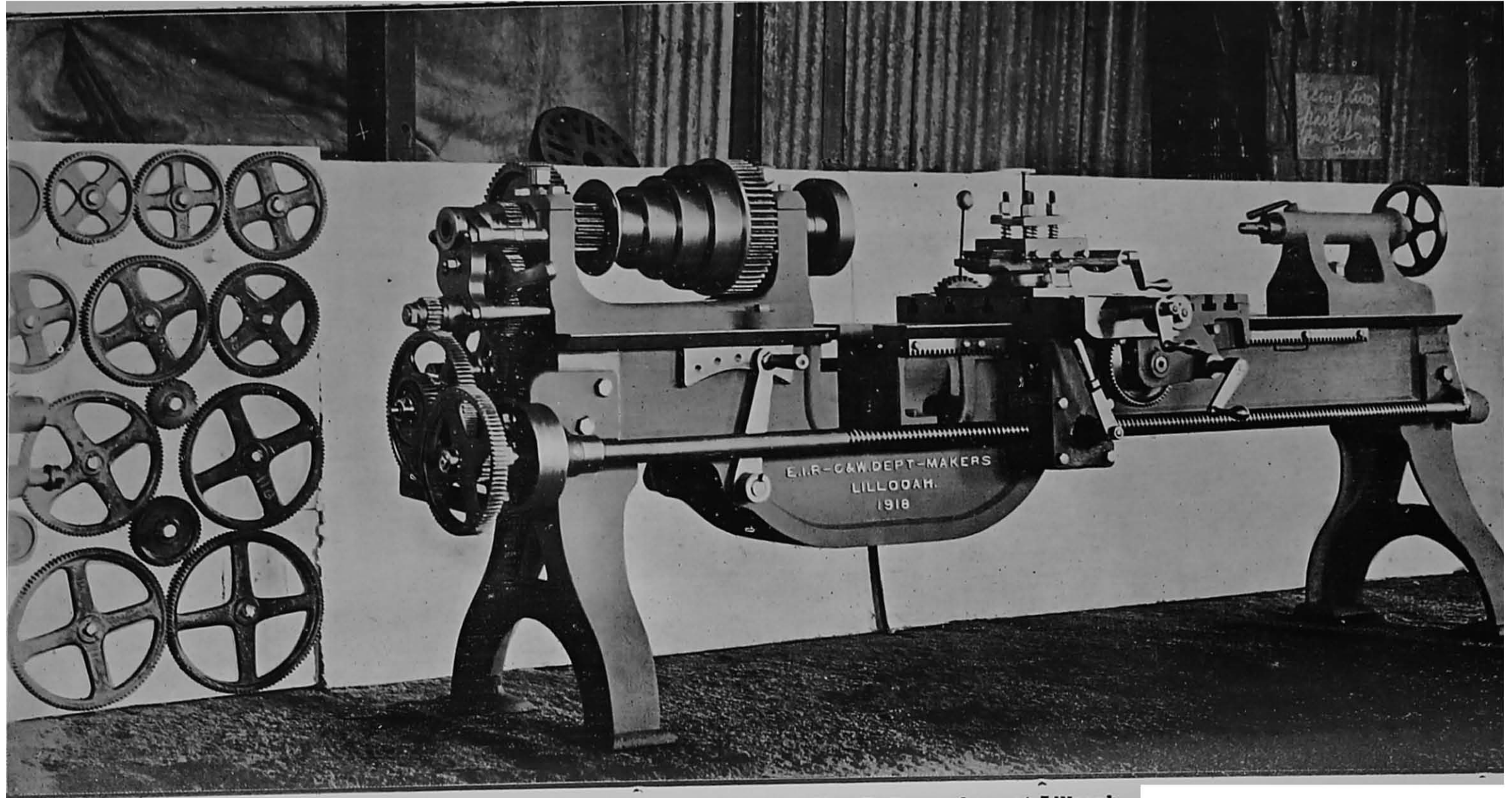
Difficulties, however, arose in certain cases, for as these demands were also limited to the railways' actual minimum

Firms in India Permitted to Indent for Stock.

requirements, it became evident, as time went by, and stocks of railway materials held by firms became seriously depleted, that if established trade in India was to be maintained some relaxation of the rules was necessary. This has now been effected by permitting firms to put in priority applications for an equivalent of six months stock of essential imported materials.

It was found, however, that even the reduced demands of railways could not be met in certain cases where the demand exceeded the supply. This was notably so in the case of the steel industry whose resources have been taxed to the

Schedule Allotment System.



Lathe manufactured in the East Indian Railway shops at Lillooah.

utmost owing to the war and it thus became necessary to introduce what is known as the "Schedule Allotment System." This schedule is comprised of certain essential steel products for railway use, such as steel plates, steel castings, wheels and axles, etc., in respect of which India is rationed by the Ministry of Munitions. The total yearly allotment is divided up and distributed amongst the different railways by the Railway Board. As already mentioned, owing to war exigencies the allotments are not always up to requirements, but the system has the great advantage of guaranteeing the supply of vital materials in good time.

(f) **Distributing Agency at Bombay.**

In August 1917 the "S.S. Dunera" arrived at Bombay with a large consignment of materials purchased from the Chinese Government by His Britannic Majesty's Minister at Peking on behalf of the Government of India; the distribution of this material to different railways, was undertaken by the Agent, Great Indian Peninsula Railway under the orders of the Railway Board.

The advantage of a Distributing Agency at Bombay became so apparent that it was decided to extend its scope to embrace certain classes of English stores arriving on indents of which the scarcity was marked and which it was desirable to pool amongst the various railways. Red lead, white lead, tin sheets, cells and sections and fans are some of the more important articles being dealt with in this way and the addition of others is contemplated.

(g) **Methods Introduced to make Railways more Self-supporting.**

The difficulty of obtaining finished materials from Europe has resulted in most railways making efforts to become more self-supporting, and many lines are now constructing machine tools for use in their workshops. In last year's report an illustration appeared showing spring steel rolls manufactured by the Great Indian Peninsula Railway and several railways are now constructing their own lathes; an illustration of a lathe constructed in the East Indian Railway shops at Lillooah appears in this report. The North Western, Madras and Southern Mahratta and East Indian Railways are recutting and retempering files and arrangements have been made for other lines to send them not only their files for renovation but also foremen and mechanics to learn the work.

Paint grinding and file cutting machines also are being constructed in railway workshops. The East Indian and Great Indian Peninsula Railways are also manufacturing paints from local slates, clays, etc., with considerable

success. It may be mentioned that the colours of mail vans and passenger stock have been modified in many instances to obviate the necessity of using red or white leads which are not obtainable in adequate quantity in India.

Buffers are being manufactured from channel-iron and other scrap, and machines have been designed and constructed in railway workshops for rolling spring plates from scrap tyres; this has helped considerably to relieve difficulties which the shortage of spring steel has occasioned.

Experiments with cast iron broad gauge wagon wheels are also being made on one railway, the results of which are awaited with interest.

CHAPTER VI.

STAFF.

(a) Provident Funds.

For some time past the Government of India have been considering the question of the general improvement of the conditions governing the Provident Funds of Indian Railways. With the approval of the Secretary of State they decided in October 1917 that the existing rate of subscription of 1-12th of the salary of the employé should be continued, that the contribution from the railway of an amount equal to the subscription should be allowed with retrospective effect, and that interest on deposits be guaranteed at the rate of 4 per cent. per annum with effect from 1st April 1914 in the case of State-worked railways and also in the case of four Company-worked railways, *viz.*, Assam-Bengal, Bombay, Baroda and Central India, Great Indian Peninsula and Madras and Southern Mahratta Railways whose provident fund securities have been taken over by Government. They also decided that, subject to certain limitations, the 100 per cent. bonus above referred to carrying interest, should be credited to each subscriber *from the date of commencement of service* not on the subscriptions actually paid by him but on those which he would have paid if *throughout* his service his rate of subscription had been $8\frac{1}{2}$ per cent of salary. In addition to this concession the Government of India decided to grant gratuities to gazetted officers for good, efficient, faithful and continuous service with effect from 1st April 1916. The subordinates had been granted this concession six years ago and it was considered necessary to grant gratuities to superior officers also. The conditions of eligibility and of the amount admissible differ in the two cases.

Reference has been made above to the provident fund securities of some of the Company-worked lines having been taken over by Government. A word of explanation appears to be necessary. As a result of the war the provident fund securities of the Company-worked railways had depreciated in value and it was considered necessary to devise means to protect the subscribers from loss. Two alternative proposals were put before the Companies. The Assam-Bengal, Bombay, Baroda and Central India, Great Indian Peninsula and Madras and Southern Mahratta Railways adopted the scheme under which their provident fund securities were taken over by Government. The Burma, Bengal-Nagpur,

East Indian and South Indian Railways adopted the alternative scheme under which the undertakings guaranteed to make good, if and when the provident funds are wound up, any deficiency in the sale price of the securities held on 31st March 1914 as compared with the purchase price, subject to certain conditions. These latter companies have since reconsidered their decisions in this matter and they may possibly adopt the first alternative of handing over their provident funds to Government. In fact, the East Indian Railway has already accepted the first alternative. The Bengal and North-Western and Rohilkund and Kumaon Railways have been permitted, subject to certain conditions, to neutralise depreciations by an annual charge for 15 years from 31st December 1917 against the joint working expenses of the Companies and State lines.

In all these cases the object aimed at has been to avoid the necessity of debiting individual accounts with the amounts represented by an extraordinary temporary fall in the value of securities due to the war.

(b) Strikes.

The year 1917-18 did not pass without clear evidence of unrest amongst the railway staff, and at different times in the course of the year the men of certain departments of the Great Indian Peninsula and Oudh and Rohilkhand Railways went out on strike.

On the 25th June 1917 about 5,000 workmen of the Great Indian Peninsula Railway's Carriage and Wagon Shops at Matunga struck work. The strikers endeavoured to persuade the staff of the Locomotive shops at Parel to join them, but were unsuccessful. The gates of the shops were closed, but the strikers forced them open stoning the officers who tried to reason with them. Fifty rank and file of the Railway Battalion of the Indian Defence Force were turned out and the strikers then retired but stoned passing trains finally holding up a local train which they boarded, and in it left for Bombay. The men at Bombay were met by the City Police and were told to submit their grievances through the proper channel, and they then dispersed. They promised to return to work the following day, but failed to do so and the shops were therefore closed till the 29th June when the men returned to work.

On the 18th July 1917 a large number of workmen in the Great Indian Peninsula Railway Locomotive shops at Parel struck work. Neither the Agent nor the Locomotive Superintendent had received any representation from the men as to what their grievances were. The Parel operatives tried to induce the workmen of the Railway's Carriage and Wagon Shops at Matunga to join them, but at first were unsuccessful. The Matunga workmen, however, joined their fellow-workers on the 24th July 1918. It was subsequently ascertained that the men demanded grain compensation and an enhancement in the rate of wages.

From about the 8th of August until the strike ended on the 21st, assistance was afforded to the strikers by certain outside organizations which raised a considerable amount of money by subscription, and opened shops for the free distribution of grain and small sums in cash for the relief of the strikers and their families. The strikers were at all times orderly and well behaved, and though the strike lasted for 35 days, no serious casualty occurred and not a single arrest had to be made. Ultimately the strikers appealed to His Excellency the Governor of Bombay, who after looking into the matter, and realizing the fairness with which the men's claims had been met by the Railway Authorities, issued a personal message, recommending the strikers to resume work. This message was given to the Commissioner of Police for communication to the leaders of the strike and on the 21st August the shops were re-opened and the men returned to work.

The strike on the Oudh and Rohilkhand Railway lasted for a very short time only. On the 22nd September 1917 the men in the Locomotive Shops represented certain grievances which the Locomotive Superintendent redressed, but on the 17th of the following month the same men on their way to work were stopped by certain agitators though the *Mistries* were permitted to proceed. Shortly after the men of the Carriage and Wagon shops were called out and while the *Mistries* remained the men left. On their way they passed through the engine shed and intimidation was resorted to. Stones and coal were thrown and some of the shed men were injured with the result that they joined the strikers. A few firemen and one or two drivers followed suit. The Agent and Locomotive Superintendent received a deputation of the men and certain concessions were granted on the understanding that nothing more would be done and the men would turn up at work as usual on the morrow. This they did, and though some men who had only been in the service a few months tried to cause further dissension, they were not listened to.

(c) **Temporary Increase of Pay to Subordinate Staff on Railways.**

In recognition of the extra work thrown on the staff due to the war, an all round temporary increase of 5 per cent. of pay was granted to the subordinate staff on railways drawing pay up to Rs. 600 per mensem with effect from the 1st November 1917 for a period of 12 months and thereafter subject to reconsideration at intervals of 6 months. In addition it has also been found necessary to revise the scales of pay on most lines.

CHAPTER VII.

MISCELLANEOUS.

(a) Coal Department.

In 1917, 18,212,918 tons of coal were mined in India, an increase of about 958,609 tons on the preceding year. **Coal mined in India.** Despatches of coal by the East Indian and Bengal-Nagpur Railways from the coal fields of Bengal and Bihar and Orissa amounted to 14,486,980 tons in the year 1917-18 as compared with 15,108,139 tons in 1916-17.

Including bunker coal, shipments from Calcutta to Indian and Foreign ports in 1917 amounted to 901,125 tons as compared with 1,999,657 tons in 1916 and 2,757,118 tons in 1915.

The State Railways Coal Department inspected 6,912,013 tons of coal in 1917-18 as compared with 6,061,658 tons in 1916-17. **Tonnage of Coal inspected by the Coal Department.** The quantity of coal shipped from Calcutta by the department was 523,513 tons, the greater portion of which was for Admiralty requirements.

Owing to the shortage of labour, due to the bumper-harvest of the preceding year in the districts from which colliery labour is recruited and to the fact that during the rains many collieries had great difficulty in keeping their workings clear of water, raisings fell off considerably and the position of railway coal stocks gave cause for considerable anxiety from September 1917 to February 1918.

The requisition of certain coals imposed in 1916 remained in operation during the period under review. **Government Requisition of Coal.** The prices of requisitioned coal were raised in January 1918 and again in April 1918 and are now very considerably above pre-war rates.

(b) Control of Coal.

As described in last year's report, during 1917 a Coal Supplies Committee under the Chairmanship of Sir Robert Highet, Agent, East Indian Railway,

sat in Calcutta to regulate the distribution of coal to public consumers in India. The Mining Engineer to the Railway Board was a member of this Committee and was also the officer authorized under the Defence of India Act to requisition coal for Government purposes.

Towards the end of the year, it was decided by Government that it was necessary to co-ordinate more closely the work of distribution and requisition, and Mr. G. C. Godfrey, a Member of the Railway Board, was deputed to Calcutta as Coal Controller for this purpose.

Mr. Godfrey took up the work in Calcutta on the 1st November 1917 and the Coal Supplies Committee then ceased to exist. The Government of India desire to record their appreciation of the valuable work done by the Committee, which carried the country through a very difficult time of coal shortage.

A combination of circumstances, such as good rains, a bountiful harvest, consequent delay in labour returning to work in the collieries, and the flooding of many collieries through inability to obtain pumps from England, brought about a serious shortage of coal between September 1917 and the end of January 1918. The result was that there was very considerable difficulty in maintaining supplies of coal for Admiralty shipping, and for the railways of India, and there was constant anxiety lest important mills and industries should have to close down for want of coal.

After the middle of January, the labour began to return to the collieries and the Coal Controller issued notices of restriction as to output, and as to class of labour employed, upon a large number of the smaller workings producing inferior coal — the object being to utilise the labour available for the collieries turning out the better classes of coal.

That these measures were successful is evidenced by the fact that at no time during the good raising months of February and March was there any excess labour unemployed as the result of the restrictions, while the supply of labour at the unrestricted collieries was better than would have been the case had the available colliery labour been distributed all over the fields.

(c) Use of Oil Fuel in Locomotives.

As a result of the successful oil fuel trials held on the North Western Railway, details of which were reported last year, it was decided to continue the conversion of engines to oil burning as rapidly as possible, the intention being to work up to a consumption of 300,000 tons of oil per annum for the North Western and Great Indian Peninsula Railways.

Unfortunately it has not been possible to adhere to the conversion programme owing to the difficulty of obtaining sufficient tankage for the transport of oil from Persia and this cause has limited the consumption to approximately 60,000 tons for this year.

Freight Difficulties.

Full preparations have, however, been made against the return of normal times and as soon as freight is available the rapid conversion of engines will be proceeded with.

The erection of large storage tanks at Karachi is nearing completion and it is interesting to note that these are of a type unique in India. Made of concrete and lined with Pudlo, they have proved very satisfactory, the loss due to percolation being negligible.

Storage Tanks.

This is a matter for congratulation as, owing to the shortage of steel plates the erection of steel tanks would have taken a great deal longer.

(d) Pulverised Coal.

Experiments in the use of pulverised coal are being made on the Great Indian Peninsula Railway. In view of the character of much of the Indian coal the subject is one of great importance, but it has not yet been sufficiently developed to say what the results will be.

(e) Indian Railway Bridge Committee.

At a conference presided over by the Right Honourable Lord Inchcape, G.C.M.G., K.C.S.I., K.C.I.E., at Calcutta in January 1912, it was decided—

“ With regard to the question of the rules under which girders have
 “ now to be designed, that the whole question should be referred
 “ to a committee in which Companies’ officers would be included
 “ to be appointed in India by the Railway Board. It being
 “ understood that the Companies’ Home Boards would be at
 “ liberty to refer the Committee’s report to their Consulting
 “ Engineers and have full opportunity of expressing their views
 “ before the Railway Board issued revised rules on this subject.”

The main points for consideration were :—

- (i) the loads which railway bridges should be designed to carry.
 - (ii) the stresses to be allowed and method of calculation of such stresses.
- On the first point the Railway Board have collected the ideas of Boards of

Directors and Agents of Indian Railways ; as regards the second point there has been delay as progress with consideration of it depended—

- (a) on a report of the discussion on a paper written by Mr. C. W. Anderson (Bridge Engineer, Bengal-Nagpur Railway) for the Institution of Civil Engineers, which was not read till 1915 ;
- (b) on making a suitable officer available for carrying out experiments on " Impact " which the discussion on the above mentioned paper showed to be necessary ; there was considerable difficulty in making arrangements for this during the war.

Eventually a Committee was convened in 1917 with the Chief Engineer of the Railway Board as Chairman, and met at Simla in August 1917 ; as a result of this meeting a report was sent to the Agents of all Indian Railways for an expression of their views. The Committee's report and the views of the Agents, Boards of Directors and their Consulting Engineers are now under consideration by the Railway Board, and a Member of the Committee has been deputed to carry out experiments with a view to determining whether any alteration shall be made in the method of calculating " Impact ".

(f) Government Test House at Alipore.

For some years it has been the custom to refer in this report to the work done by the Superintendent of Local Manufactures and his staff, who worked under the orders of the Railway Board.

The great preponderance of Munitions samples which were submitted for test, however, made it quite clear that the Test House would serve a much more useful function if placed under the control of the newly formed Indian Munitions Board. The Test House, therefore, and all its staff passed out of the control of the Railway Board into the hands of the Indian Munitions Board when the latter body was constituted at the end of 1916-17. It is hardly necessary to add that railways will continue to take advantage of the facilities Alipore Test House affords.

(g) Aerial Ropeways.

The question of introducing special legislation for the control of aerial ropeways, which has been under consideration since 1914, has made no further progress. As stated in last year's report, an Act passed for this purpose must provide for adequate inspection to safeguard the public and property and while the War lasts, Engineers having the requisite technical knowledge and experience to act as inspectors are unobtainable. Government, however, have certain schemes for ropeways under consideration and hope to arrange that progress with these shall not have to be deferred pending legislation.

CONCLUSION.

An outstanding event of the year has been the discussion of the future system of management of railways in India. In the main this discussion has centred round the question, which has been so strenuously debated and is now so prominent in several countries, of State and Company Management. In India however this question has a special aspect, seeing that already the great majority of the lines are owned by the State and under its contract with the companies to whom they are leased for management the State has extensive powers of control; in this connection the note on the relation of Government to the railways in India which was mentioned in the introduction will be found of special interest. Under Indian conditions again there is the special factor that at present the companies to whom the main lines are leased for management are domiciled in England, and the question arises whether in the event of the present system of State ownership and Company management being continued it would not be better to have Indian companies with Boards in India. These matters have been reported on to the Secretary of State and are now under his consideration. The prosperity of railways and the prosperity of the country are interdependent, and his decision will be a momentous one for both.

Apart from this the year has been one of exceedingly heavy traffic and hard and incessant work. The gross earnings were about 14 crores more than in the last year before the war. It is true that there have been not inconsiderable increases in fares and rates, but there has been a great increase in the actual work done. The difficulties also of dealing with the traffic are aggravated as the war is prolonged; men and machines have been working at high pressure and without the usual opportunities for recreation and renovation. Railways have in fact had many anxious moments during the year. There were times when the coal stocks ran down to a critically low figure, and the question was whether railways would be able to keep themselves or essential industries going. There were other times when the prospects seemed poor of being able to keep up supplies which it was vital for the largest Imperial reasons to send overseas. The Railway Board have frequently noticed the desire of railway officers and subordinates to undertake military service. They consider the desire entirely laudable. If it has not always been possible to meet it they would impress on all ranks the fact that by staying in his place and doing the work next him, the railway man in India has equally been helping on the war. We may have had our anxieties but we pulled through and it is to the men who ran the machine that the thanks of Government are due.

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 **History of relations of the Government and companies.** 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 :—

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*l.* per mile of line, with an addition in respect of large bridges costing more than 10,000*l.* 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 23,695,226*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 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."

Introduction of modified guarantee terms.

Action in the direction suggested by the Commission was taken by the formation of three companies without a guarantee (the Bengal Central in 1861 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 1880 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 differed 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.

Arrangements between the Government and companies at present.

be summarised as follows:—

The relations between the Government and the Guaranteed companies now working railways may

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

Other lines worked by companies. constructed by companies which receive no direct 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 consists of a President and two

Controlling Authority.
Members with a Secretariat establishment.

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