



and passenger stock of the East Indian Railway running over the Oudh lines whenever the Ganges bridges are finished. To these arrangements of Lord Elgin we give our complete assent.

29. It only remains to us to call attention to two minutes of Sir Charles Trevelyan, in the arguments of which we have been unable to concur.

30. In his first minute, dated 30th September last, objection is taken to the construction of narrow gauge and light railways. So far as the present proposals are concerned, the question of narrow gauge lines does not arise. But we are not prepared to recede from the position before taken up by the Government of India in respect of such lines, viz. that when nothing better can be got, and with due provision for their resumption and conversion into full gauge lines when the traffic calls for the change, the Government may without objection aid such lines, in each case determining the amount of aid with reference to the objects to be attained.

31. As regards light lines, very nearly the same remarks will also apply. As soon as the Government gives up the system of guarantee, and abandons all right or desire to interfere in the management of railway companies' affairs, it ceases to be in a position to decide whether a line shall be constructed of rails of one class or another. Such a matter is essentially one for the company to determine. What the Government can do is to decline giving assistance, unless certain terms are offered by the companies, as the companies can refuse to accept the assistance offered if it be too little to satisfy them. The Government of India has adopted the conclusion that a 5 feet 6 inches gauge line, of such a character as will admit of the carriage and waggon stock of the great lines going over it at a moderate speed, will probably be for many years to come sufficient to meet the requirements of the country, and this general standard it has taken as the *minimum* for the full gauge lines. . . .

It may be here remarked that the Indian Tramway Company had been allowed to build a line between Arconum and Conjeveram in the Madras Presidency on a gauge of 3 feet 6 inches. This line was 19 miles in length, and was opened

to traffic on the 8th May 1865. Proposals to convert this gauge into the 5 feet 6 inches gauge and extend the line to Cuddalore and Pondicherry were made at intervals between 1866 and 1868. The Madras Government recommended in 1869 the extension to Cuddalore; but when the nature of the country through which the extension would have to pass was considered, that Government could "not recommend any departure from the present (3 feet 6 inches) gauge on which the line from Arconum to Conjeveram has been laid." In 1868 this line was included in the 3 per cent guarantee accorded to the Carnatic Railway Company, and in turn was in 1874 absorbed by the South Indian Railway Company under their 5 per cent guarantee. Its gauge was converted to the metre in July 1878.

A minute was recorded in 1869 by Sir John Lawrence, reviewing minutely the whole question of railway extension. It is dated the 9th January 1869, three days before Sir John Lawrence made over the high office of Viceroy and Governor-General of India to Lord Mayo. Little time was lost by Lord Mayo in reporting to the Secretary of State on the subject of railway extension in India, and in March of that year a series of despatches was sent home advocating the immediate construction of several lines of railway—some by the agency of companies, and some by direct State agency. The policy advocated was that an extension of railways was absolutely essential to the proper development of the resources of India; that the finances of India could not bear the burden of the proposed additional railways if constructed on the same expensive principle as had hitherto ruled; that Government was quite capable of making its own lines, and that as it could raise money cheaper than a company, to make its own lines was the more economical proceeding; that the position of several of the proposed lines was such as did not demand a first-class standard railway, and that either a lighter construction, or a narrower gauge, or both, could be adopted with

economical advantage; and that Government, possessing its own railways, would be capable of exercising on the spot a more efficient and economical management than if administered by a Board of Directors in London. The Duke of Argyll was then Secretary of State for India, and he approved of Lord Mayo's proposals almost in their entirety.

The introduction of the metre gauge as the gauge for certain railways in India may be said to have arisen from this correspondence. The following portions of the correspondence¹ are those that bear on the question of a narrower gauge than the standard gauge of 5 feet 6 inches :—

42. There is only one other point to which I wish to refer. If there is one thing which comes out in more prominent relief than another in connection with railway construction in all parts of the world, it is this, that those lines are financially successful in which the capital accounts are kept down to a low amount, and those are unsuccessful in which this has not been accomplished. The lesson we should learn from this is, that the character of the line and the amount of expenditure upon it should be regulated as far as possible by a proper consideration of the possible returns, and not more than is essential by any preconceived ideas of what is the best standard form of railway to adopt. I regard it as the extreme of infatuation to lay down any absolute rules to regulate the modes of construction of railways in a country so vast, so various in its natural features, and so poor as India. Still more mistaken is it to apply to India rules essentially based on the wants of England, which is probably the country in the world from which India most widely differs. England, of all others the richest, the most populous, the most celebrated for its manufactures, the most addicted to commerce; an island of small size in a highly advanced state of civilisation, where despatch is of extreme importance and time equivalent to money; England of all countries is the last which we should take as our model in these things. In one respect certainly, but only in one, can I admit

¹ Sir John Lawrence's Minute, dated 9th July 1869.



that English standards are applicable—let all workmanship be thoroughly good of its kind, and every part of the construction permanent and suited to what is required of it.

43. Skill in engineering works implies the successful adaptation of the art of construction to varying circumstances. For a poor country, economy is one of the essential conditions to be complied with, and its requirements may be as rigid as any of those imposed by physical conditions. Wholly to reject railways for a country which is not able to support lines of the most costly description is quite unreasonable; and if, on a further examination in detail of the probable cost and returns of any of the lines which otherwise seem desirable, the expense of lines of the ordinary gauge seems prohibitory, while lines of a narrow gauge would be financially practicable, I should consider it a most mistaken view to reject the narrow gauge line. And so with any other modification of ordinary practice. For complete success in the great operations which the Government of India has before it, broad views and a ready adoption of all truly sound measures, whether out of the usual course or not, are essential, and it will be a source of lasting regret if the progress of this country, which of all others most directly depends on the improvement of its means of internal communication, should be retarded by the weight of administrative prescription or engineering prejudice.

Again, discussing the question¹ of a line of railway between Pondicherry and either Madras or Arcot, the Government of India wrote :—

27. Although we are far from opposing the adoption of a narrow gauge railway when circumstances seem to indicate that proper financial results cannot otherwise be obtained, we are not inclined to acquiesce in the expediency of constructing short lengths of railway on a gauge different from that in common use. If narrow gauge lines are to have a fair field, they must be given a sufficient development to render the cost of shifting goods from their waggons to those of adjoining broad gauge lines unimportant

¹ Despatch to Secretary of State, No. 25, Railway, dated 11th March 1869.



in relation to the freight for the average distances over which the goods are carried. We do not think that this condition can be properly complied with, unless 100 or 200 miles at least of a narrow gauge system is constructed, and short of this we should not view favourably a proposal to execute narrow gauge lines in a country so easy as that immediately south of Madras. The known desire of the French Government to obtain a railway connection with Pondicherry by a line of the full Indian gauge should, we think, have much weight in the decision come to on this question ; and on the understanding that the outlay will be kept down to the sum valued in the estimates that have been made, about £7000 per mile, we are clearly of opinion that the 5 feet 6 inches gauge for this railway should be adopted, as far at least as the point from which the line to Pondicherry would leave it.

In calling the attention of the Secretary of State to that portion of Sir John Lawrence's minute extracted above, the Government of India wrote :¹—

19. The considerations which have led us to these conclusions also indicate that, under the conditions in which India is placed as to the provision of capital for railways, if it appears to be financially impossible to carry out railways on the full 5 feet 6 inches gauge, the Government should not hesitate to accept any other system of construction which will afford a practical means of extending these works. It is quite well known that perfectly useful and satisfactory lines have been carried out on a much narrower gauge, and it would be evidently unreasonable to reject the provision of such railways if they afford evidence of being profitable, while broader gauge lines, from their greater cost, could not be undertaken with financial propriety. These remarks more particularly apply to the more thinly-peopled and hilly tracts of the Peninsula and Central India. Across these Provinces, main lines on the full gauge have already been carried, giving communication between Bombay and Madras on the one side, and Bombay and the North-Western Provinces on the other ; and whatever advantage is to be obtained by the possible transfer of the

¹ Despatch to Secretary of State, No. 28, Railway, of 22nd March 1869.



rolling stock of the north to the south of British India has thus been secured. For the further extension of the network of railways, no hesitation should be felt in accepting whatever system of construction is proved to be economically the best suited to each case.

20. We are disposed, as we indicated in our last despatch on this subject, No. 25, dated 4th March, to consider that too great importance has been attached to the value of uniformity of gauge beyond certain limits. That there are many conveniences in uniformity of gauge is, of course, evident, and in a compact, densely peopled, and highly-civilised country like England differences of gauge have been proved by experience to be inconvenient and are highly undesirable. But the inconveniences, where the distances to be gone over are very great, all the centres of population and trade are far apart, as is commonly the case in India, are of a secondary character. For passenger traffic, changes of vehicles, if not frequent, are a very minor objection, and are commonly enforced on passing from the lines of one company to those of another in every country. For goods, changes of vehicles represent a certain additional charge for loading out of one set of waggons into another. This charge will commonly not exceed the cost of transport for 10 miles of railway, and the practical inconvenience is no greater than that which would have been caused by such an addition to the distance over which the goods had to be carried.

21. The advantage obtained from any facilities of construction of locomotives for a broad gauge must be set off against the corresponding facilities of construction of the road and works for a narrow gauge; and where the traffic is likely to be light and the cost of construction high in comparison to the net profits, the balance may readily rest with the narrow gauge line.

22. It would always be our wish to conform to the 5 feet 6 inches gauge, if the financial objections to it were not insuperable; but we shall hope to receive your approval to our considering it an open question, when the prospects of the returns from any contemplated system of lines are not satisfactory, whether such lines might not be constructed on a narrow gauge, say 3 feet 6 inches instead of the ordinary broad Indian gauge.

The Duke of Argyll's despatch in answer to these despatches



from the Government of India makes no direct reference to the question of gauge, but merely remarks, in assenting to the principles enunciated, that the Secretary of State "concurs generally in your reasoning, and in the more important conclusions at which you have arrived."¹ A few months before this despatch was written, the Secretary of State had sanctioned the execution of a railway between Lahore and Rawalpindi as a State undertaking; and in this despatch he gave sanction to the commencement of a line down the Indus Valley, one from Delhi and Agra to the Sambhar Lake, another from Kulbarga to Hyderabad (Deccan), and a fourth between Karwar and Hubli. It was on the question as to the proper gauge to be adopted on the Indus Valley and the Lahore-Rawalpindi lines that the battle of the Indian gauges was fought. As soon as the Secretary of State had given his sanction to the Government of India building its own lines of railway, Lord Mayo took up the matter in strong earnest. He wrote to America to obtain the services of an engineer who had had experience of the construction of light lines of railway, and a gentleman was selected and arrived in India.

The question of gauge for certain lines was also immediately taken up.² The propriety of adopting a narrower gauge, and thus reducing the first cost, for many branch railways, which were never likely to become through routes of communication, and the fact that lines on a gauge of 3 feet 6 inches had been adopted with more or less success in Norway, Queensland, Chili, and in the Madras Presidency, led the Government of India to think that such a gauge might well suffice for such branches as those from the main lines to the salt works at Sultanpur (near Delhi), to the salt works at Pind Dadan Khan in the Punjab, and for any lines that might be made in Burma. As sufficient information on the subject of cheap lines was not in the possession of the Government of India, the Secretary

¹ From Secretary of State, No. 42, dated 15th July 1869.

² Despatch to Secretary of State, No. 111, Railway, dated 16th October 1869.



of State was asked to obtain the best professional opinions of the day on the whole subject. The brief was worded as follows :—

We do not desire that any absolute standard narrow gauge should be fixed, as the peculiar features of very difficult country may make such an extremely small gauge as that of the Festiniog Railway desirable in rare instances. At the same time, we are fully sensible of the disadvantages of a variety of gauges, even when the lines are not in connection, especially in the matter of obtaining stock and material ; and we therefore should wish to ascertain what is considered by the highest authorities in England on such a subject to be the narrowest gauge compatible with carrying a passenger and goods traffic—say such as exists on an average branch line in England, at a speed of say 12 miles an hour—with efficiency and economy, the line being supposed to be constructed through country which presents no especial engineering difficulties and gradients not steeper than 1 in 100. Of course the economy of first construction must be duly considered and weighed against possible increased charge for working.

Before any report was received in answer to this request, the Government of India made a further representation to the Secretary of State,¹ recommending the more extended use of a narrow gauge for railways in India,² and making a distinct proposal that the Indus Valley and Lahore-Rawalpindi lines should be constructed on a gauge of not more than 3 feet 6 inches. The most serious objections to the use of a narrow gauge which had been felt in times past were “based on the practical difficulties met with in the construction, working and maintenance, in the repair of engines, and in the economical designing and safe working of the vehicle stock.” But these objections had been overcome ; the evidence which the Government of India had collected of the working of narrow gauge lines in other countries, and the interesting reports on

¹ To Secretary of State, No. 51, Railway, dated 17th May 1870.

² *Ibid.*, No. 52, Railway, dated 17th May 1870.

the Festiniog and on the Mid-Wales Railways which the Secretary of State had sent out to India,¹ clearly showed that the above objections to a narrow gauge had now been removed by the skill of the manufacturer, and there was abundant evidence to prove that a line could be constructed and stocked so as to carry, on a gauge of from 3 feet to 4 feet in width, all the traffic that was likely to seek any of the secondary lines yet to be constructed in India, if not indeed the traffic of the trunk system.

The proposal of the Government of India was, therefore, to divide the railway necessities of the country of India into two classes, and make a broad distinction between the railways hitherto constructed and which formed a connected system of trunk lines along the great political and commercial routes, and those lines which were about to be taken up and which were of secondary importance in the network of railways designed to open out the resources of India. These secondary lines, as proposed, were very extensive, and formed systems in themselves; and believing that if built on a smaller gauge the demands for traffic would be amply met, and a large saving effected in the initial cost, the Government of India came to the conclusion that substantially built narrow gauge lines were all that were necessary. The following paragraphs of the first despatch (No. 51, Railway) above quoted give the views of the Government of India :—

7. In easy country the saving in first cost of a narrow gauge line, compared with a line on the standard gauge, will be comparatively small. But in difficult country this saving may be increased very considerably, in some cases enormously, by the adoption of steep gradients and sharp curves, which have an important bearing on the location, and therefore on the outlay on the formation. By their introduction deep cuttings and high embankments are avoided with the heavy works necessary for passing the natural drainage through the latter. We may

¹ From Secretary of State, No. 23, dated 13th April 1870.

eliminate the effect of the gradients from this discussion as applicable alike to all gauges ; but the economy in construction resulting from the adoption of sharp curves in a hilly country will be generally admitted, though it must also be admitted that, with the introduction of specially constructed engines and vehicles, sharp curves can be combined with retention of a wide gauge. There can, however, be no doubt that the narrower the gauge, the sharper are the curves possible ; for whatever special construction be applied to the rolling stock, it is applicable to the stock of all gauges alike.

8. Apart, however, from all question of the saving that thus admits of being directly estimated, we are of opinion that the practical declaration involved in the adoption of a narrow gauge, that we are determined in all things to suit ourselves to the requirements of the country, and not to waste a rupee in perpetuating a standard of railway in excess of these requirements, merely because it exists in certain parts where it may, or may not, be suitable, will lead to economies in many indirect ways, the aggregate of which will be important, and will contribute towards the earlier consummation of the extensions already admitted to be required.

9. Firmly convinced of the sufficiency of a narrow gauge to carry the traffic of our secondary lines, and fully satisfied that an important economy must ensue in the aggregate over the whole extension system, we should fail in our duty to India if we hesitated to advocate the adoption of gauge narrower than the present standard. Whether that gauge should be 3 feet or 3 feet 6 inches is comparatively a matter of detail. As at present informed, we should regard 3 feet 6 inches as the maximum width that should be adopted. An early decision on the point is called for, so as to admit of timely arrangements being made for rolling stock, and we should be glad if your Grace would determine it after communication with the best authorities on the subject.

The Government of India in this despatch clearly indicated its desire to have good substantial lines of a narrow gauge than to have light lines with slow speed on the standard 5 feet 6 inches gauge. Not that a high speed of forty or fifty miles



an hour drawn by heavy engines with a wheel-load of seven tons was ever intended on the narrow gauge lines, but the Government of India thought that the lines should be substantial enough to bear locomotives with a wheel-load of four tons and to stand a maximum speed of 25 miles an hour.

The Government of India proposed to make the whole length of line from Karachi to Lahore, and eventually on to Peshawur, on a narrow gauge. This involved converting about 319 miles between Karachi and Lahore, which was already opened to traffic, to the narrow gauge. The reasons adduced are given in the following extract from despatch No. 52, Railway, dated 17th May 1870:—

The present position of affairs is doubtless well known, but it will be convenient to describe it here. From Karachi to Rawalpindi a line of railway has been sanctioned, and there is little room for doubt that its extension to Peshawur will follow. The total distance by this route from the sea to Peshawur is 1080 miles, of which 320 miles¹ in two sections, separated from each other by 500 miles, have been constructed and stocked on the standard gauge, and are now being worked. Of the intervening 490 miles, the section between Mooltan and Kotri of about 300 miles in length has been surveyed, and the estimates are now under preparation. Of the section from Lahore to Peshawur, construction is just commencing on the 100 miles between Lahore and Jhelum, on the understanding that the rails will be laid on the Trunk Road to the standard gauge; beyond Jhelum, as far as Rawalpindi, the surveys are approaching completion. Between Kotri and Mooltan, and between Lahore and Jhelum, the country presents no features which would demand, on the score of economy in location, the adoption of a narrow gauge

	Miles.
¹ Karachi to Kotri	105
Mooltan (Rajghat) to Lahore	214
Total	<u>319</u>

additional reason, if needed, for keeping down the outlay both on first cost and on working to the lowest possible limits.

On the 28th June 1870, probably after perusal of the above despatch, the Duke of Argyll sent the following telegram to Lord Mayo :—

I am carefully considering narrow gauge question. Many objections raised. What does Lord Napier think regarding Indus Valley line on military interests involved ?

The answering telegram was sent on 9th July 1870, and was as follows :—

Lord Napier gives his opinion as follows : “Because nearly one-third of the line from Karachi to Lahore is laid and working on the broad gauge ; because of the comparatively easy country of the remaining two-thirds ; and especially because of the advantage of accumulating rolling stock of other lines for military emergencies, I am in favour of completing the Indus Valley line with broad gauge.”—Opinion ends. Viceroy only remarks that if narrow gauge is built from Karachi to Peshawur, there will always be the rolling stock of the entire 1100 miles available for emergency on any short section, such as that above Lahore.

Lord Napier also remarked in his note of 7th July 1870, from which the above opinion was extracted, that there was immediate necessity for a line of railway to Peshawur ; and as he noticed that Lord Lawrence, in his scheme for the extension of railways, had put down the Peshawur line to be completed in 1885 and the Indus Valley line in 1890, added that—

Rather than see such a fatal delay, I should submit to any minor evil, such as a break of gauge. For instance, a narrow gauge might, I believe, be laid on the Lahore and Peshawur road to complete the communication from Jhelum in one year without turning a spadeful of earth, and would pay its value in political security and economy of transport by the time the main line, according to the programme in Sir John Lawrence's minute,



would be advanced to that point, and it might either be retained or transferred for branch lines to our hill stations.

Lord Mayo did not think that the actual state of the case was quite before Lord Napier when he recorded the above note, so he put an explanatory note on record.¹ He pointed out that no importance should be attached to the dates on the map accompanying Lord Lawrence's minute ; that the Indus Valley line had been recommended to the Secretary of State as one of the first which should be made ; and "that the rapidity of railway construction can only be regulated in the first instance by the financial strength of the Empire, and in the second by the power of organisation of establishment and labour" which it is possible to develop. Considering the extremely difficult nature of the country beyond Jhelum, and the resulting cost of a railway on the 4 feet 6 inches gauge, Lord Mayo also demonstrated that no line of railway ought to be made north of Jhelum which should be capable of carrying the stock of the East Indian or Delhi lines ; and consequently "if a narrow gauge line is made the whole way from Karachi to Peshawur, the whole rolling stock of a line, 1100 miles in length, will always be available for working on any portion of the system ; and therefore the narrow gauge, constructed as suggested, will give a much greater facility for the transport of troops and military stores from Lahore to all parts of the frontier, north or south, over that of a line which would be composed in part of light broad gauge line."

The Secretary of State again telegraphed to the Viceroy that strong opposition was being shown to the narrow gauge as applied to strategical lines of railway, but that there was a general agreement to the narrow gauge when the strategical lines had been completed. He again asked if the Government of India had fully considered how far the standard 5 feet 6 inches gauge, with a lighter rail, would be best for the

¹ Note by the Governor-General, dated 28th August 1870.

in preference to the standard gauge. Beyond Jhelum the country is extremely difficult, and the improvements and diversions of the Trunk Road requisite to admit of rails being laid upon it must entail a heavy expense, which will be reduced the narrower the gauge and the sharper the curves adopted. In brief, the country is such as to indicate distinctly a narrow gauge for the 170 miles between Jhelum and Peshawur. Lahore, it should be added, is the north-west terminus of the standard gauge trunk lines from Calcutta and Bombay.

3. We have no hesitation in saying that were it a question of the section between Lahore and Peshawur alone, we should at once dismiss from consideration all idea of anything but a standard gauge line. The ordinary traffic on this route, with the exception of salt from the Pind Dadan Khan mines, is so small, that any railway of the smallest gauge or lightest rails would carry it. Commercially, the line has little to recommend it. Politically, it is of the highest importance, and in consequence, may, on emergency, be exposed to the demands of a heavy extraordinary traffic. To adopt a different gauge, then, from the lines terminating in Lahore would involve the necessity of maintaining a large stock in inactivity, so as to be prepared for the emergency. This would be a constant source of outgoing, in addition to the loss of interest on the capital sunk.

4. The question has, however, presented itself whether, as the gap between Mooltan and Kotri of 500 miles has yet to be constructed, the necessary reserve of stock might not be secured by adopting a narrow gauge for that line. It is true that the country is such that the saving by the adoption of a narrow gauge line would not, as respects the reduction that may be feasible in the works, be so great as in other parts of the plains of India; but there can be no doubt that, in a sparsely populated country like Sind, every possible reduction in the amount of work to be executed should be taken advantage of. There would, however, be a saving which, over 500 miles, may amount, it is roughly estimated, to £200,000, apart from any further saving which may be possible in stocking the line, or by using a light description of permanent-way. The adoption of a narrow gauge on this gap would, however, necessarily involve the relaying of the Sind and,



as far as Lahore, of the Punjab line on the same gauge. These lines are at present laid with rails of from 65 lbs. to 68 lbs. per yard, chiefly on timber sleepers, about 70 miles of the Punjab line being on iron bowls. The rails are heavier than would be required for the improved stock of the narrow gauge, but, together with the stock at present working over them, can be utilised elsewhere. The consent of the railway company would, of course, be necessary; but looking to the probable diminution of their capital account that would result from the laying of these lines with the lighter rails, and to the obvious advantage of uniformity of gauge throughout the Indus Valley, we apprehend that a proposal to this end would not prove unwelcome. The first opportunity under the contract of Government purchasing these undertakings is as yet remote; but it might suit the shareholders to surrender them in anticipation if the proposal were not regarded with favour. The difference of value between the old and new rails and stock should more than cover the cost of relaying.

5. Believing then that, irrespective of any saving in first cost by the use of a lighter description of permanent-way, the adoption of a narrow gauge would lead to a large saving on the cost of the 170 miles of line north of Jhelum, to a by no means insignificant saving in outlay on 500 miles between Mooltan and Kotri; also that lighter rails on a narrow gauge may be substituted on the existing railways in the Indus Valley without additional outlay, we would urge your Grace to accept the recommendation contained in our telegram already referred to, that a narrow gauge should be adopted for the entire line of railway from Karachi to Peshawur. As a light description of permanent-way may be combined with a broad gauge, we have not adduced the saving from its adoption in support of the narrow gauge, but we may mention that we estimate the saving by the use of lighter rails at about £400 a mile over the 760 miles of new line to be constructed. With light rails on a broad gauge, special engines, it should be noted, would be required. The poor returns hitherto realised on the Sind and Punjab Railways and on the Indus Flotilla do not justify our forming any sanguine expectation of an early remunerative traffic on the Indus Valley Railway, even when completed so as to form a through line of communication, and afford an

Peshawur and Indus Valley lines. In reply to this, the following telegram was sent on the 5th October 1870:—

The Punjab and Sind State Railways should in any case be laid with light rails suited to engines of moderate wheel weights, and the entire rolling stock should be capable of running from Peshawar to Karachi. The special engine stock will rule the transporting power of the line, whatever the gauge may be; and if light rails on standard gauge be adopted on northern and middle sections, we must provide new engines for whole length, otherwise efficiency of line on light sections, but particularly above Jhelum, will on an emergency be reduced by one-third compared with the line of uniform description throughout. For our views as to difficulty of country and character of line above Jhelum, see Railway Proceedings, No. 44, for August. I consider every line now contemplated north of the Nerbudda in a great degree strategical.

Meanwhile, in accordance with the desires of the Government of India, the Secretary of State had nominated a Committee of engineers to settle the actual width of narrow gauge lines which would be most suited to the wants of India. This Committee reported in September 1870, and the following summary of their proposals, and of opinions of several of the consulting engineers to the London Board of the Indian Guaranteed Railway Companies, is extracted from Mr. Danvers' Report on Indian Railways for the year 1870:—

12. A Committee, consisting of Colonel R. Strachey, R.E., C.S.I., Colonel C. H. Dickens, R.A.; C.S.I., Mr. John Fowler, C.E., and Mr. A. M. Rendel, Consulting Engineer to the East Indian Railway Company, was accordingly appointed "to consider the precise gauge and general character for and average narrow gauge line of railway in India." The result of their investigations and deliberations was given in two reports—one containing the conclusions at which all the members of the Committee, except Mr. Fowler, had arrived; the other expressing

that gentleman's opinion alone. All, including Mr. Fowler, were in favour, on the ground of economy, of introducing a narrower gauge in India than the present standard of 5 feet 6 inches in districts where a break of gauge would not be productive of serious inconvenience, but they differ as to what that gauge should be. Colonel Strachey, Colonel Dickens, and Mr. Rendel recommended 2 feet 9 inches; Mr. Fowler, 3 feet 6 inches. The opinion of the former was based upon the conviction that to obtain the greatest economy in construction, and consequently the greatest possible extension of railways in India, the gauge selected should be not only narrow, but the narrowest which would combine convenience of transport for various goods and passengers with reasonable speed, and with economy and safety in working, and they were persuaded that these conditions would be fulfilled by a 2 feet 9 inches gauge. Mr. Fowler, on the other hand, was of opinion that a width of 3 feet 6 inches should be adopted, on the clear ground that it was not greater in first cost of works and rolling stock than a gauge of 2 feet 9 inches, and was greatly superior in carrying capacity, convenience, and economical working. The other members of the Committee considered that the cost of a railway was in proportion to its gauge; he did not. He felt, to secure the greatest simplicity and economy of construction and working in a locomotive, a gauge of 3 feet 6 inches was required. They thought that engines of sufficient power might be put on a 2 feet 9 inches gauge to draw at a sufficient speed the largest traffic which the lines for which a narrow gauge is suitable are likely to carry. The same differences of opinion on similar grounds are expressed in regard to the rolling stock of the respective gauges. Opinions were also given on the subject by Mr. John Hawkshaw, as Consulting Engineer to the Madras and the Eastern Bengal Railways, and by Mr. G. P. Bidder, as Consulting Engineer to the Sind, Punjab, and Delhi Railway. They are both opposed to the application of any other than the existing gauge to future lines which may be required as branches to extensions of the systems of railways with which they are connected. They attach great importance to the evils and inconveniences of a break of gauge, and contend that the very small saving, if any, which might be

secured by the adoption of a narrow gauge would be more than counterbalanced by those disadvantages. Mr. Hawkshaw, however, admits in the early part of his report that if "it were a well-ascertained fact that there are districts in India where, having regard to financial reasons, a railway on a narrower gauge could be made, but where a railway on the existing gauge could not and ought not to be made, then that would be a case in which a narrow gauge might be considered as an absolute necessity." He calculates, upon certain assumptions, that the difference in the first cost of a heavy railway on the 5 feet 6 inches, and a light railway on the 3 feet 6 inches gauge would be £1810 per mile, and that saving in maintenance and renewals of permanent-way would be £50 per mile per annum, or, if capitalised at twenty years' purchase, £1000. He considers, however, that the object of economy would be best attained by constructing a lighter system of railways on the existing gauge, and calculates by this means £1250 per mile might be saved in the first cost, and £40 per annum in maintenance, or £800 capitalised. Thus, under the least favourable view of the case, a saving of about £800 per mile is admitted. The case above described in Mr. Hawkshaw's words would probably be regarded as the rule, instead of the exception, for future lines in India. If 10,000 miles are to be laid out, economy must be observed in the construction of every mile, and a saving of £800,000 in every thousand miles, or of £8,000,000 in 10,000 miles, becomes a matter of importance.

13. A much greater saving, however, is expected by the advocates of the narrow gauge. I may mention, in passing, that the estimates for the Carnatic Railway, on the broad and narrow gauge systems, made by Mr. C. Douglas Fox, the Consulting Engineer to that Company, show a saving of £1700 per mile in favour of the latter. The same capital would thus make 112 miles of the 5 feet 6 inches, or 151 miles of 3 feet 6 inches. I am informed, also, that in America 80 miles of a line which is to be 850 miles in length has been laid on a 3 feet gauge at a cost of £2500 per mile, including rolling stock, the rail being 30 lbs. to the yard, joined by fish-plates; the sleepers pine wood, 5 feet long, set 2 feet 6 inches apart.



14. The existence of another gauge in the country necessarily complicates the question of introducing a narrow one; and in some places and situations the inconveniences of a break of gauge may be so great, or the value of a line of communication for strategical purposes may be so impaired by it, as to make it worth while to pay the difference in cost; but under ordinary circumstances these kinds of difficulties may be greatly reduced by improved mechanical appliances and good traffic arrangements. The condition of things, moreover, in this country, where, within short distances, and with an immense traffic, a break of gauge has been found to be most burdensome and objectionable, is, very different from that of India.

The Duke of Argyll answered the Government of India in despatch No. 72, dated 26th October 1870. Notwithstanding the very decided proposals made by the Government of India to make the Indus Valley and Peshawur lines on a narrow gauge, and the recommendations of a Committee to adopt a gauge of 2 feet 9 inches, and of one member of that Committee to adopt a gauge of 3 feet 6 inches, the Duke of Argyll would give no definite orders as to the kind of railway to be constructed over those lengths, or as to the width of the narrow gauge if such be adopted; but he confined himself to expressing his agreement with the desire of the Government of India to study rigid economy in the construction of these new railways, and eventually concluded by leaving the main questions to be decided by the Viceroy, Lord Mayo. This despatch is a very important one in the history of the gauge question.

The proceedings of the Government of India on receipt of this despatch are best summed up in the memorandum which Lord Mayo put on record,¹ stating his reasons for adhering to the previous policy of the Government of India, and deciding that the Indus Valley and Peshawur Railways should be on a narrow gauge, and that the width of that gauge should be 3 feet 3 inches. The question of adopting in India a metrical

¹ Dated 30th December 1870.

system of weights and measures was then under discussion by the Government of India, and a draft bill was actually before the Legislative Council. As the adopted gauge, 3 feet 3 inches, was so nearly the same as the proposed metrical standard, the narrow gauge for railways was changed very shortly afterwards from 3 feet 3 inches to 3 feet 3 $\frac{3}{8}$ inches, the length of a metre. The following is the memorandum :—

We recommended the adoption of the narrow gauge from Lahore to Peshawur, mainly on the grounds that it would be possible to construct the whole line from Lahore to Karachi on this principle; this would ultimately make available the entire ordinary rolling stock of 1100 miles of railway, which we conceive is amply sufficient for any military emergency.

The question, therefore, that we submitted to Her Majesty's Government was, whether it would be desirable to break the gauge between Mooltan and Kotri, it being assumed that, if this were decided in the negative, a narrow gauge railway northward from Lahore would not be recommended. After more than six months the whole question is now returned to us for final decision. The result will be that some considerable delay must take place in the commencement of active work on the Lahore and Jhelum line. This cannot be helped, and it is now our duty to arrive at a decision as rapidly as possible and forward it to the Secretary of State. We should endeavour then to recommend the construction of such a railway as will be amply sufficient for all the requirements of the country, and be constructed at the lowest possible cost. Our decision in this will definitely fix what the Indian narrow gauge is to be.

The history of our Indian railways does not show that a sudden outburst of traffic can reasonably be expected; and we cannot anticipate, in traversing less fertile and poorer countries than have hitherto been occupied by existing lines, the receipts we shall obtain in the first instance will increase in the same proportion as they occasionally do on American and European lines.

It is impossible to define with any degree of accuracy what the traffic on the new Indian railway is likely to be. The results of the Delhi and Lahore and Mooltan and Lahore lines are not



encouraging, and I have no reason to suppose that they will suddenly improve. On the other hand, we must be certain that the railways we are about to construct will amply provide for all military wants and probable commercial requirements for a number of years.

I therefore asked the Council on our last meeting to consider whether we should adhere to our former recommendation, that a narrow gauge should be adopted between Lahore and Karachi on one side, and Lahore and Peshawur on the other. The Council having come unanimously to the conclusion that we should abide by our former recommendation, renders it unnecessary to discuss that question further. A similar conclusion was also arrived at with regard to the Rajputana and Central India lines.

It remains, therefore, only to consider what should be the dimensions of the narrow gauge line which it will be our duty now to recommend to the Secretary of State.

The great differences of opinion which exist between the high authorities who were consulted by the Secretary of State in this matter, as shown in the accompanying papers, involves us in much difficulty.

In considering unprofessionally such a subject, and in endeavouring to arrive at a sound conclusion as between the two narrow gauges recommended, viz. 3 feet 6 inches and 2 feet 9 inches, we can only be guided by experience and authority. In this view there is no doubt that we should be quite safe in adopting the 3 feet 6 inches gauge; for it has been well and effectively tried, and is admitted to be sufficient for the conveyance of a large amount of traffic.

It is also a fact worthy of notice, that those Governments and authorities who are now desirous of providing cheap narrow gauge railways, namely Russia, Canada, Queensland, and Norway, have all adopted the 3 feet 6 inches gauge.

In Norway a railway of that dimension, 120 English miles long, exists, and it is generally admitted that it has proved to be completely suited to the light traffic of that country.

No such experience is available with regard to the 2 feet 9 inches gauge. The only line of any length of such small dimensions that I know of is the Festiniog Railway. This is a

short line, 2 feet gauge, with comparatively heavy rails, 49 lbs. per yard; it is worked in a hilly country under peculiar circumstances.

Therefore we have, as between a 3 feet 6 inches and a 2 feet 9 inches gauge, little or no practical experience to guide us. We know very little of the latter, but we know that the former has succeeded.

I have no means of showing very precisely the difference of cost between a 3 feet 6 inches and a 2 feet 9 inches gauge.

Mr. Fowler, in paragraph 24 of his letter, puts the difference of cost between a 3 feet 6 inches and a 2 feet 9 inches railway at £82, 10s. per mile for Scotland and £45 for Norway; for the Indus Valley he puts it at £45 a mile with iron, and £110 with wooden sleepers; but he says that in consequence of the additional length and cost of siding which a 2 feet 9 inches gauge would require, the relative cost would scarcely differ. He further states that, with regard to bridges, the dimensions for the strength and stiffness required would always include the width of a railway of a 3 feet 6 inches gauge.

The weight of rails would probably be the same. I am not an advocate of very light rails on any Indian railway, and would recommend a rail proportionately lighter than the 60 lbs. Oude and Rahilkund rail, which would be about 40 lbs. for a narrow gauge.

On the whole, therefore, according to the information at our disposal, I cannot put the difference of cost as between a 3 feet 6 inches and a 2 feet 6 inches gauge with wooden sleepers, and say a 40 lbs. rail, at a greater amount than £100 a mile. This over the distance from Mooltan to Kotri and from Lahore to Peshawur, which is about 700 miles, makes only a difference of £70,000—a sum which is hardly to be regarded if very superior advantages can be obtained.

I have no reason to suppose that the working expenses of a 3 feet 6 inches or a 2 feet 9 inches railway would differ very materially.

The size of the carriages on the different gauges proposed is a matter of the first importance.

I assume that in most railways, and especially those of narrow



gauge, the width of the carriage in the clear may be equal to double the width of the gauge.

I am not aware whether on any first-class line carriages whose platforms are double the width of the gauge are actually at work ; but Mr. Fowler appears to be of opinion, in paragraph 13 of his letter, that there can be no objection to a 3 feet 6 inches gauge bearing a carriage 7 feet wide. But in none of the papers placed at my disposal does the possibility of increasing the breadth of the carriage beyond this proportion appear to be contemplated.

Whether it would be safe then to put a carriage $6\frac{1}{2}$ feet or 7 feet wide upon wheels 2 feet 9 inches apart, or a carriage 8 feet wide upon 3 feet 6 inches wheels, I can give no opinion which would be of value. This is a point for engineers to discuss, and one that I suspect nothing but practical experience would satisfactorily solve. I am not aware that the experiment has been tried, and certainly in ordinary conveyances steadiness could not be obtained under such conditions. I believe, therefore, that twice the width of the gauge is the limit of breadth in the construction of our carriages which we ought to recommend.

If we adhere to the principle that this limit ought not to be exceeded, it would take 6 inches off the internal width of the vehicles, and render a carriage of the 2 feet 9 inches gauge 5 feet wide ; of a 3 feet gauge, 5 feet 6 inches wide ; of a 3 feet 3 inches gauge, 6 feet wide ; and of a 3 feet 6 inches gauge, 6 feet 6 inches wide.

I am inclined to think that from 6 feet to 6 feet 4 inches is the least width that can be conveniently given to a carriage to carry four passengers seated across. I put European and first-class passenger traffic out of the question altogether. With 6 feet 4 inches you could get 19 inches for four passengers in a row, which is one-fifth of an inch less than is now given to the new third-class carriages on the East Indian Railway, and which is not more than sufficient.

There is no advantage to be obtained either in gradients or curves as between any of the gauges. This, however, may be doubted as between a very broad gauge and a very narrow one ; but certainly no increased facility in either gradients or curves is gained by a 2 feet 9 inches gauge over one of 3 feet 6 inches or 3 feet 3 inches.

A very serious further objection which is urged to the very narrow gauge is, I believe, that which is described in the 12th paragraph of Mr. Fowler's letter as regards locomotives. Mr. Fowler, who is a high authority on a practical question of this kind, states from experience that, in order to secure the greatest simplicity and economy in construction and working, a gauge of 3 feet 6 inches is required for the engine.

He says that a locomotive may be constructed for almost any gauge, but that no locomotive, simple or strong, can be made with any great chance of success to work on a gauge less than 3 feet 6 inches; and I may add, in confirmation of this opinion, that Mr. Fell told me in regard to his engines, the great mechanical difficulty with which he had to contend was the extreme narrowness of his gauge, which is 3 feet 7½ inches: this obliged the mechanism to be compressed into so small a compass that, unless workmanship and material of the very first class were used, breakages were always occurring.

The defective character of his machinery, which was made in Paris, has been the greatest difficulty with which Mr. Fell has had to contend from the commencement of his enterprise. No undue weight, however, should be attached to this opinion, because the mechanism for working the central rail complicates the ordinary construction of the locomotive, and I am told that it has lately been found desirable to use two engines on Mr. Fell's railway, one for the central and the other for the outer rails. However, it must be recollected that Mr. Fell's gauge is 10½ inches wider than that advocated by Colonel Dickens and Colonel Strachey.

With regard to the carrying capacity, it is affirmed by Mr. Fowler that a 3 feet 6 inches gauge has a carrying capacity of 63 per cent greater than the 2 feet 9 inches. I am not prepared to adopt this opinion without further proof, but still it is a statement gravely made on high authority.

It is said that even a 2 feet 9 inches gauge might be too much for the wants of the country, and that if a 3 feet 6 inches width were adopted, the stock would be little lighter than the existing stock of the East Indian Railway.

I cannot but think that the power of considerably increasing the carrying capacity of a railway is a great recommendation in



its favour, because for the earlier periods of its existence it will be quite possible to build lighter and smaller vehicles than will ultimately be used.

But lightness is by no means regulated by gauge, and we can build as light a carriage on the standard gauge as on any other.

The weight of the carriage ought to be regulated, as nearly as possible, by the exact work it is expected to perform.

I think, therefore, these papers demonstrate that there is no important difference in cost between a 3 feet 6 inches and a 2 feet 9 inches gauge; that experience shows that a strong serviceable railway on the former size can be made with perfect success; that no difficulties with regard to locomotives are likely to occur; that its carrying capacity is considered much greater, and that, as far as passenger traffic is concerned, more comfort and convenience can be obtained than on the narrow line.

I cannot venture to say that the applicability of a railway to India on the 2 feet 9 inches gauge is disproved. Hereafter it may turn out that it deserves all that has been said of it. But, on the other hand, it must be admitted that weighty objections have been urged against it; whereas as regards the gauge 9 inches wider success is proved, and it is certain that it possesses requirements sufficient to provide for the locomotive wants of a country where a limited amount of traffic only can be expected, and considerable distances have to be traversed.

I confess I am unwilling to embark on anything in the shape of an experiment in a matter of such enormous importance. An error made now would be irreparable.

We must endeavour by every means to secure the most absolute certainty of success.

I have the greatest respect for the ability and judgment of the experienced engineers who have recommended the 2 feet 9 inches gauge, but the responsibility of selection now devolves upon my shoulders, and I am not prepared to recommend the adoption in India of any system which has not stood the test of experience, and is not supported by the almost unanimous opinion of skilled engineers.

I think, therefore, that the adoption of a 3 feet 6 inches gauge would be a thoroughly safe course for us to take; but if a 3 feet 3 inches one will provide for all the possible requirements of the



country, I should prefer it. Some saving in cost would be gained. The small reduction in width could not affect the locomotive question, and a considerable economy of space would be obtained. This would give a carriage of 6 feet width in the interior, and would seat four third-class passengers in a row, allowing 18 inches to each seat.

This is quite as small accommodation as, in my opinion, ought to be given, and I have some doubts whether it is quite sufficient.

On the Eastern Bengal Railway, the horse-boxes are 8 feet in the clear, 7 feet in the interior, divided into three partitions, two of 2 feet 6 inches, and the middle one of 2 feet. This is, I think, too small.

The 3 feet 3 inches gauge would give, according to these proportions, a horse-box 6 feet 6 inches in the clear, and 5 feet 6 inches in the interior. This would give a space for two horses abreast of 2 feet 9 inches each (including the partition), which is precisely the space allowed on the horse-boxes of the East Indian Railway.

If, however, a great number of horses have to be moved in a short time, horse-boxes would be little used; and if a rapid transit is desired for military objects, the main portion of the troopers must always be carried in ordinary goods waggons.

Six feet in the interior of a vehicle will be sufficient to carry gun-carriages for the heaviest artillery whose wheels do not, in scarcely any case, exceed 5 feet 3½ inches.

For goods traffic, especially for the bulky goods, such as unpressed cotton, jute, etc., the additional space will be very valuable; and if a very small traffic is expected, short carriages can be used.

I incline to the opinion that the 40 lb. rail should be adopted, because it is the weight which experience shows has been most generally adopted for lines of this dimension, and bears a fair proportion to the 60 lb. rails of the Oude and Rahilkund standard gauge. But at the same time I do not wish to say more than that, with 3 tons on the engine wheel, and 2 tons on the waggon wheel, the rail should not be lighter than 36 lbs. to the yard. The final decision on this must be reserved until the precise character of engines and stock on each line is determined.

It appears that in such a country as the Indus Valley or Rajputana a railway of this kind ought to be built for less than £5250 a mile, and according to Colonel Strachey for £2645 less than the standard gauge with 60 lb. rails, or £1707 less than the standard gauge with 45 lb. rails; and it is probable that as we gain experience, the cost might be considerably lessened.

According to the best consideration I can give to this extremely difficult question, I recommend the adoption of a 3 feet 3 inches gauge.

This decision as to the width of the narrow gauge, and as to the lines that were to be made on that gauge, was duly reported to the Secretary of State.¹ These despatches stated that the Government of India generally accepted the views expressed by the Duke of Argyll in paragraphs 5 to 11 of his despatch No. 72, Railway, dated 26th October 1870, already quoted, "as to the main military and financial considerations that arise, and that we are satisfied that the economy likely to be obtained from the adoption of the narrow gauge will justify our accepting the break of gauge at Lahore with such inconveniences as it involves." The matter had been left to the decision of the Governor-General; and no sooner had Lord Mayo given his verdict in favour of the narrow gauge, than orders were issued that the Indus Valley railway, the Lahore-Rawalpindi line, the lines in Rajputana from Agra and Delhi towards Ajmere, and the line from the Great Indian Peninsula Railway to Indore in Central India should be constructed on the narrow gauge. The section between Lahore and Jhelum had already been commenced as a light railway on the 5 feet 6 inches gauge, but the work had not progressed sufficiently far to cause any considerable alterations to be required for the narrower gauge. Surveys and estimates for the other lines were then proceeded with on the basis of the gauge being a metre; and the construction of the lines on that gauge was vigorously prosecuted.

¹ Despatches Nos. 2, Railway, and 3, Railway, of 10th January 1871.

During the year 1870 the London newspapers contained many proposals for narrow gauge and light railways; and many were the arguments brought forward showing their superiority over the ordinary standard gauges. In a report on the Festiniog Railway to the Secretary of State for the Colonies by Mr. (now Sir) G. L. Molesworth, who was at that time Director of Public Works in Ceylon, the merits and demerits of these lines were discussed. His conclusions were that the arguments claimed for the 2 feet gauge of the Festiniog line were not borne out by the facts of the case, and that its superiority over the ordinary gauge of 4 feet 8½ inches under all circumstances was quite delusive. The merits of narrow gauge lines were, however, from time to time still discussed in the newspapers; and when it became known that it was decided to construct the Indus Valley and the Lahore-Rawalpindi Railways on a narrow gauge, the outcry was great. First and foremost in vehemence against the decision was Mr. Lee Smith, the engineer who had been originally sent out by the Secretary of State to construct the Lahore-Rawalpindi Railway, but who had left the Government service before much advance had been made in the prosecution of the works; and the protests were continued by many engineers of high professional standing in England. Mr. Lee Smith maintained that he could construct a light railway on the 5 feet 6 inches gauge from Kotri to Mooltan and from Lahore to Peshawur for a sum of money differing only very slightly from the accepted estimates for those lines on the metre gauge, and stated that a firm of contractors were prepared to carry out the works on the strength of his estimates. During 1872 considerable correspondence took place between Mr. Lee Smith and the Secretary of State, and this was transmitted to India for information. It was, however, not quite understood whether this correspondence was only sent for information, or whether the Secretary of State desired an expression of opinion from the Government of India (Lord Northbrook, Governor-General) as to the question of the



break of gauge on the two railways. The Duke of Argyll, however, telegraphed that he had hitherto considered the question of gauge as settled, and deprecated any action which might unsettle that decision. The desultory discussion amongst the engineers in England, however, still continued; and as it was much desired to discuss the matter in a rational manner, the Secretary of State permitted the reading of a paper on the subject before the Institute of Civil Engineers. This paper, which was read on the 4th February 1873 by Mr. W. T. Thornton, C.B., the Secretary for Public Works at the India Office, stated simply and openly the reasons which led the Government of India to adopt a narrower gauge, and was followed by a lengthy, and at times acrimonious, discussion.

No direct action was taken on this discussion, but it led shortly afterwards to a discussion on the same subject in the House of Commons; and although much difference of opinion was expressed during the debate, "Mr. Gladstone intimated that the arguments on both sides would be carefully examined in the light of the discussion, and in the light of such other facts and arguments as may be considered to bear upon the policy involved." In consequence of all this opposition to the change of gauge, and in conformity with the promise made by the Prime Minister in the House of Commons, the Duke of Argyll reviewed the whole state of the case in a lengthy despatch to the Government of India.¹ In this review the Secretary of State showed that lines on the 5 feet 6 inches gauge connect the three presidency towns of India, and also are in connection with the principal centres of commerce in the Ganges valley and as far north as Lahore; that the amount of money sunk in guaranteed capital of railways was very large—nearly £94,000,000—and that the produce of the railways only returned a very small percentage on the outlay; and that as far as the commercial aspects of the districts round Lahore

¹ Despatch from Secretary of State, No. 54, Railway, of 27th March 1873.

were concerned, it appeared that, Karachi being its natural outlet, a railway on the metre gauge would amply cope with commercial demands. But as far as the military requirements of the north-west frontier are concerned, the matter might now be different; it was on this aspect of the question that doubts of the soundness of the policy pursued had been raised. With reference to these arguments, and dismissing the question of danger in India from internal disturbance, the Duke of Argyll wrote :—

29. It is evident, therefore, that whatever special importance is attached in many minds to the adoption of the standard gauge beyond Lahore is connected with the special danger of invasion from without.

30. On this important part of the subject, the facts presented by the recent war in Europe have very naturally had a powerful influence on opinion. And I have no hesitation in saying that, if the circumstances of India were the same, or had even any analogy with the circumstances of France and Germany, the argument for uniformity of gauge would be conclusive.

31. I have therefore to direct your attention to the difference, amounting to contrast, which exists between the two cases.

32. All the leading States of Europe are in close contact with other nations having armies more or less equal to their own—possessing at least the same advantages of science, of organisation, and of speedy access to their mutual frontiers. The consequence is, that in all these cases great armies with powerful artillery can be placed at very short notice in a position to invade their neighbours.

33. Since the defeat and dissolution of the army which had been trained under Runjeet Singh, and the conquest of the Punjab, no similar conditions exist on our Indian frontier. There is no nation upon that frontier, or for many hundred miles beyond it, with any military science, with any trained or regular army, or with any artillery whatever.

34. I do not place out of view the possibility—although I do place it in a distant future—of a great European power organising

offensive operations from beyond the north-west frontier. But even if such operations were possible at the present time, we may be sure of this, that no such invasion of India from that quarter could be effected without the threatened danger being known to us not only many weeks, but many months, before it could actually arise.

The conclusions arrived at by the Secretary of State were that a metre gauge railway from Karachi through Lahore to Peshawur would be amply sufficient for the trade of the country; that such a line would also suffice for all military demands in the event of a war on the frontier; and that, consequently, only weighty considerations of political necessity would induce him to reopen the question of the gauge of these frontier lines. The following are the concluding paragraphs of the despatch :—

37. In connection with such a system of narrow gauge lines, and a view to increase the amount of rolling stock available upon portions of it, it may be wise ultimately to lay down a third rail on the section of the trunk line between Lahore and Delhi, thus bringing into play the whole carriage accommodation of the projected Rajputana line. But even without this junction, the amount of rolling stock on the Indus Valley and Punjab lines alone would be sufficient, within very moderate limits of time, to afford the most important facilities for military movement.

38. It has indeed been argued, not unnaturally, that if the danger of invasion be really so slight and so distant, these frontier lines should not be made at all. But this does not follow. The time which would be ample for the working of a narrow gauge line, with even the narrowest estimate of accommodation, would not be adequate for the construction of any line whatever. Moreover, although an invasion requiring the concentration of great armies is a very remote danger, border forays and disturbances, and even incursions of a more serious character, are possible and probable enough. These, if unchecked and unpunished, are never without effect on the tranquillity of India. To meet these, the facilities which would be afforded by the narrow gauge in

moving amply sufficient bodies of men are facilities so valuable and important, that we are bound to place them in the hands of the Government of India, if we can do so at a moderate cost.

39. These are the considerations which mainly determine my assent to the construction of lines in the Punjab and down the valley of the Indus ; and I still regard them as sufficient, provided these lines can be constructed on the cheaper system now generally admitted to be suitable for subsidiary lines.

40. Your Excellency will doubtless bear in mind that the Khyber Pass is not the only, nor even perhaps the most probable, direction in which the invasion of India by a large army would be attempted. If, therefore, this danger is to determine our policy, we must be prepared to extend the more costly gauge of railways to much more distant points, and indeed to construct the whole system of lines in connection with the Indus Valley on the same scale of outlay. If the cheaper gauge be adopted throughout, there will be no break of gauge beyond our military base throughout the whole provinces of the Punjab and of Sind. But the evil of a break of gauge, whatever it may be, will at once arise unless the standard be adopted not only for the line to Peshawur, but for all other lines which may yet have to be constructed in those provinces.

41. Your Excellency will also doubtless bear in mind that although attempts have been made to show that the expense of working and of maintenance on the standard gauge need not be materially greater than on the narrow gauge, yet these attempts must be regarded as based on the same methods of reasoning which you have rejected as regards the cost of construction. The additional capital which is sunk in construction is therefore only part of the loss which will be incurred. The dead weight arising out of annual loss on traffic will be heavily increased on lines which must be of a comparatively unremunerative character, and the difficulty you experience in diminishing expenditure and in abstaining from new taxation will be increased.

42. Lastly, looking to the many other lines into and through richer provinces of India which are now competing for the favourable attention of your Government, but from which I have been obliged to withhold or to suspend my sanction until clearer



evidence be forthcoming as to their remunerative character, I am bound to say that nothing, in my opinion, short of very weighty considerations of political necessity would justify such a large increase of cost on the subsidiary lines as that which you report would be involved in a departure from the decision of Lord Mayo's Government on the gauge of those lines.

43. Should any such considerations suggest themselves to your mind, I shall deem it my duty to weigh them carefully in Council. But short of such considerations, and on any mere balance of arguments less grave in character, I should be reluctant to reverse a decision which has not only been deliberately made, but has been already, to a large extent, acted upon, and any departure from which must involve such considerable sacrifices to the revenues of India.

This despatch was received in India in April 1873, and the position of affairs at the time was as follows. Considerable progress had been made on the Punjab Northern Railway on the metre gauge, and the girders for the bridges over the Ravi, Chenab, and Jhelum rivers were made for the narrow gauge. On the Indus Valley Railway work on the metre gauge had been progressing fairly well, and a good start had been made on the bridging of the flood openings required to pass the spill waters of the Indus. Also on both lines a large outlay had been incurred in permanent-way, locomotives, and rolling stock adapted to the metre gauge, and a good deal of this material was already in the country. No arrangements had been entered into or proposals made to the Sind, Punjab, and Delhi Railway Company for the provision of a third rail along their line between Karachi and Kotri and between Mooltan and Lahore, so that, as far as was contemplated at that time, there would be a break of gauge at Kotri and another at Mooltan. Moreover, the contract with the Sind, Punjab, and Delhi Railway Company was not determinable until 1885, so that any radical alterations of their lines could only be accomplished by arrangement. In order, therefore, to have the



question of gauge again thoroughly discussed from a military and political point of view, and quite independently of the commercial aspect, the opinions of the Commander-in-Chief and his military advisers were sought, as were also those of Colonel C. H. Dickens, R.A., then Secretary to Government of India in the Public Works Department, and of Mr. (now Sir) G. L. Molesworth, the Consulting Engineer to the Government of India for State Railways. All these opinions were attached to the answering despatch sent to the Secretary of State.¹ As they, and more particularly the notes by Colonel Dickens and Mr. Molesworth, formed very important features in the correspondence, and serve to indicate the change of ideas regarding these frontier lines which was at work in the Government of India, it is necessary to give in some detail the nature of the arguments and opinions therein expressed.

The Commander-in-Chief was asked if the military considerations involved in making the Indus Valley and Punjab Northern Railways on the metre gauge were of such magnitude as to justify the Government of India to revert to the old 5 feet 6 inches gauge, and to incur the large and fruitless expense that such a reversion would involve. The superiority of the broad gauge for military transport purposes was at once admitted, but the Commander-in-Chief was asked to support his opinion with statistics giving the relative value of the two gauges for military purposes, and the effect of a break of gauge in the movement of such bodies of troops as Lord Napier might think likely to require to be moved in the case of war on the north-west frontier. A practical example of concentrating 10,000 men and 36 guns was worked out by the Quarter-Master-General, and the relative capabilities of the broad and narrow gauge railways shown in an elaborate memorandum drawn up by Colonel F. Roberts, R.A., V.C., now Lord Roberts. In forwarding this to Government, Lord Napier remarked "that the arguments and statistics contained

¹ Despatch to Secretary of State, No. 140 Railway, 19th July 1873.



in the memorandum not only conclusively prove the great advantage which the broad gauge possesses over the narrow for military purposes, but he believes, moreover, that they would even now justify the Government of India in undertaking the expense of a reversion to the $5\frac{1}{2}$ feet gauge on both the Indus Valley and the Punjab Northern Railways." It had been ordered that the Punjab Northern Railway should, as far as possible, use a portion of the grand trunk road north of Lahore, and the works then being carried out occupied a portion of that road almost continuously between Lahore and Wazirabad, a distance of 60 miles. Among other deductions drawn from the Quarter-Master-General's memorandum was the one "that if the narrow gauge be determined upon, the railway will be used almost exclusively for the transport of stores, etc., and the great mass of the troops will have to march: it is, therefore, most essential that they should be able to do so with speed and regularity." Consequently the Commander-in-Chief represented the vital importance of keeping the grand trunk road free for the movements of troops by route march. Quite apart, however, from the deductions drawn from Colonel Roberts' memorandum, the Government of India had already recognised that their original orders to lay important railways on existing roads required modification, as the existence of a railway did not do away with the necessity of parallel road communication: consequently this point was readily recognised and used in the answering despatch to the Secretary of State.

The Consulting Engineer for State Railways also submitted an elaborate report on the whole question.¹ Mr. (now Sir) Guilford Molesworth commenced his report with the remark that the adoption of the narrow gauge for State railways in India had been settled before his arrival in India, and that he had been informed that the question was not to be reopened.

¹ Report on the question of the gauge for State Railways of India, dated 23rd June 1873.

In an annual report he had, however, stated his "conviction that a break of gauge was a very serious evil, and that it should, if possible, be avoided; that a break of gauge was better than no railway; and that having adopted the narrow gauge, the more it is connected and extended into one large system, the less will its evils be felt." Mr. Molesworth had before him the memorandum by the Quarter-Master-General (above referred to), and he showed the locomotives and stock designed for the metre gauge lines were little, if at all, inferior to the stock then running on English railways. Discussing the whole matter impartially, he arrived at the following conclusions :—

1. The capacity of the metre gauge stock is sufficient for all purposes of railway transport.
2. The carriages and waggons on the metre gauge railway are nearly equal in capacity to the ordinary stock of English railways.
3. The locomotives designed for *low* speed on the metre gauge are equal in tractive force to the large express engines designed for high speed on English railways.
4. The rolling stock for the metre gauge will be perfectly safe at a speed twice as great as that proposed for the State railways of India.
5. The metre gauge, in my opinion, is sufficient for all commercial and military purposes.
6. The cost of a broad gauge railway (60 lb. rails), with structures designed for the engines and other rolling stock of the guaranteed railways, will (excluding very large bridges) exceed the cost of the narrow gauge by £1650 or £2000 per mile.
7. The cost of a broad gauge railway (45 lb. rails), with structures designed only for the carriage and waggon stock of the guaranteed railways (*but not for the engines*), will exceed the cost of a narrow gauge railway by £720 or £1000 per mile.
8. The cost of a broad gauge railway (40 lb. rails), with



structures designed for the same axle loads as the narrow gauge, will exceed the cost of a narrow gauge railway by £350 or £500 per mile.

9. The last of these three would practically be as great an obstacle to the interchange of traffic as if a break of gauge existed.
10. There will be no appreciable difference between the working expenses of the broad and narrow gauge railways.
11. The break of gauge in a commercial point of view, though an evil, is not one sufficient to justify the commendation of the narrow gauge.
12. The break of gauge in a military point of view is a *very serious evil*.
13. A reserve of 1000 vehicles will suffice for any military emergency on the frontier.

Mr. Molesworth then proceeded to discuss from a military point of view the several railways in Western India with reference to strategical positions. He recommended a comprehensive system of narrow gauge lines which would include the Punjab Northern, Indus Valley, and Rajputana lines, and would necessitate the conversion to narrow gauge of the Sind, Punjab and Delhi, and the Bombay, Baroda, and Central India Railways. If such a system were adopted and a uniform policy kept in view, he considered that the adoption of the narrow gauge would be completely justified. But if, on the other hand, the Government should consider that such a comprehensive system was too remote or too difficult of attainment, and that the narrow gauge system would remain a series of railways isolated and disconnected, then he considered that the introduction of the metre gauge system was a mistake. Mr. Molesworth showed by comparative estimates what it would cost to convert the works on the Indus Valley and Punjab Northern lines into broad gauge lines; also that, with a 45 lb. rail and a light class of engine, the conversion could be effected for an increase of about 15 per cent on the estimated cost for

metre gauge, and that in his opinion the maintenance of uniform gauge is worth that additional expenditure.

Colonel (now General) Dickens, the then Secretary in the Public Works Department, reviewed the whole case in a note which was attached to the answering despatch. In this he stated his concurrence in most of the arguments which Mr. Molesworth had brought forward, and supported that gentleman entirely in the sufficiency of the metre gauge even for military operations. Colonel Dickens also added that "the cases which would attach to the delay of one day, which the break of gauge at Lahore would occasion, might be left out of consideration. But there are more weighty opinions on the opposite side, and by those he thinks the Government should be guided, seeing that if they err, they err on the safe side." He thoroughly approved of the decision to make narrow gauge lines, as the Government could not afford to enter on any general extension of railways without studying the greatest economy, and selecting the lines as to ensure a quick return for the outlay. But as regards the two particular lines in question, the Indus Valley and the Punjab Northern, his—

Own opinion was against the change from broad to narrow gauge in 1870-71, not from any doubt as to the capabilities of the narrow gauge, but from the conviction that these two lines would be generally regarded as part of the trunk system of railways in India, and as important chiefly in view to political and military objects. If any military emergency, such as to call these lines into use under severe pressure, was really to arise, the break of gauge would be a very serious matter. And if no such emergency arose, the knowledge that there was such a serious obstacle to their use would detract from the moral effect of the works. These reasons were in his opinion sufficient at least to make these lines undesirable to select as the first to be constituted on the narrow gauge. It is true that the military communication would be the better for a railway on the narrow gauge than without any railway at all. But still, the importance attached to the break of gauge,



and the dissatisfaction with which a narrow gauge in such a situation would be regarded, seemed more than to balance the financial advantage.

Colonel Dickens also stated that having been absent on leave when the decision was come to, he had not had occasion before to express this opinion officially. Another reason which guided him in thinking that the Indus Valley line should be on the broad gauge was that already 324 miles out of the 814 between Lahore and Karachi were laid and working on the broad gauge ; and it was only on the conversion of these parts into narrow gauge that the line between Lahore and Peshawur was to be dependent for its extra rolling stock in cases of emergency. Regarding the adoption of the 5 feet 6 inches gauge with lighter rails, Colonel Dickens remarked :—

The adoption of the broad gauge with light rails and rolling stock would enable us to utilise much of the narrow gauge material, and would save time and money therefore. But if a change is made for military and political reasons, it should, I think, be thorough, and leave no doubt that these railways will be completely efficient and equal to all requirements of a military emergency, as much as the lines which are connected with them. In spite of all contrivances and precautions, I feel doubts of the possibility, under pressure of emergency, of keeping the heavy engines of guaranteed lines off the two lines in question ; and to admit them would be to injure seriously these lines when most required to be efficient. If a change is to be made, therefore, I would adopt the $5\frac{1}{2}$ feet gauge with a 60 lb. rail.

Colonel Dickens concluded his note thus :—

If any military mishap should occur after the establishment on these lines of the narrow gauge the Government would be said to have courted disaster. Nothing of the kind can be laid to their charge if they adopt the style of construction which has been in use in India heretofore to the satisfaction of the highest military authorities. Hereafter, when the metre gauge shall have been

tried and gained confidence, it may be quite proper to introduce it on the Indus Valley and Lahore and Peshawur lines. But for the present I come (very unwillingly, I confess) to the conclusion that the progress of the works should be so far delayed as to allow of the introduction of the $5\frac{1}{2}$ feet gauge with the 60 lb. rail.

I think also that the occupation by the railway of the Lahore and Peshawur road should be given up. But the railway should be by no means taken to such a distance from the road as to be out of reach of easy military communication throughout the route.

The extra expense of the adoption of the broad gauge in this case I would regard as a military and political expense, and not as a part of the general system for the extension of railways in India.

The extra cost of adopting the broad gauge with the 60 lb. rail instead of the narrow gauge with the 40 lb. rail is estimated by Mr. Molesworth at . . . £1,536,200

To abandon the trunk road between Lahore and Jhelum, as well as between Jhelum and Peshawur, would probably cost 360,000

Total £1,896,200

But if the railway be terminated northwards at Attock, as I think it should be, the difference will be reduced by £171,500, leaving the extra charge to be incurred in round numbers at £1,700,000.

The interest on this sum is less than the cost of maintaining one regiment of European infantry.

These opinions were all duly weighed by the Government of India, and the Duke of Argyll's despatch, dated 27th March 1873, was replied to on the 19th July 1873. The despatch was signed by all the Council, but in the opinions expressed they were not unanimous. Dissents against a new



departure from the existing policy were recorded by Sir R. Temple, the finance member, and the Honourable B. H. Ellis, the member in charge of public works; and these dissents were sent home with the despatch. The despatch commences by saying that the Government of India—

Adheres to the views originally expressed, namely, that the economy which will result from the adoption of a narrow gauge in the case of a large proportion of the contemplated railways in India overweighs the disadvantages which accompany a break of gauge; and that although it may be expedient to adopt the 5 feet 6 inches gauge on a few of those lines, new railways in India should, for economical reasons, be generally constructed with the narrow gauge. Our opinion in this respect has been confirmed both by the satisfactory report which we have received of the experimental working of the State railway between Delhi and Rewari, and by the general conclusions at which Mr. Molesworth has arrived after a careful comparison of the relative advantages of the broad and narrow gauge.

But Lord Northbrook did not consider that the question now at issue extended to the general suitability of the narrow gauge for State railways, but referred solely to the propriety of continuing to build the Indus Valley and Punjab Northern Railways on the metre gauge. A glance at the map of India was sufficient to show that a line of railway from Lahore to the sea at Karachi must be considered as one of the main trunk lines of India. That distance measured 814 miles, and of this distance 324 miles in two lengths, one at either end, were already built on the broad gauge, and were in operation. It was originally proposed to convert this open length to the metre gauge, or to lay down a third rail for the passage of metre gauge vehicles, but this proposal is not dwelt on in this despatch, which only combats with the question of break of gauge. The despatch points out that some of the highest military authorities took part in the discussion on the relative merits of



in the meantime, by the desire of the Secretary of State, the military aspect of the case had been reconsidered in England by General R. Strachey and Major (now Sir) E. C. S. Williams. The notes submitted by these officers were generally directed against the statements and conclusions drawn by the Quarter-Master-General in India as to the want of capacity of the metre gauge for military purposes. The question of the change of gauge was a serious one, and was discussed by the Cabinet. On the 18th November 1873 the Duke of Argyll telegraphed to Lord Northbrook—

Cabinet consulted gauge question. Unanimously, with me, in declining to expend million and a quarter excess beyond estimate for narrow gauge; but we will not overrule you if you determine after receiving our despatch to take standard gauge with 45 lb. rail, as Molesworth suggests.

A despatch to that effect followed immediately afterwards, and reiterated the decision in the telegram. The Duke of Argyll remarks in this despatch that while—

The Government of India and its professional advisers are satisfied of the complete sufficiency of the narrow gauge, considered in itself, for all purposes both civil and military, . . . the only objections to adhering to the decision of the Government of Lord Mayo as applied to the particular lines in question are, first, the inconvenience which may result from the occasional necessity of transferring troops and military stores from one set of conveyances to another; and, secondly, the inconvenience which may arise from a supposed limitation of rolling stock.

As regards the want of sufficient stock for the metre gauge lines, the Secretary of State remarks that he has seen no evidence to convince him that the systems as proposed by Lord Mayo would not be supplied with as much stock as could be usefully employed. He considers the inconvenience of break of gauge much exaggerated; but as the Government



of India attaches so much importance to this convenience from a military standpoint, he will not over-rule that Government if it decides on the standard gauge with a 45 lb. rail, as suggested by Mr Molesworth. And in conclusion, while agreeing to the policy of removing the Lahore-Rawalpindi line from off the grand trunk road, he remarks that—

It is not without the greatest reluctance that I shall advocate any further extension of the exceptionally broad gauge, which was adopted in India when very sanguine expectations were naturally entertained, but which experience has proved to be needlessly cumbrous and expensive for the traffic of the country. I should greatly prefer the other alternative, which is evidently regarded with favour, on its own merits, by Mr Molesworth, namely, that of making the new narrow gauge system still more extensive and still more connected.

— But, notwithstanding the fact that the Sind, Punjab, and Delhi Railway Company had agreed to modify their engines so as to render practicable the Indus Valley Railway being made on the standard gauge with a 45 lb. rail, the Government of India decided not to adopt the broad gauge with a 45 lb. rail. The Government of India disclaimed that the question of gauge had been reopened at its instance; but since the Duke of Argyll had permitted its rediscussion, Lord Northbrook was now of opinion that it had been a mistaken policy to think of constructing either the Indus Valley or the Punjab Northern on the metre gauge, and that nothing short of the standard gauge with a 60 lb. rail would satisfy the exigencies of the case. The Commander-in-Chief, Lord Napier, was absent from Calcutta at the time this despatch was being discussed, and did not sign it, but his views were ascertained and embodied in the despatch. He gave his decided preference for the broad gauge with a 45 lb. rail,—not apparently on the score of economy, from which standpoint the question was being fought, but because it ensured the broad gauge winning the day, as hereafter it would be an easy

the 5 feet 6 inches and smaller gauges at the Institute of Civil Engineers, and that they condemned a break of gauge on military grounds. The consensus of military opinion in India was the same. Also, although the Indus Valley would doubtless be of considerable value for passenger and commercial traffic, its value for military purposes was of much more importance. The line from Lahore towards Peshawur, and which was already sanctioned as far as Rawalpindi, was designed entirely for military and political reasons; consequently the question of gauge of these lines was a matter which should be settled entirely on military grounds. On this evidence the majority of the Council agreed with the Viceroy in recommending that the 5 feet 6 inches gauge be adopted on these frontier lines, as that would settle for ever all difficulties as to a break of gauge at Lahore. ✓

Sir Richard Temple dissented from this decision, because the evidence was quite conclusive in showing that the capabilities of the metre gauge were ample for all military requirements, and that it was very much cheaper to reduce the gauge of the open lines between Karachi and Lahore, or to lay down a third rail until those lines could be acquired from the Guaranteed Company. The dissent of the Honourable B. H. Ellis is recorded in a powerful minute, in which the whole tenor of the despatch is severely criticised. His reasons for dissent are summed up thus in his minute :—

1. The despatch of the Secretary of State, to which this despatch purports to be a reply, has anticipated all the points now urged, and has not really been answered.
2. Though Mr Molesworth and Colonel Dickens are in accord with the despatch on the particular issue, the facts stated in their notes tend to show that the narrow gauge is efficient for all purposes, and greatly more economical than the broad gauge.
3. The opinions of the military officers, quoted in the despatch, are not relevant.



4. The military objections based on the report of Colonel Roberts are overstated.
5. Substantially there will be no break of gauge seriously affecting military operations.
6. There are alternative suggestions for meeting the requirements of the military authorities in a less objectionable way than by incurring needless expense in constructing a broad gauge line, when a narrow gauge suffices for the traffic.
7. The additional cost of the broad gauge will be greater than is estimated in the despatch, and sufficient weight has not been given to the financial considerations involved.

Mr Ellis laid great stress on the financial points, and warned his colleagues of the results likely to occur if the Secretary of State sanctions a change to the 5 feet 6 inches gauge on these lines :—

In the first place, it cannot be admitted that in this discussion it is only the gauge of the two railways specially named that is being discussed. I warn my colleagues who entertain this belief that the present movement is but the thin end of the wedge ; and that if the Government give way on this occasion, the whole policy of the narrow gauge railways in India is imperilled. I know that it is even now sought to construct on the broad gauge the line from Gwalior to Agra, which forms a part of the Rajputana series of metre gauge lines connected with the narrow gauge terminus at Agra. I know also that an effort will be made to adopt the broad gauge on the line from Ajmere to Ahmedabad now under survey, this also being a part of the regular Rajputana series. Other lines will follow, and the result will be a number of isolated metre gauge lines, each of no great length ; and when these are found to be unsuccessful, it will be asserted that the whole scheme was a mistake. But such a result may fairly be attributed, not to the policy itself, but to the divergence from that policy involved in the departure from its principles in individual instances as they occur.

This despatch was not answered until November 1873, and

matter to change the lighter rail for a 60 lb. one when required. Sir Richard Temple and Mr Ellis still retained the opinions they had recorded as dissents from the previous despatch ; and it was also stated in this despatch that "Mr Hobhouse, who was unable to attend when the question was before discussed, is inclined to take the same view." The question of changing the gauge of these two lines to the standard gauge was therefore supported by Lords Northbrook and Napier of Magdala, Sir Henry Norman, and Mr E. C. Bayley.

Apart from the gauge question, the Government of India showed in this despatch that the works on the Punjab Northern Railway had proceeded so far that it was much better to allow the metre gauge line, which had been laid along the side of the grand trunk road, to be finished and used as a temporary line, pending the decision of the gauge for the eventual line which was to be made off the road. To this the Secretary of State agreed,¹ saying that "you may proceed at once with narrow gauge on Punjab Northern line. In a few days I shall tell you what I decide on the Indus Valley, if I decide at all." Mr Gladstone's Cabinet resigned a few days afterwards, and Lord Salisbury took over the India Office portfolio on the 22nd February 1874 ; but in the interval between sending the above telegram and the resignation, the Duke of Argyll gave his decision on the gauge question.² He exonerated the Government of India regarding the reopening the question of gauge, but said it was necessary in order "to test the persistent representations of those who have contended that no great excess of cost is involved in the broad gauge." The Duke remarked that no less than three members of the Viceroy's Council dissented from the views of the majority, and recorded his refusal to constructing these lines on the broad gauge in the following terms :—

¹ Telegram dated 12th February 1874.

² Despatch No. 20, Railway, of 16th February 1874.



9. Under these circumstances, Her Majesty's Government are of opinion that there is no sufficient reason for departing, at very considerable cost, from the careful and well-considered scheme of the late Lord Mayo's Government. That scheme will establish a cheaper system of railways commencing at Lahore, and reaching from the extreme frontier of our dominions to the sea. There it will be in unbroken communication with a separate harbour of its own on the western side of India, and as easily accessible as Bombay by the shortest route from England.

10. The system of railways will be constructed on a gauge which, as shown by your consulting engineer, can easily be made to have a carrying capacity of the English standard gauge, and one sufficient for all purposes of railway transport. On the same authority, it appears that the rate of travelling can, with perfect safety, be made double that actually proposed for the State railways of India, and that in other respects it is sufficient for all purposes, whether military or commercial.

11. I have therefore to instruct your Excellency to proceed with the scheme originally laid down by Lord Mayo's Government, and subsequently adopted under the authority conveyed by my despatch of 26th October 1870, No. 72.

12. You will consider carefully the detailed arrangements (many of which have been already suggested by Mr. Molesworth) which may secure the largest carrying capacity of carriage on the narrow gauge, and the greatest facilities in platform accommodation, etc., for transfer at the one great station, Lahore, where alone it will be required.

This was probably one of the last acts of the Duke of Argyll before leaving office, but the matter was evidently not considered as finally disposed of by that decision, for on the 21st March 1874 Lord Salisbury telegraphed to Lord Northbrook not to take the orders in the Duke of Argyll's despatch (No. 20) as final. But up to the 16th April 1874, when the Government of India forwarded to the Secretary of State a further memorandum on the question of break of gauge from a military point of view by Colonel F. Roberts, R.A., V.C.

(now Lord Roberts), no further orders had been received in India. The gauge question was, however, decided early in June of that year, as the Secretary of State telegraphed on 11th June that the standard gauge and rails were sanctioned for the Indus Valley line; but it was not until the 25th June 1874 that Lord Salisbury signed the despatch giving definite orders on the subject.

This despatch set at rest the question of gauge on these two lines; and not only have they been opened on the 5 feet 6 inches gauge, but important extensions to Peshawur, Khus-halgarh, and to the foot of the Bolan Pass, are also either under construction or built on the same gauge.

During the year 1874 the question of gauge for the branch line from Agra to Gwalior was also under consideration. Mr. Ellis, the honourable member in charge of the public works, represented that this branch belonged to the Rajputana system of narrow gauge lines, that it would not be a paying line, and therefore had nothing in its favour to be considered as a trunk line. But the fact that Maharaja Sindia had promised to lend the Government of India 75 lakhs of rupees at 4 per cent if the line was made, that he had expressed a desire to have the railway on the 5 feet 6 inches gauge, and that the Commander-in-Chief's representations that such a line was a strategical one and of great importance from a military standpoint, decided the Government of India to make this branch line on the 5 feet 6 inches gauge. No further questions regarding gauge arose until the Government of India issued orders to commence the line of railway between Ahmedabad and Ajmere. For several years before it had been the desire of both the Guaranteed Railway Companies with termini in Bombay to extend their ventures northwards, and get an entrance into the Gangetic Valley. The Bombay, Baroda, and Central India Railway Company had even been permitted to make a series of surveys as far north as Agra and Delhi; and the Great Indian Peninsula Railway Company



was desirous of extending its system into Malwa by means of a branch to Indore. The decision of Lord Mayo's Government to stop all further guarantees on the old system, and for Government to undertake the construction of its own railways, interfered with these proposals, as the construction of all railways through the States of Rajputana and Central India was considered a work which should be exclusively undertaken by Government. Surveys between Ahmedabad and Ajmere were commenced by the Government of India towards the end of 1872, with a view to eventually running a railway on the metre gauge through that part of Rajputana. The Government of Bombay, whose views on the subject had been invited, regretted that the line was not to be built on the standard gauge; but as a break of gauge had been determined upon, recommended that it should take place at Pahlampur, and not at Ahmedabad, as the province of Guzerat was sufficiently fertile to demand a railway on the broad gauge. That Government also recommended that the section between Ahmedabad and Pahlampur should be handed over to the Bombay, Baroda, and Central India Railway Company to be built under their guarantee. The London Board of Directors of this Railway Company were also pressing their claims for extension northwards and objecting to any break of gauge; but they were informed by the Secretary of State, Sir Charles Wood, that it was not intended to deviate from the policy under which it had been decided not to sanction the extension of that company's lines with guaranteed capital unless by the possible authorisation of short branches as feeders.

In July 1874, after Lord Salisbury's decision to construct the Indus Valley line on the 5 feet 6 inches gauge, the Government of Bombay again strongly urged its views, to the effect that "it is imperative that the Ahmedabad and Ajmere line should also be laid on the broad gauge, if not as far as Ajmere, at least as far as the point which is best suited for the junction of any future Sind extension." The Honourable

B. H. Ellis, before resigning his seat in Council, went over the projected line, and considered that there were no valid reasons for desiring to reopen the question of gauge for any part of this line. Consequently, in the despatch recommending the Secretary of State to give his sanction to lines from Ahmedabad to Ajmere, and from Neemuch to Nasirabad, the question of gauge was not mentioned ; the estimates were for a metre gauge line ; those estimates were sanctioned, and orders were issued to construct the lines on the metre gauge. But a feeling was growing up that the section between Ahmedabad and Pahlampur might well stand the broad gauge. Owing to the failure of the south-west monsoon in 1877, severe famine was felt in Guzerat. The Minister of the Baroda State strongly urged the immediate construction of the section between Ahmedabad and Pahlampur on the broad gauge. This was recommended to the Secretary of State for acceptance, not only because the Baroda Railway could then work the section and so utilise its surplus rolling stock, but also because the Baroda State had contributed largely to a recent loan. The Secretary of State consented, and the earthwork and bridges on this section of the line were ordered to be made for a 5 feet 6 inches gauge. It was considered that this part of the line would probably form part of any line going towards Hyderabad in Sind ; and the surplus engineers set free by the completion of the Indus Valley Railway were employed during the cold season of 1877-78 in running trial lines between Deesa and Sind. Sir Andrew Clarke, member of Council for Public Works, considered that such a connecting link was absolutely essential for strategic purposes, and that it would soon have to be undertaken.

It was, however, presently discovered that the Bombay, Baroda, and Central India Railway Company had no powers to work any other line except their own ; and that even if they obtained the requisite Parliamentary power, which they were anxious to get, they would want a large increase of stock to



work the extension. Consequently, in May 1878, the Secretary of State asked by telegram if the Government of India was still of "opinion that the portion of the railway between Ahmedabad and Pahlanpur should be constructed on the broad gauge." This was not officially replied to until January 1879, when the Government of India reported¹ that the orders regarding the construction of portion of the line between Ahmedabad and Pahlanpur on the broad gauge had been rescinded, and that now the whole line between Ahmedabad and Ajmere would be on the metre gauge. Difficulty had been experienced on the southern part of the line in brick-burning; and although the earthwork on the section to Pahlanpur was completed for a broad gauge line, little or no bridgework had been commenced; the additional expense due to the orders in 1877, when famine-relief operations were needed, was consequently trifling. The following extract from the despatch gives the argument of the Government of India :—

Our reasons for accepting the alteration from the broad to the metre gauge suggested by your Lordship, between Ahmedabad and Pahlanpur, are, first, that the change will effect an immediate saving of some 12 lakhs of rupees; secondly, that it is better to have a break of gauge at a military station like Ahmedabad than at an outpost like Pahlanpur; thirdly, that the prospect of an extension towards Sind is remote, and that, even when the extension is taken up, it is probable it will be built on the same gauge as the Rajputana system, instead of on the broad gauge of the Baroda Railway; and, fourthly, that, as far as can be judged at present, there are no reasonable grounds for apprehending that the metre gauge will not suffice to carry the traffic between Pahlanpur and Ahmedabad.

2. We are aware that the conclusion we have arrived at will be distasteful to the mercantile community of Bombay and also to the Baroda Railway Company. But the aim of the former is to

¹ In despatch No. 24, Railway, 24th January 1879, to Secretary of State.

convert the whole line from Ahmedabad to Delhi and Agra into a broad gauge undertaking, a result which could not be achieved without an expenditure of two or three millions sterling; while the object of the latter is to secure the control of the traffic working of the State railway. Both parties are earnest in their conviction that the interest of Bombay, as a seaport in competition with Calcutta, is injured by a break in the direct road to the North-Western Provinces, and that the existence of two gauges, with double proprietorship and management, will increase charges for transport, diminish conveniences for travelling, and cause delays in transmission of goods. We believe there is some exaggeration in these apprehensions, and that it would be unjustifiable for us, even if it were feasible under the financial existing circumstances of the Empire, to expend in their removal two or three millions sterling.

To this despatch Sir Andrew Clarke recorded a dissent, as he believed that the economy could only amount to 6 lakhs, which was not commensurate with the advantages to be gained. He also pointed out that, in his belief, the traffic along the Rajputana Railway would be so great soon after its opening right through as to compel its conversion into the broader gauge at no very distant date. In this view he had been supported both by the press and by sundry representations made from time to time in the shape of memorials and resolutions at public meetings. The Government of India, however, stood firm, and was supported by the Secretary of State, Lord Cranbrook. The question of the gauge on the Rajputana-Malwa system of railways was supposed to be finally set at rest. The anticipations of Sir A. Clarke have, nevertheless, been proved to have been based on sound judgment. The traffic on this system has already become too heavy for the gauge, and the question of converting it to the broad gauge, or of increasing its carrying power in other ways, has been before the Government for some years past.

It having been determined to adopt a second gauge in



India for secondary lines, a constant and fruitful source of discussion arose on the question of gauge for each new project that came forward. It was not, however, until the revival of projects by companies, on the basis of "private enterprise" in railways, that any serious difficulty arose, ending in practically resuscitating the old gauge controversy. The subject was formally reopened in 1883-84, by the Government of India, asking for the opinions of experts as to the relative cost of transport on each gauge, having arrived, though somewhat incorrectly, at the conclusion that the figures would be in favour of the broad or standard gauge. It was admitted, however, that in first cost the narrow gauge showed a material saving. In April 1884 the Government of India considered it advisable to refer the whole question to the Secretary of State, and in their despatch (No. 48, Railway), they said that they understood that the policy accepted for some years past by both themselves and the Secretary of State was in effect that the metre gauge was to be invariably adopted for local and provincial railways, "specially designed for a slow goods traffic," and that a network of subsidiary lines of this nature, and at the lowest possible cost, should be promoted as far as possible. The standard gauge was, on the other hand, to be regarded as suited to "supplementary through lines of communication," or those which are designed for military or strategic purposes. In applying those broad principles to the selection of gauge for each project, the Government of India thought that certain further points must be borne in mind.

First, as the evil of break of gauge and cost of working a railway are intensified in proportion to the shortness of the lead, short connections of a different gauge from the railways connected should be avoided as far as possible; and, in the case of through communications, should be deemed absolutely inadmissible. *Second*, in estimating probable traffic, full allowance must be made for development under the stimulus of the line itself, and of the general progress of the Empire, and also for special

circumstances (such as a famine in the case of a "protective" railway), which may throw on the line an abnormally heavy traffic at particular periods in a year or a cycle. Earlier estimates appear to have been too often below the mark in this respect. The advance in doubling the East Indian and Great Indian Peninsula Railways indicates that a vast country like India will at no very distant date need the double broad gauge for all its arterial communications. *Third*, that it is not indispensable that all branches should be on the same gauge as the trunk line they feed. "Provincial and local" branches situated where the metre gauge is apparently ample to satisfy "local needs and local means" may be on that gauge, though the trunk line be broad gauge. The evil of break of gauge is the penalty, so to speak, which the locality must pay for the poverty of its resources.

The Select Committee of the House of Commons, which sat in 1884, substantially adopted these views, as the following passage from their report will show:—"With regard to the question of gauge, your Committee are of opinion that all the leading trunk lines, with their principal feeders, should be on the broad gauge, the metre gauge being as a rule confined to tracts of country where that system is already in successful operation, and to local lines where the traffic is likely to be so light, that cheapness of construction more than counterbalances the undoubted disadvantage of break of gauge." This decision was of service in dealing with questions of gauge then pending, but was clearly too vague, and perhaps intentionally so, to afford permanent guidance to the Government of India for the future. As a fact the question again arose in dealing in 1887 with the subject of the gauge for the Bengal-Nagpore Railway. This was settled in favour of the broad gauge. But the need, or at least the desire, on the part of some of the authorities in India for a more definite policy on the subject, caused in a great measure by proposals for the conversion of an important line from the metre to the broad gauge, led to a further reconsideration of the subject in 1889-90. Before



the end of 1888 a total length of 800 miles of metre gauge had been converted to the standard gauge, and nearly 200 miles of the latter to the metre gauge, involving an expenditure to the State of not far short of four millions sterling, while proposals for further conversions were being brought forward. It was not, therefore, too soon that at the end of 1889, the Director-General of Railways, then Colonel L. Conway-Gordon, R.E., submitted a note to the Government of India, in which he vigorously urged the necessity for a declaration of policy on the gauge question, and concluded by offering two alternatives for consideration. The first was to follow the English precedent, and make it illegal, without the special sanction of Government, to make any line of railway in India on any other than the standard gauge of 5 feet 6 inches; or, secondly, to localise the gauges to certain areas, and to make it illegal without special sanction to construct any line of railway, within the specified areas, of any other gauge than that approved for that area. He added that the first alternative would, in his opinion, be in the end the more economical to the nation; while the second, as a political measure, would be the most feasible.

Colonel Gordon's note was accompanied by the opinions of twenty-two railway officers, engineers, and traffic experts, the majority of whom were in favour of a definite policy, and of the adoption of geographical limits for each gauge; but on other points they were not in entire accord with Colonel Gordon's views, notably on the proposal for broad gauge lines of a light character. The subject was most carefully considered by the Government of India, and in June 1890 a despatch was sent to the Secretary of State, in which the evils of break of gauge were again dwelt upon, and definite proposals formulated, which were to the following effect:—That it was not desirable to legislate with the view of enforcing decision on the gauge question; that certain areas now occupied by the metre gauge should be as a rule reserved for that gauge;

but that, exclusive of these areas, it was proposed to lay it down as an absolute rule that no new main line should be constructed except on the standard (broad) gauge. It was, moreover, proposed to allow no material expansion of existing metre gauge systems, and to rule that the areas now in possession of that gauge should not be held to be unconditionally surrendered to it, but that if held advisable broad gauge lines of a light character might be laid through such areas.

In replying to this despatch in August of the same year, the Secretary of State for India (Viscount Cross) agreed with the Government of India that legislation was not needed, and that the power should be retained of deciding the gauge to be adopted on any projected railway. He held that, as reported by the Committee of the House of Commons, "it should be accepted as a rule that the main lines should be on the broad gauge, and the metre gauge lines confined to tracts of country where that system is in successful operation," and as regards questions relating to branches and feeder lines, he considered that each case should be decided as it occurs, and that there appeared to be no necessity for laying down any more positive rule. A suggestion in the Government of India's despatch, to the effect that it might ultimately be found necessary to convert a great part of its railway mileage in order to obtain uniformity, was met by the Secretary of State with but small encouragement. He held that the financial considerations in such an idea would be very serious, and that the money required for such purpose would be "better employed, and the object in view equally well secured, by making new lines of a uniform gauge with those connected through districts unprovided with railway accommodation." He concluded by saying that the decision as to the gauge for branch lines should be left with the Government of India, and that any scheme for conversion must be reserved for special consideration.

In submitting this question to the Home Government, the Government of India made no reference in their despatch to



the fact that gauges narrower than the metre—viz. of 2 feet and $2\frac{1}{2}$ feet—had been already introduced on some small lines, although permitted in their origin, as being nothing more than steam tramways on existing roads. Since the date of the Secretary of State's reply, and owing, perhaps, to the evident intention of the Home Government that the gauge question should be left open, there has been an inclination to recognise and allow the $2\frac{1}{2}$ feet gauge for short feeder lines, on either independent substructure or on the side of existing roads. For lines of the latter class, which can be made and stocked for from 15,000 to 17,000 rupees per mile (£950 to £1100), there is certainly a large field in India, and it seems probable that this small gauge may before many years show a large mileage. The 2 feet gauge has at present a very small mileage, and is not likely to extend. It was laid down as a tramway originally on the east road between the plains and Darjeeling, a hill station on the Himalayas, but this line has since become practically a railway in nearly every condition.

—How the gauge question will be determined in India, or whether indeed it will ever be settled, is very difficult to foresee. The development of late years of competitive lines, the steady growth of traffic, and a healthy spirit of rivalry, has led to a marked increase in train loads, and consequently in the weight of engines and in the weights on axles. This has been recognised by the Government, and revised standard dimensions and wheel loads have recently been sanctioned for each gauge, which, it may be hoped, will be held to be final. If this is done, and if the traffic on Indian railways expands in the future in anything like the same ratio as has been shown in the last ten years, it may be expected that fresh proposals will arise for the conversion of the narrow gauges into broader, and that considerable pressure may be brought to bear on the Government of India to assent either to this or to a further revision of the standards. The conversion from the metre to the standard gauge has so far shown that the cost, exclusive of

rolling stock, will be from £3000 to £3500 per mile, allowing for the sale, in a very limited and steadily decreasing market, of the metre gauge material. The operation is consequently one that cannot be lightly entertained. The original scope of metre gauge lines has certainly been largely extended. In lieu of being the field for mere branch or subsidiary lines, it can now show large systems of arterial communication, embracing many hundreds of miles of line, and carrying a traffic which would in some cases perhaps be more conveniently and more cheaply dealt with on the standard gauge. But these developments were difficult if not impossible to foresee. The surprising effects of the opening of the Suez Canal on the export trade of India was not realised by the projectors of the metre gauge, nor were the effects of the railways themselves in stimulating production, even in very unhopeful districts, in any sufficient degree anticipated.

But the saving to the country by the introduction of the metre gauge is undoubted. In capital cost alone, the difference between the metre and the standard gauge has been found on careful estimates, over the same ground, to be on the average in the ratio of about $6\frac{1}{2}$ to 8, which represents about £1100 per mile of line, and thus on the present mileage of the metre gauge the saving is considerably over seven millions sterling. For the same traffic, under similar conditions as to grades, cost of fuel, and establishments, there is practically no difference worth notice in the cost of working as compared with the standard gauge, and the inconveniences of break of gauge have certainly not been recognised by traders, nor as yet in military emergencies. Had the standard broad gauge been insisted on throughout the country, excluding from consideration the broken reed of a "light" broad gauge, many a district now prospering under railway communication would for many a year have had to see its produce still carried by bullock carts over cross country tracks, or have given up the attempt to compete with more favoured localities.



CHAPTER V

RATES AND FARES

Passenger Fares

THE original contracts with the guaranteed companies afford the first indication of the views of the Government of India on the subject of rates and fares. In these it is stipulated that the companies shall allow the use of the railways to the public "on such terms as shall be approved by the East India Company," and shall not charge higher tolls without approval; it being further required that when the net receipts of the lines shall afford a dividend on the capital outlay in excess of 10 per cent, the fares and tolls are to be reduced, with the view of limiting the net receipts so that they shall not produce a return beyond that figure. The determination of suitable rates was necessarily at the outset, and indeed for some years, a source of perplexity to both the officials of the Government and of the companies, neither of which were in a position to do more than theorise on the subject, and thus the rates first adopted were admittedly tentative. It was, in fact, agreed on both sides that rates should not be held to be fixed, or approved finally by the Government, until the lines had been fairly open for some time, and the tendencies and character of the traffic sufficiently established. On one point there was at the first a very general agreement, viz., that but little was to be expected in the shape of passenger traffic, and that the receipts would be mainly derived from goods.

The first report on Indian railways to the Secretary of State for India, in 1859, said that experiments had been tried with varied success, that the incomplete state of the lines made it difficult to ascertain the precise rates which were most suitable and remunerative; but that there was no longer any doubt as to passenger traffic, and that the people of India had shown that they were as eager as those of any European country to avail themselves of this mode of travelling. This report went on to urge what is not now generally accepted, viz. that low rates and remunerative rates were not always synonymous, that increase of numbers necessarily produced an increase in working expenses, and that it was doubtful whether it was possible to carry passengers with profit, and in proper vehicles, at a lower rate than one-fifth of a penny per mile, which was then the lowest fare for this traffic on one of the Indian railways. At the end of 1861 there were nine railways in progress in different parts of the country, on which there was an aggregate open mileage of 1600 miles. Taking the exchange value of the rupee as being then at two shillings, the rate and fares, highest and lowest, in force for goods and passengers are shown in the following table :—

	PASSENGER FARES.			GOODS RATES.				
	1st Class.	2nd Class.	3rd Class.	1st Class.	2nd Class.	3rd Class.	4th Class.	5th Class.
	P. mile	P. mile	P. mile	Per ton per mile	Per ton per mile	Per ton per mile	Per ton per mile	Per ton per mile
	d.	d.	d.	d.	d.	d.	d.	d.
Highest	2½	1½	¾	1½	1½	2½	3½	6½
Lowest	1	½	¼	1	1½	1½	1½	3½

The general charge for the lowest class of passenger traffic at this time was three pies per mile, which at an exchange of two shillings per rupee represented ¾d. The lowest, or first-



class goods rate, was generally one-third of a pie per maund (82 lbs.) per mile, equal to about $1\frac{1}{2}$ d. per ton mile. The action of Government as regards rates and fares already tended towards what has since been accepted as the most politic and rational course, viz. that of fixing maximum rates for goods and passengers within which the companies were free to alter at their own discretion. The question of the minimum had not yet arisen, and did not come forward until competition between rival lines forced on the Government the necessity of protecting its interests as regards the guarantee, and to make a stand against what appeared to be unremunerative rates. The natural desire of both the Government and the companies was to make the railways as profitable as possible; but the latter, fully alive to their advantages as monopolists, were not inclined to regard the increase of numbers or tonnage as of so much importance as the increase of receipts; while, on the other hand, the Government had to elect between the claims of the public at large to early relief from the burden of the guarantee, and the clamour of the travelling and trading classes for low fares and rates. The tendency in the earlier years was to increase rather than reduce rates, although this appears to have been due in some measure to a scarcity of rolling stock; but the Indian traffic manager was already in the toils of the "cost of conveyance" heresy; he had not yet realised that this is a variable, and, in the absence of serious competition, sought to base his rates and the volume of his business on what appeared to be finality in the cost of transit.

The earliest rates in force for passenger traffic are given on page 195, and these were continued for some years. It was soon found, however, that this traffic, especially of the third or lowest class, which afforded over 90 per cent of the coaching receipts, was likely to become a very important source of income. In a report to the Secretary of State on Indian railways in 1860, it is observed that "it is worthy of note how greatly the traffic of the third class preponderates. The proportion of the first

and second class put together is to the third class as 1 to 16 $\frac{1}{2}$. This shows conclusively how strong has become the desire of the population at large to move about when the means of doing so has been provided. If railways have produced this result with a people usually regarded as inactive and stationary, it may reasonably be expected that an impulse will be given to the already expanding trade of India the advantages of which will be equally felt in this country." The cost of travelling by rail in India is compared in a subsequent report (in 1864) with that in England at the time, and it is shown that for a journey of 100 miles, by third class, the fare averaged on seven railways about 3s. 2d. (exchange being at about 2s.); while in the United Kingdom the charge for the same distance, in the same class, by "parliamentary" train, was 8s. 4d. Thus the native earning, or on a wage of say 10s. a month, was being charged 38 per cent of what was levied on an English artisan, whose income may be put at £5 a month. At this period the open lines carried a length in the aggregate of 2687 miles, and the third-class traffic showed a yearly total of numbers conveyed of about 8 $\frac{3}{4}$ millions, or no more than 3260 per mile open.¹ It was not then seen that it was to this third-class traffic that the subsequent success of the Indian railways would be so largely indebted, nor was it seen that they were charging almost prohibitive fares, and stifling a most valuable source of income. The third class affords, in fact, in India the backbone, if not nearly the whole body, of the coaching receipts; the other classes might, as far as profit is concerned, be abolished; indeed, on most lines their removal would be a positive gain, and it is not many years ago that a leading railway manager in India stated it would pay him to give every first-class passenger twenty rupees to stay away. Thus in dealing with this subject it is only proposed to refer to fares in the third class, and to

¹ At the present time (1892) the last returns show an open mileage of 18,042, a total of all classes conveyed yearly of 127,456,913, and the number per mile open 7064.



disregard the other classes as having no practical effect on the revenues of Indian railways.

The obstacles in the way of reduction of fares were to be found in two leading principles, which appear to have been then considered the foundation of all policy. The first was that the lines must be made promptly profitable; and, secondly, that "the cost of conveyance" was merely a fixed figure. Thus in 1866 we find it said, in a report to the Secretary of State, that "there has been a tendency during the past year to increase rates and fares. . . . It is not yet possible to judge what the established rates for passengers should be," but that "lower rates *may* be found more profitable than higher. If, however, the traffic goes on increasing in the same ratio as it has done during the last two years, the rates will in some cases have to be raised higher than they are now, in order to realise the profits which the railways could command. Considering the question in the abstract, the first point to be ascertained, before fixing charges of this kind, is the *cost of conveyance*, and then the charge which, in addition to what is required to cover the cost, will produce the greatest aggregate return; for it should be borne in mind that it is not the high profit upon the unit, but the small profits upon large numbers or quantity which should be sought for." It is not necessary at the present day to comment on this peculiar mixture of views, but it took many years before the dictum conveyed in the last sentence was acted upon in India. The tendency to charge high fares and rates appears, at any rate, not to have been shown by the Government, but by the railway companies, the former having been charged indeed with allowing them to be too low, and thus neglecting the interests of the general taxpayer, who had to find the interest guaranteed on the capital outlay of the companies. This consideration had necessarily considerable weight in influencing the action of the Government. It recognised the broad, general benefit which railway communication conferred on the country, both directly and indirectly, but it was bound

to recognise that it endowed the trading and travelling classes with special advantages, and that the burden of the guarantee must not be allowed to lie too heavily on the public at large. The firm intention of the Government not to relinquish or loosen their control over the passenger fares levied on the companies' lines is well illustrated in a despatch to the Secretary of State in 1867.¹ This was in reply to one in which a minimum of interference was suggested, unless on the ground of the fares being more or less likely to be profitable to the company concerned. They said, referring to the views of the Secretary of State, that—

2. No recognition appears therein to be made of any duty on the part of the Government to protect the interests of the people. This duty is recognised in England in the institution of parliamentary trains. In India, where the Government gives a guarantee of interest, in addition to other privileges allowed to railway companies, we are of opinion that it has a still stronger right, and is bound by a more imperative duty, to look to the interests of the people in this matter. Further, our belief is that a railway best serves its own interests as well as those of the Government by accommodating itself to the wants of the public.

3. While freely admitting that the control of the Government should not be so exercised as to compel the railway company to carry passengers without a profit, we should suggest that in any arrangement for the re-adjustment of fares of the lower classes, the accommodation of the public should be considered, so far as it is not manifestly incompatible with the interests of the company, or the means at their disposal for providing such accommodation. The cases which we have more particularly in view are those in which there is doubt, and in such cases we think the companies should try first the proposals most favourable to the public.

4. We beg that the principle we have now advanced may be considered as the rule in dealing with questions of railway fares.

In a circular issued in the Public Works Department in

¹ No. 26, dated 8th February 1867.



October 1867,¹ the Government of India decided that, as regards the guaranteed lines, the fares then in force and sanctioned should be held to be the maxima, and that in the case of lines to be opened in the future, the maximum would be fixed for the lowest class at the rate of 2 pies per mile, the accommodation to be provided being "in covered carriages without seats." This latter condition was, however, never carried out, notwithstanding that the habits of the natives would have made it quite acceptable; but the main reason against it was the difficulty of providing against overcrowding, and of giving each passenger adequate space. On receipt of a copy of this circular by the Secretary of State, he objected to the intention declared therein, that the Government of India should fix such maxima or withdraw powers of this nature from the local Governments, in whose hands should be left "the settlement of the maximum scale of rates and fares for every description of traffic on railways within their Presidencies."² He held that it was as much the interest of the companies as of the Government "to give the maximum number of passengers with the maximum of profit." In replying to this, the Government of India felt obliged to protest against the decision, and before carrying out these instructions, said—

. . . . We beg to submit the following observations for your consideration, referring to the opinion that the railway companies have, in common with the Government, as much interest in regulating fares so as to "give the maximum number of passengers with the maximum profit," and that there is every reason to expect that they will exercise their powers judiciously in this respect. He would observe that it does not appear to us to be the interest of the railway companies to carry the maximum of passengers with the maximum of profit, but on the contrary, to get the maximum of profit with the minimum of passengers; thus it would

¹ No 10, Railway, dated 16th October 1867.

² Despatch No. 17, of 29th February 1868, from Secretary of State.

be preferable to them to carry two million passengers in a half-year at 3 pies (per mile), instead of three million passengers at 2 pies. Now the interest of the Government, acting in behalf of the people, is directly opposed to this. At the same time, we do not desire that the companies should lower their fares so as to lose the maximum profits, nor indeed are we of opinion that the companies would wish to raise their fares so as to cause the number of passengers to fall below what would give the maximum of profit. But between these two extremes the interests of the Government and the people are opposed to the interests of the railway companies and their officers.

Later on, in 1869, we find the Government of India so intent on promoting the movement of the lower class, as to be prepared to incur the risk of losing dividend to meet the outlay on guaranteed interest. In a despatch to the Home Government in 1869,¹ they say that it is of the last importance to fix the third-class fare on Indian railways "at the lowest possible amount," in the interests of the companies and of the vast masses of the native population; that they will prefer to travel on foot or in carts, regardless of personal inconvenience or loss of time, so long as they can make a saving by such methods over that of travelling by rail; that it is to this class that returns must be looked for from passenger traffic in India, and that therefore fares should be pitched so as to secure the greatest possible number. In a letter written previously to the Government of Madras (in August 1869), this view is put even more plainly with reference to reduction of fares on the Madras Railway. "His Excellency in Council is accordingly strongly of opinion, that it will be to the ultimate benefit of the company to look more at present to an increase of numbers, by the adoption of a lower fare for the third class, than to any immediate important addition to the receipts. . . . It can neither be to the financial interest of the company nor to the well-being and prosperity of the country, that the fares should

¹ No. 115, Railway, 24th November 1869.



be pitched so high that the millions may not be induced to travel."

In 1869-70 the Government of India commenced the construction and working of a system of State railways, by the direct agency of its own officers, with the avowed intention of endeavouring to reduce and simplify rates and fares. As soon as the first sections of these lines approached completion, the Government addressed the Secretary of State on the subject.¹ They said that they proposed to adopt, with some minor alterations, the rules and regulations as regards working which were then in force on the guaranteed railways, and to simplify the classification and rates for goods; while for this and for passenger traffic they intended to have four classes, as follows, based as regards charge on a station-to-station rate, the unit for goods being on a weight of a "maund," viz. 82 lbs.

GOODS.		PASSENGER.	
	Pies.		Annas.
Special	2	1st class	8
1st class	4	2nd "	4
2nd "	6	3rd "	2
3rd "	8	4th "	1

The lowest passenger fare of one anna between stations worked out then at from 1 to $1\frac{1}{2}$ pie per mile, which was equal to about half a farthing. It was considerably lower than that on any other Indian railway at the time, the lowest fares being on the Great Indian Peninsula and Madras Railways, on which there were fares of $2\frac{1}{2}$ and 2 pies per mile; but the service for these rates was worked with so many vexatious restrictions, that it gave but little hope of becoming successful. An attempt had, it is true, been made on two other lines, in 1861, to give what were called "coolie" trains, with a fare of $1\frac{1}{2}$ pie per mile; but for the same reason, and

¹ In Despatch No. 26, Railway, of the 29th January 1873.

because the people had not then become accustomed to railway travelling, this was abandoned as unremunerative. The rates above quoted for State railways were duly put in force, although on lines which passed through comparatively poorly populated areas. On one of them three classes only were in use, and on the other four classes, and when these two lines were about to be connected and amalgamated under one management, it became necessary to have the same classes on both. In advising the Government on this point, the Director of State Railways (then Colonel E. C. S. Williams, R.E.) said that he was satisfied, from a study of the traffic by classes on the older lines generally, and particularly on the open lines of State railways, that the attraction of the lowest class, "whether it be 1 or $1\frac{1}{2}$ annas per station, is so great, that practically no large section of the masses will pay even half an anna extra per station distance for mere segregation." The passenger mileage on the lowest rate was then, in fact, more than double that which obtained on the next higher, and, as Colonel Williams truly said, "the mass will always go for the lowest class, and the lower its fare the greater will be the tendency to two classes only;" and again, "It is solely to the lowest class of passenger traffic that we can look for profit in coaching, if such profits be a *sine qua non*,¹ and the really important question, and to which we shall shortly come, is, What shall be the fare in the lowest class henceforth?" The report recommended for adoption on State lines the three classes above mentioned, which then worked out for the lowest class at from $2\frac{1}{2}$ to $1\frac{1}{4}$ pies per mile, according to the distances between stations. These recommendations were accepted by the Government of India, and in the letter in which this was intimated there is a sentence worth quoting as a typical illustration of paternal solicitude for the native passenger. The Director was instructed, that "without allowing any caste distinctions, the Government of India are of opinion that general instructions

¹ To the State.



should be issued to station-masters and guards not to force very dirty people into carriages with decently-dressed passengers, so long as there are vacant seats elsewhere." To this was added the further instruction, that accommodation was to be reserved on every train for women in the third class. In reporting their decision in this matter to the Secretary of State, the Government stated that, while the determination of the fares in the first and second classes was comparatively unimportant, that of the lowest class was quite otherwise, as this was the one that paid, and that in accepting an average of about 2 pies per mile, they thought that this was the lowest that could safely be adopted for the present.

With the aim, kept steadily and constantly in view, of attaining simplification, and as far as possible reduction in rates, the Government issued a circular letter in May 1876, putting forward statements showing the existing classification of goods, the average goods rates, and average passenger fares on all the Indian railways, and invited the agents and managers to endeavour to arrive at uniformity; and later on, in September of the same year, proposed a conference of railway officials for the discussion of sundry disputed matters, among which was that of the reduction of passenger fares. These then stood as follows in each class :—

AVERAGE PASSENGER FARES ON INDIAN RAILWAYS IN 1876.

	AVERAGE FARE PER MILE.			
	1st Class.	2nd Class.	Inter-mediate Class.	Lowest Class.
	Pies.	Pies.	Pies.	Pies. ¹
Madras	15	6.5	3.5	2
South Indian	12	5	...	2
Great Indian Peninsula	18	9	4	2.5
Bombay, Baroda, and C. India	15	7	...	3
East Indian	18	9	4.5	3
Eastern Bengal	12	6	4.5	3
Oude and Rahilkund . . . . .	...	9	...	2
Punjab and Delhi	17.78	8.94	4.47	2.77
Sind	13.52	4.8	...	2.84
Calcutta and S. Eastern . . . . .	...	9	...	2.55
Nalhati	28.13	14.07	7.06	4.62
² Rajputana	10.38	4.61	...	2.03
² Holkar	11.79	4.42	...	2.21
Khamgaon	18	9	4	2.5
Amraoti	18	9	...	4
Wardha Valley	18	9	4	2.5
Nizam's	18	9	4	2.5
² Tirhoot	12.09	4.36	...	2.18
² Punjab Northern	9.43	4.71	...	1.87

The Government subsequently issued a resolution on the effect of low fares, recommending the adoption of a maximum for the lowest class of $2\frac{1}{2}$ pies per mile (about a farthing), and in this they urged that low fares had been adopted on the State lines, and that in guaranteeing interest on the company's lines, they would in effect be liable for any loss which the adoption of a similar course might cause on these railways. The resolution went no further, but on the East Indian Railway, where under a new contract the Government had powers to reduce fares in the lowest class to 2 pies per mile, a firmer position was assumed, and the agent of the line was required, while thoroughly opposing it, to reduce his rate of 3 pies to $2\frac{1}{2}$ pies. The agent (Mr., now Sir Bradford Leslie) objected, on the ground

¹ The value of a pie might be taken then at a little over half a farthing.

² State Railways.



that he was satisfied that the existing fare did not exclude "a single *bonâ fide* traveller, whether on business or on pleasure," and that the $2\frac{1}{2}$ pie rate would not only result in increasing the passenger mileage, by the amount requisite to yield the same net receipts, but would not even give the same gross receipts. Fortunately, however, the Government, under strong and able advice, stood firm, enforced the lower rate, and said that if it was as they anticipated successful, they would require it to be lowered still further, viz. to 2 pies per mile. It is worth while to notice how fully the result justified the action of the Government. In 1880, when the 3 pie per mile rate was in force, the number of third-class passengers conveyed was 7,792,724, and the numbers and receipts per mile open 5181, and Rs.5748. In 1892, the lowered rate of $2\frac{1}{2}$ pies having been in action since 1881 over the whole system, the total numbers carried of the same class was 11,769,923, and the numbers and receipts per mile open were respectively 8841, and Rs.7310. But, in fact, from the very first the beneficial effect of the reduced fare was clearly seen, not only in the increase of numbers and in the slow but steady increase in receipts, but in the manifest advantage which it gave to trade and to goods traffic in facilitating the movement of the smaller traders.

Again, in the same year 1880, in reviewing the accounts of the South Indian Railway Company (a guaranteed line), the Government of India, in a letter to the Government of Madras, urged that a fair local train service should be maintained on the lines in that province for the benefit of the poorer classes at a rate of not more than 2 pies per mile, and that the company referred to should be informed that, as there was no immediate prospect of their being able to earn surplus profits over and above the figure of guaranteed interest, they should be "liberal in their dealings with native travellers," and that "any loss that may arise from such liberality will not fall on the shareholders, but on the Government ; while if there is a

development of trade and of passenger traffic, the shareholders will get the advantage hereafter when surplus profits begin to be realised." Early in 1881¹ the Government of India issued a pamphlet giving the opinions of provincial Governments and of leading railway officials on the subject of low passenger fares. The general feeling was strongly in favour of the principle, but there was a marked divergence of view as to what a low fare implied. The publication was however distinctly useful, not only in the dissemination of opinion on the general aspects of the question, but in offering facts and figures which required to be more widely known to railway men. The manager of one of the State lines² put the case in a way which is still applicable, and is worth reproducing. He said that "if we look at what railways have done, in view of the conditions they have had to face, we shall find that they have adopted, in competition with carts and boats, comparatively low goods rates, but that they have never thought of lowering their passenger fares sufficiently to enable an ordinary coolie to travel more cheaply by rail than he can travel on foot, though this can undoubtedly be done. . . . It is not, therefore, to be wondered at that railways have altogether failed to attract the masses, and have only succeeded in getting the well-to-do classes. . . . To attract the masses railways will have to lower their fares until a journey can be done as cheaply on the railway as on foot. To do this, the fare must not exceed $1\frac{1}{2}$ annas for twenty miles, or say 1 pie per mile, and perhaps in the poorer districts it may have to be reduced to $\frac{3}{4}$ of a pie." In issuing this pamphlet, the Government observed that third-class fares had been reduced by order to $2\frac{1}{2}$ pies per mile on the East Indian Railway (as above noticed), and that the effects of this reduction would be watched "with care and interest," with the view of proceeding further in the direction of a

¹ Circular No. VII., Railway Government of India—Public Works Department—21st January 1881.

² Major (now Colonel) Sedgwick, R.E.



general reduction of fares, and it was added that this opportunity was taken of impressing on all railway administrations that increases of fares were deprecated, and should not be permitted except on the clearest and strongest grounds.

To those who are conversant with the habits and character of the Oriental, it will be readily understood that no difficulty has at any time arisen on the question of the speed or accommodation in trains in dealing with native passenger traffic. To the vast majority of native travellers, a distance of 200 miles in the 24 hours is fully as much as they expect, and they prefer, for many reasons (among others the absence, owing to sundry objections, of the provision of conveniences in the carriages), to find long halts every few hours, where they can "spread themselves out," buy and eat such food as they allow themselves on such journeys (which is found for sale on the platforms), discuss the incidents of travel, the prospects of crops, or the chances of some everlasting law-suit. The discomfort, which to a European would be intolerable, in such a climate, of cramped accommodation, hard boards to sit on, the crush at booking-offices, and the many worries incidental to the discipline of railway arrangements, are accepted by them with a patience, and even good-humour, which is really surprising, and which is, or at least should be, standing evidence of the possibilities of development of this traffic. In the direction of improving the comfort of the lower class very little has been done, or indeed has been possible. Stringent rules have been issued from time to time against overcrowding in carriages, for the provision of reserved compartments and conveniences for native women, and for giving ample water supply at all stations, especially in the hot season; while the introduction of an "intermediate" class, at a slightly increased fare, affords for long journeys, to those who can afford it, some possibility of sleeping at length on a rather hard bench, instead of sitting in one posture for hours or days on an equally hard seat. But nothing would, in fact, be gained even in competition

by the provision of such luxuries as the cushions and lavatories which are now considered indispensable in the third class on the leading English railways. All that the lower classes require in railway travelling is the means of transit at less cost than that of doing it on foot. Temporary discomfort or inconvenience, or the loss of a few hours at stations, are wholly disregarded as compared with money cost, and it is with this factor and this only that we have to reckon in fixing our fares for the bulk of our native passengers.

It is not necessary to notice in detail the successive phases of the efforts made by the Government for the reduction of the fare in the lowest class. On the State railways, and on those of the "assisted" companies, under whose contracts the Government had full control over rates and fares, the issue of an order was sufficient to ensure its being carried out promptly and loyally; but in other directions, as for instance on lines controlled by native States, or on lines on which there were good prospects of surplus profits over and above the guaranteed interest, and the terms of whose contracts prevented any extreme measures of interference, the Government was constrained to act with caution, and to be content with offering advice and the example of the State lines. On these, moreover, while it could be shown that the low rates induced a most noticeable increase in numbers, it could not be as clearly proved that they were directly, or at least promptly, profitable. The gross receipts improved, but, on the other hand, working expenses, including train mileage, increased, and allowance had to be made for interest on the capital outlay for additions to rolling stock. To the State, the evidence of net profits was not so material as the fact of the increased movement of the people, and the consequent indirect advantages which this implied in so many ways. Up to the year 1890, the minimum fare aimed at by the Government was $1\frac{3}{4}$ pies per mile,¹ but was

¹ Public Works Department, No. 1446, Railway Traffic, of 12th December 1887.



not acted on, the lowest fare on State lines being 2 pies per mile. In July 1891¹ this minimum was further reduced to $1\frac{1}{2}$ pie per mile, a decision for which the author may claim to have contributed by a communication on the subject in October 1890. As yet one line only, the Madras Railway, has had the sense to adopt this fare, and with results that are so far very encouraging; while another, the Bengal and North-Western Railway, closely follows with a station-to-station rate, which is equivalent to about $1\frac{3}{4}$ pies per mile, and with entirely satisfactory effect. What is needed is that the Government should have the courage of its opinions, and show the lead by giving this low rate a full and fair trial on some large State line. There is good reason for the hope that this course will be shortly taken; but until this is done, it will continue to be held, by those well qualified to hold the opinion, that we have not yet reached, and that by a long way, the limits of our passenger traffic on Indian railways, and to this it will be impossible to offer any adequate refutation. At the same time, it is conceded that a rate of $1\frac{1}{2}$ pie per mile is not properly applicable over the whole Empire, but is only suited for adoption over areas in which the population is at once dense and poor, and where low wages, and the general struggle for existence, renders them unable to contemplate journeys by rail on more onerous terms. The statistics of the railways which serve such districts point to the certainty that with large numbers, low speeds, and properly-fitted vehicles, passengers of the lowest class could be carried at a fare of 1 pie per mile, and leave a profit of from 20 to 30 per cent; but the cost of carriage is a quantity varying with the volume of traffic, and it may be found that an even lower rate is possible. If, however, we can profitably carry at 1 pie a mile—a rate which implies that a man can travel 24 miles for the lowest daily wage now paid in India—we may rest satisfied that we have placed railway travel within the means of the poorest classes, and may

¹ See Appendix.

be content to wait for the results. The following table shows the average fares in the three periods 1872 to 1892 on the principal Indian railways :—

Railway.	FARES, LOWEST CLASS.			
	1872.	1882.	1892.	Remarks.
East Indian	3	3	2.5	State Line.
Great Indian Peninsula	2.5	2.5	2.5	Guaranteed Line.
Madras	2	2	1.5	Do. do.
Bombay, Baroda	3	2.5	2.25	Do. do.
Sind-Punjab	3	2.5	2	Now North-Western Railway.
Great Southern	2	2.5	2	Now South Indian Railway.
Eastern Bengal	3	3	2.5	State Line.
Oude and Rahilkund	2	2.5	2.5	Do.
Rajputana . . . . .	...	2	2	Do., leased to Company.
Tirhoot . . . . .	...	2.5	1.75	Do. do.
Nizam's . . . . .	...	2	2	Company's line.
Indian Midland . . . . .	...	...	3 to 2	According to distance.
Bengal-Nagpore . . . . .	...	...	2	

SCHEDULE OF MAXIMA AND MINIMA RATES AND FARES IN COACHING TRAFFIC, given in Appendix A to P. W. D. Resolution No. 1446, R.T., dated 12th December 1887, and at present in force.

	Maximum. Pies per mile. ¹	Minimum. Pies per mile.
<i>Passenger Fares—</i>		
1st class	18	12
2nd class	9	6
Intermediate class	4½	3
3rd class	3	1½
	Maximum. Pies per maund per mile.	Minimum. Pies per maund per mile.
<i>Luggage</i>	2	1
	Maximum. Pies per mile.	Minimum. Pies per mile.
<i>Carriages</i> ² —		
Single carriages	42	30

¹ One pie may be taken as one-twelfth of a penny.

² Subject to a minimum charge of Rs. 5.



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	Maximum. Pies per truck.	Minimum. Pies per truck.
Two or more carriages on one truck	54	42
<i>Horses</i> ¹ —	Maximum. Pies per mile.	Minimum. Pies per mile.
Single horse	24	18
<i>Dogs</i> —	Maximum. Pies per fifty miles or portion thereof.	Minimum. Pies per fifty miles or portion thereof.
Each	96	48

Parcels—

The rates passed at the Railway Traffic Conference of 1884, as under:—

	First 100 miles. Annas.	Every additional 100 miles. Annas.
Not exceeding 5 seers or 1 cubic foot ²	3	1
„ 10 „ 2 cubic feet	6	3
„ 20 „ 4 „	10	5
„ 30 „ 6 „	13	6½
„ 40 „ 8 „	16	8
For every additional 10 seers or 2 cubic feet, or portion of 10 seers or 2 cubic feet	4	2
Parcels exceeding 40 seers in weight, or 8 cubic feet in measurement may be booked if accommodation will allow.		

Goods Rates.

It must be stated at the outset, in dealing with this subject, that the object of this work is to indicate the policy of the Government of India, and that only incidental notice will be taken of the minor or comparatively unimportant action or dealings of local governments and officials. Nevertheless, it was from this source that in the earlier years of Indian railways

¹ Subject to a minimum charge of Rs. 5.

² Subject to a maximum charge of one rupee for a parcel not exceeding 5 seers, irrespective of distance.



the interpretation and working of the contracts with the guaranteed railways was sought and obtained, and it was not until the year 1867 that the Supreme Government felt it necessary to determine on a definite course as regards the extent of their control over rates and fares generally. In that year the Government of India addressed a despatch on the subject to the Secretary of State for India,¹ and in replying on the 16th May of the same year they were informed by the Secretary of State that the conclusion he had arrived at, "after careful examination of all the circumstances of the case," was that the companies should be left free, within the maximum to be fixed by Government, to make such alterations in their scale of rates and fares as they might at any time think desirable. On this the Government of India issued a circular from the Public Works Department,² addressed to all "local Governments and Administrations," which propounded certain principles for their guidance in controlling rates, and indicated the part which the Supreme Government should take in this respect. It held that the Government of India should only so far interfere as might be necessary to fix a general policy, and "to regulate matters by which a railway company working within the territories of one local Government may affect a company working within the territories of another Government." Beyond this the Government of India desired to leave the subject of maximum rates and fares entirely to the local officials concerned. They further declared that the only policy of the Supreme Government, as regards the fixing of the rates and fares on railways, should be to make them as generally useful to the mass of the people as was consistent with due profits to the companies; that the powers of the Government under the contracts were limited to the approval of increases of fares after they had been once fixed, and to the fixing of fares on the first opening of a railway. It was clear,

¹ No. 26, of 8th February 1867.

² No. 10, Railway, of 16th October 1867.

it was said, "that it can never be proper to insist on any fare or rate that shall not afford a reasonable profit with ordinarily filled trains, and that there are only a few cases in which the Government should interfere with the freedom of the companies to act according to their judgment on the ordinary system of trial of the relations of supply and demand." The matters which it was held should be retained in the hands of the Government of India were the fares for the lowest class of passengers, the rates for food grain, and for the carriage of coal. As regards the two last, the circular said that the rates already in force and sanctioned were to be considered as the maximum on lines already opened, and that on future lines the maximum rate was to be $\frac{1}{4}$ of a pie¹ per mile, or (at the then rate of exchange) $\frac{2}{3}\frac{7}{8}$ of a penny per ton mile. The then maximum rates on four of the principal Indian railways at the time was as follows in each class, to which terminal charges were added :—

Classes of Goods.	RATES PER TON MILE PIES.			
	East Indian Railway.	Great Indian Peninsula Railway.	Bombay, Baroda, and Central India Railway.	Madras Railway.
1st	9	8	8	14
2nd. . . .	13 $\frac{1}{2}$	10	10	18
3rd. . . .	18	16	16	24
4th. . . .	27	20	20	36
5th. . . .	54	30	30	54

The interference of the Government had not taken place too soon, for the railway companies had already begun to experience the pressure of traffic, and to recognise that in the absence of competition they had the game in their own hands. The want of rolling stock further increased both the need and the possibility of charging higher rates, especially in the busy

¹ A pie is one-twelfth of an anna, and 16 annas = 1 rupee.

season, while the agents of the two companies on the Bombay side had represented the enormous difference between the rates they were allowed to charge and the rates for carriage by cart, which was seven times greater than those by rail. It is curious to note, however, that thus early in this discussion the companies offered to accept minima if they could be allowed to increase their maxima. There being then no competition, this did not then seem to be a matter of importance to the Government, and, unfortunately, as it proved eventually, it passed unnoticed in the circular above referred to.

The action taken by the Government of India did, however, meet with the approval of the Home Government.¹ The Secretary of State agreed in the view that the Government of India should only interfere so far as to fix a general policy, but held that in keeping in their hands the fares for the lowest class of passengers, and the rates for food-grains and coal, the suggested limit had been passed, and that the settlement of the maximum for every description of traffic should be left in the hands of the local authorities. He said that in directing the establishment of maximum rates and fares he had intended that such bounds should be fixed as would leave it to the discretion of the companies to vary the rates in force, and that in some of the rates mentioned in a recent circular no such discretion was left. He held that the companies were not advocates of high rates, as it was as much their interest as that of the Government that their charges should be so regulated as "to give the maximum of passengers with the maximum of profit." The despatch thus made pointed reference mainly to passenger traffic, and the reply of the Government of India² dealt only with this phase of the question, laying stress on the importance, or rather the necessity, for control in this respect, and insisting that the interests of the Government and the

¹ See despatch No. 17, of 29th February 1868, from Secretary of State for India.

² No. 76, Railway, of 25th April 1868.



companies could not be considered to be identical. This protest, nevertheless, appears to have had but little effect in moving the Secretary of State from his original position. In replying in June of the same year¹ he regretted that he was unable to agree with the views of the Government. He was quite sensible, he said, of the advantage of low rates to the travelling and trading public, and that they would most probably in the long-run be remunerative, but he thought that, as regards passenger traffic, the interests of the lower class of travellers would be sufficiently protected by the maxima to be fixed by local Governments; and that as regards rates generally, the right policy was to leave to the companies the duty of fixing them within such limits. He concluded by stating that it was his wish "that maximum rates should be fixed by local Governments, that the actual rates within such maximum should be regulated by the railway companies, and that the maximum rates fixed by local Governments should leave a reasonable margin for exercise of discretion by a company in varying working rates as circumstances may, in their opinion, require."

Views, or rather orders, thus plainly stated, left the Government of India no option but that of compliance, and in October a fresh resolution was issued² giving effect to them in practically similar terms. In forwarding a copy of this resolution to the Home Government on the same date, the Government of India did not attempt to conceal their objections. They admitted that the local Governments were as well able to protect the interests of the people as they were; but that, apart from the obvious difficulty of getting various distinct and distant authorities to adopt the same means to attain the desired end, there was the financial objection, inasmuch that the different means adopted were so many experiments made at the risk of the Government of India, which was responsible

¹ Despatch No. 48, dated 25th June 1868, from Secretary of State.

² Nos. 1174-80, Railway, of 6th October 1868.



for the finance of the Empire. They further urged that one central authority was the most suitable in order to carry out an approved policy with consistency and success. No difficulties of any moment arose in carrying out this policy so long as the main lines were free from competition, and no further references appear to have been made until then to the Secretary of State. Each line had a definite territory of ample dimensions, and within the maxima rates fixed by the local authorities it was free to adopt such rates as the traffic would bear. No attempt had been made by the Government to secure any uniformity in the scales of rates or in classification. The divergences in the rates may perhaps be accounted for, in some measure at least, on the ground that in India, and indeed elsewhere, the traffic managers were apparently bound by the assumption that the cost of carriage was some definite figure, within narrow limits, on each railway, and influenced to only a small extent, by the volume or character of the traffic dealt with. But powerful agencies were ere long to come into action, and to disturb the peaceful career of the guaranteed lines. The opening of the Suez Canal, and the consequent introduction of Indian produce into the European markets on favourable terms, led to a keen rivalry between lines leading to the sea-board; a series of severe famines in different parts of the country had similar results, and traffic officers began at length to realise that the volume of tonnage was an important factor in determining the cost of transport by rail, and that rates, which at one time would have seemed to spell ruin, proved to be the principal source of profit. Later on the era of State and competitive railways arrived, with the inevitable effect of a war of rates, and appeals for the interference of the Supreme Government.

The first indications of the storm which was to set in later, came in the shape of a memorial from Calcutta traders in 1881, pointing out that the rates for produce between Upper India and Bombay were injuring the trade of Calcutta, and praying



that relief might be afforded them, by requiring either that higher rates should be enforced on the Bombay route or lower on the Calcutta route. This complaint was supported by the Bengal Chamber of Commerce, and as a part of one of the routes to Bombay was over a State line, the Government of India felt it necessary to take action. This took the form of instructions to the manager of the State line that the charges to Bombay should not be lower than what was charged on similar goods to Calcutta. It should be observed, that at this time the route to Calcutta was, as regards rates, wholly under the control of the Government, as the East Indian Railway had become the property of the State in 1879. The course thus taken by the Government of India was promptly objected to by the lines leading to Bombay and the Bombay Chamber of Commerce, and supported by that Government. Both the Bombay lines were guaranteed, and were thus free from anxiety on the score of low, or even unremunerative rates, more especially as there was then but little prospect of their yielding returns in excess of the guaranteed rate of interest, or, in other words, of affording surplus profits over and above that figure to the shareholders. The views of the Government of India as conveyed, at the end of 1881, to the Government of Bombay¹ were, that while they did not intend that there should be an absolute equalisation of rates from Upper India to Calcutta and Bombay, under all circumstances, based only on mileage, they thought that this principle should be adopted if, "tempered with the proper commercial principle of an even return on the capital expended." They stated that from the point of view of the general welfare of the country, it was immaterial to what party its surplus produce was directed so long as the course of trade was unfettered by artificial obstacles. "The lines of railway which the State has become instrumental in providing have been constructed for the purpose of carrying goods and passengers at the lowest rates consistent with

¹ Letter to Bombay Government, No. 1192, of 19th October 1881.



yielding a fair and reasonable return on the capital laid out. As trade increases these rates will decrease; but the ultimate limit of legitimate competition between the various lines must be regulated by their capabilities of making an equally fair profit from the traffic they carry." They were quite willing to admit the advantages of competition in stimulating traffic, but held that the disastrous results of this, when recklessly followed, as on the English and American railways, had taught the world a lesson which could not be ignored.

These views were strongly objected to by the Government of Bombay. It was urged that it was quite impossible to adjust rates on theoretical principles, which should be absolutely fair to the railways concerned; that the practical, simple, and intelligible principle was that of equal mileage rates; while to attempt to fix rates with the object of insuring an equal return on the capital invested, would assuredly lead to endless dispute, and would fail to give satisfaction to traders. This remonstrance from Bombay had been strengthened by the receipt of a dispatch from the Secretary of State,¹ in which he held a similar opinion, and indeed considered the position taken up by the Government of India to be altogether unsound. He held that it was impolitic to interfere with any idea of adjudicating on the rivalry between the two lines affected, and "that the advantages due either to geographical position, or other circumstances, should furnish no reason for imposing on either artificial restrictions in the shape of enhanced rates, in order to produce an equal return of net profits on the capital of both." This warning note failed in its effect, for in May of the same year, we find the Government of India addressing the Government of Bombay on the same subject, and stating that the conclusion arrived at, "after careful consideration of all the arguments adduced on this somewhat complicated question," was that in fixing the charges for the carriage of the same commodity on different railways, the cost

¹ No. 41, Railway, 9th March 1882, to Government of India.

of carriage could not be neglected, nor could this "important element" be omitted in the division of through rates between lines working in connection. They pointed out the effects of steep gradients in enhancing cost of working; that it was "perfectly clear" that a line under such conditions could not carry at the same mileage rate as one under more favourable conditions, and on the latter it would be manifestly unfair to require its rates to be raised so as to produce equality. A copy of this letter was communicated to the Secretary of State in reply to his dispatch above referred to, stating that it was the desire of the Government, in the interest of the country generally, that all rates should be reduced to the lowest limit which will give a fair profit, and that "this cannot be obtained by the adoption of uniform mileage rates on all lines."

The reply of the Secretary of State¹ was very decidedly opposed to these views. He admitted that the cost of fuel and the character of the gradients on a line must be considerable factors in determining the lowest rates at which goods can be carried with a "fair margin of profit," but that elements still more important were the capital-cost and volume of traffic, and that if the two Western lines were the property of private companies, "they would certainly not raise their mileage rates above those of the Eastern line, because their fuel was dearer and gradients steeper." He held that it was impracticable to attempt to proportion the rates on competing lines on the basis of the supposed aggregates of the factors of cost of transport on each; that it would not be desirable, if it were practicable, and that managers should be left to fix rates as they may deem most advantageous for their respective lines, subject to the interposition of Government in extreme cases. The concluding paragraphs of the despatch are worth quoting in full:—

12. In the present condition of the Indian railway traffic, I am

¹ Despatch No. 132, Railway, of 19th October 1882.

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not apprehensive of evil results from the course now indicated ; I am rather disposed to think that the interests, both of the railways and of trade generally, will be better served by accepting the legitimate consequences of competition, regulated, as it necessarily will be, by the desire to apply skill and economy to the work of management, and stimulating as it must do, the introduction of improvements in the harbour arrangements at the ports of shipment to which competing lines lead.

13. As regards the division of receipts among the different lines over which the traffic passes, it seems to me that the practical difficulties in the way of establishing any agreement based upon calculations of the cost of working would be insuperable, and that the principle of a mileage division, which is applied under the Clearing-House arrangements in this country, may fairly be applied to Indian lines, whatever their original cost of construction or their present cost of working may be. . . .

This solution of the difficulty, as offered by the Secretary of State, was clearly the only practical one. \ It was not, however, until the following March (1883) that the Government of India felt able to take action, and in a letter¹ to the Government of Bombay, enunciated its views on the principles on which rates and fares should in future be regulated. Starting with the axiom that the fundamental aim in the management of a railway was to attract the maximum quantity of traffic the line can carry at the best rates obtainable, it might be considered that, in one sense, all rates would be special, though capable of classification into groups, and that each rate would depend on what the article would bear, what quantity of it is obtainable, and what is the approximate cost of hauling it ; that the cost of carriage would be one of the limits within which rates may vary, the tax which the trade will bear being the other. But in the determination of a rate, it was necessary to consider the whole circumstances of the traffic dealt with as regards empty running, the intermittent nature of it, and the effect of competition by

¹ No. 162, R.T. (Railway Traffic), of the 2nd March 1883.



other routes. The theory of equal mileage rates was held to have been condemned by competent authorities in England; while "telescopic" rates, or rates varying inversely as the distance, were recognised as legitimate in all cases where the favoured traffic would be lost without such rates, and as being financially possible owing to the lower proportionate cost of the longer lead. In a case where a railway had the practical monopoly of the traffic, the fixing of rates was a simple matter, in which the State need only interpose for the purpose of fixing maxima in the interests of the public; but that when competition arose, the basis for the calculation of rates would be materially changed. While bearing in mind such factors as capital cost, gradients, cost of fuel, and carrying power, rates had to be eventually governed by the necessity of attracting traffic, and "not by any arbitrary standard of profit to which it is thought fair to attain." A railway which was disadvantageously affected as to cost, gradients, fuel, etc., must expect "to go to the wall" in rivalry with another more favoured naturally; and from this it followed, that when traffic passed over more than one railway, and the division of receipts could be agreed upon on no other method, it would be necessary to apportion them according to mileage run.

The next point considered was whether, in the case of competition, those principles could be held to be affected by the fact of the State being either the proprietor of or holding a certain interest in and control over, one or more of the conflicting railways. It was held that they were not; that the State ought not, and often could not, interfere so as to put all on a theoretically fair and equal footing; that it could not legitimately make a common purse among its railways, in order to support one at the expense of another, or still less to drive an independent competitor from the field. Rival routes must be left alone, to get the highest traffic they can. The net result would be "the greatest aggregate of traffic upon all combined, which is consistent with a profit, the maximum of accommodation to

traders and the public, of gain to both producers and consumers, and the highest possible development of the resources of the country." There was one contingency, however, in which the State would be justified in exerting such influence as in any case it might possess, namely, when from either "ignorance, recklessness, or idle rivalry" on the one hand, or on the other from the indifference derived from the security of a Government guarantee, rates were unreasonably or unnecessarily lowered. In concluding the letter, the Government of India stated that, subject to interposition on such grounds, the agents and managers of railways might be left free to fix rates on the principles laid down, but that they should carefully examine their existing rates, both for goods and coaching, especially in the latter, the third-class fares, to see how far they were capable of modification or reduction. Copies of this letter were sent to the Secretary of State, and it was published in the Government Gazettes and newspapers, as indicating the general policy of the State on the subject.

It was not expected that this declaration on the part of the Government would suffice to relieve it from further interference in the competition which the rapidly expanding export trade was giving rise to in all directions. \ Indeed, no sooner was the difficulty between Bombay and Calcutta disposed of or quieted down for a time, than a fresh crop of troubles arose, from the rivalry of the lines serving the North-West Provinces, with Calcutta as a base. Over the administration of the State lines the Government had obviously ample powers, but its position with regard to the guaranteed and assisted companies was very different, and it seemed certain that complications would become more frequent and embarrassing with every extension of the railway system. The prominent difficulty lay in the adjustment of the goods rates of competing trunk lines, in order that no undue advantage should be afforded to one line over that of another—more especially with respect to those in which the State had a definite interest. \ The Government of



India seemed at length to see a refuge from their troubles in the establishment of a Clearing-House, which should be independent of the Government, have powers not merely to allocate the distribution of the receipts from through traffic, but to settle disputes as to routes for traffic, charges by rival routes, and the simplifying of goods classification. This idea had been already submitted to a Traffic Conference of the principal railways, but had not been favourably received. The Government decided, however, to refer the proposal to the Secretary of State for India, which was done in August 1885,¹ requesting that the opinion of Boards of the different railway companies in England should be invited. The reply to this was sent in February 1886,² the Secretary of State then being Lord Kimberley. The views of the railway companies generally were decidedly opposed to the proposition. They held that it was both premature and unnecessary, and that, moreover, the scope of the functions of the proposed Clearing-House Committee would go far beyond that of the institution under this title at home. The Secretary of State considered that more evidence of its necessity was required before he could press the matter further, but that if its main object was to settle the rates on lines competing for traffic to the sea-board, he thought it was beyond the proper duties of Government to interfere in such matters, otherwise than by the influence it possessed, either under existing contracts or as owners of the State lines.

The course thus generally indicated by the Secretary of State was one which the Government of India would have willingly adopted, but the exercise of mere "influence" was clearly inadequate for the purpose of determining disputes in which the guaranteed railways were involved, nor had the Government as yet arrived at any general principles under which they could recognise the rights of managers to fix such

¹ Despatch 120, Railway, of 7th August 1885.

² No. 16, Railway, of 25th February 1886.

rates and fares as would seem to them to be best suited to the traffic to be dealt with. The necessity for definite action in this direction was brought to the notice of the Government in August 1887, in the form of an able and exhaustive note by Colonel L. Conway-Gordon, R.E., then Director-General of Railways. In this he laid down certain principles for acceptance, based upon practice in England and elsewhere, with regard to railway rates and fares, reviewing at the same time the position of the Government as to its power of control over the guaranteed and "assisted" railways and those under Native States in this respect. The recommendations made in this note were generally accepted by the Government, and were embodied in a resolution in December 1887;¹ but owing to the terms of the contracts with the guaranteed lines, it was not considered possible to make the orders wholly applicable to other than State railways, or to other lines only so far as was consistent with existing contracts or agreements. In the remarks preceding the resolution, the Government of India stated that they endorsed, without reservation, the general principles "that managers of railways should be left to fix their own rates and fares; that the interest of railways and trade generally would be better served by accepting the legitimate consequences of competition; and that the interposition of Government would be justified only in cases where companies under the security of a guarantee might fix rates below what would cover the cost of transport with a margin of profit." The terms of the resolution were as follows:—

- (a) That the schedule of maxima and minima rates and fares, forming Appendix A to this resolution, shall be adopted on all railways worked directly by the State, and by all other railway administrations, whether their lines be already opened or not, so far as this schedule is not inconsistent with any contracts or agreements previously

¹ No. 1446, Railway Traffic, dated 12th December 1887.



entered into ; and that it shall not be departed from without due cause being shown.

- (b) That in order that the public may have complete information as to the maxima rates and fares which every railway is authorised to charge, the maxima and minima rates and fares fixed for each railway shall be published in their goods and coaching tariffs, under the signature of a consulting engineer if a private company, and of the Secretary to Government in the case of a State line.
- (c) That unless sufficient reasons can be brought forward against the adoption of this course, the general goods classification now in force on the East Indian Railway shall be accepted for all railways worked directly by the State, and by all other railway administrations, with the same proviso as to interference with existing contracts as under (a) above.
- (d) That there shall be no undue preference, either as between two railway companies or between a railway company and a particular person or class of individuals, by making preferential bargains, or by granting to one particular company or person more favourable conditions for the carriage of goods than to the rest of the public at large.
- (e) That the Director-General of Railways be instructed to place himself in communication with the several railway companies, with a view to establishing a Standing Committee of Railway Managers.

As regards the first clause (a) the Government considered that the principle of fixing maxima rates and fares had been recognised in every English Railway Act, and in legislation in Europe and in America. In India, however, it was not only necessary to follow this course, but on account of the guarantee of interest to certain railways, it was also necessary to fix minima rates. It was held that this guarantee would enable a railway to work at a loss to Government without affecting the pecuniary interests of the shareholders in any way,

and at the expense of the taxpayer, *i.e.* when such guaranteed line was not paying the guaranteed interest, and had no near prospect of so doing. Thus a company, under such circumstances, might in competitive traffic lower rates below a point which would yield profit, and, consequently, it was necessary that the Government should have the power to enforce a minimum "when circumstances have shown them to be necessary" in the financial interests of the State. The restriction of the minimum was, moreover, a salutary check on the action of managers of State railways in competition with each other or with a guaranteed line. On the question of terminal charges, the Government admitted that it was impossible to prescribe any maximum or minimum which would meet all cases, and that they must remain content with reserving power, in case any cause should be shown for interference, of fixing what may appear a fair and reasonable charge. Having fixed the maxima and minima in each class, and established a standard for the classification of goods for State lines, the Government conceded that railway administrations should be allowed to alter rates within these limits, and that while abstaining from making preferential bargains or allowing "undue preference," the various railways should give reasonable facilities for through traffic, and should aim at serving the country "as if they were under one management," and that a trader should not be forced to base his calculations on as many different scales of rates as there may be railways between the starting-point and destination. The protection of the public in this sense was subsequently effectually carried out in the revision of the Indian Railway Act, to which reference is made in another chapter. On the question whether the charging of a lower or equal rate for a longer than a shorter distance constituted "undue preference," the Government of India held that it appeared to be as yet unsettled in England, although the weight of legal authority was much opposed to the practice, and that it might be held to be *prima facie* evidence at least of such preference.



The managers of State railways were required to accept this view, and it was to be urged on the officers of the guaranteed lines by the local officials.

The Schedule which accompanied the resolution above referred to fixed a maximum and minimum rate for goods for each class, but this was illusory, as they were one and the same, or in other words, no latitude was given as to charges within any class, and the only way left to a railway manager was to alter his classification in any case in which he desired to raise or lower his rates. To have permitted this would have been to abandon the policy which, up till then, had been firmly pursued, viz. of endeavouring to bring all the railways into line with a uniform classification. It was eventually admitted that the terms of the Schedule should be altered, that a separate maximum and minimum should be fixed for each class of goods, and that within these limits managers should have power to vary charges without reference to Government, while alteration of classification, when once fixed, should not be made without formal sanction. A revised Schedule was appended to a resolution on the subject,¹ which was as follows:—

<i>Goods Rates—</i>		Maximum. Pies ² per maund per mile.	Minimum. Pies per maund per mile.
5th class		1	} $\frac{1}{8}$
4th „		$\frac{5}{8}$	
3rd „		$\frac{2}{3}$	
2nd „		$\frac{1}{3}$	
1st „		$\frac{1}{3}$	
Coal, edible grain, and other low-priced staples carried at special rates		$\frac{1}{3}$	$\frac{1}{16}$

This Schedule was to apply to railways on the standard or metre gauge administered or controlled by the Government, and was applicable to both local and through booking. A standard classification to be adopted on these lines was laid

¹ No. 563, Railway Traffic, of 16th July 1891.

² One pie may be taken as equal to $\frac{1}{12}$ of a penny.

down, and the guaranteed and other lines invited to accept it, which was done by nearly all. The question of terminal charges remained to be settled, but so far (1893) the only action taken by the Government has been to declare that it could not recognise the right of any railway administration to levy special charges, in addition to the prescribed maxima, on traffic passing through junctions, and that statements showing all terminal charges on every railway were to be periodically submitted for consideration. Previously to this the Indian Railway Act of 1890 had been passed, and this point had been briefly dealt with in sections 45 and 46. The former merely said that "a railway administration may charge reasonable terminals," and in the latter, the determination of what was reasonable was to be referred to the Commissioners—the wording or intent of this section being adopted from the English "Railway and Canal Traffic Act" of 1888.

The effect of this action of the Government has been to relieve it almost entirely of the burden of settling disputes between the different administrations, and in great measure to reduce the number of cases in which dispute arises. All lines which have accepted the minimum are bound by it in competition, and it is only when this is infringed that a reference is or can be made by opposing lines. The result that may be expected from the practically unrestricted rivalry for through traffic which is now allowed, is that rates that are now thought impossibly low will be found on the contrary to be not only possible, but distinctly remunerative under certain conditions, and that ere long the present minimum in the special classes may be reduced still lower. On three of the principal State railways it has been ascertained that the actual cost of carrying a maund one mile on the whole traffic has averaged no more than $\frac{1}{11}$ of a pie, while the average sum received has been $\frac{1}{8}$ of a pie, thus indicating a profit of over 100 per cent.

The introduction of through booking by rail and sea, on the American system, between India and England, has been



effected as yet on one line only, viz. the North-Western Railway, having its terminus at Karachi. The first proposals on the subject were made, in 1884, by Sir W. P. Andrew, then chairman of the Sind, Punjab, and Delhi Railway Company. Nothing was done, however, until after this line became the property of the State, and was merged in the system of the North-Western Railway. In 1886 negotiations were entered into by the manager of this line with the Hall line of steamers, on the basis of giving them through booking from any station on the railway of passengers, parcels, and goods to Europe, and as a set off to purchase from them a certain tonnage of English coal monthly. Difficulties arose mainly on the grounds of the legality and responsibility of the railway in granting through bills of lading; but these, after considerable delay, were got over, and an agreement was entered into for five years dating from the 1st January 1890. So far there has been no similar movement at other ports, nor does it seem likely, under the existing conditions of Indian business, and the essentially conservative character of the trading classes, that any initiative will be taken on that side. There are, moreover, substantial differences between India and America, in both the methods of conducting such operations and in the class of men who would be engaged in them. In India there are but few places where at present firms can be found who could be safely entrusted to ship to Europe to order on a sample or mark, and the crowd of large and small agents at the ports, who are at present a necessary part of the machinery of both the export and import trade, would certainly be likely to oppose an innovation which would probably deprive them of a large share of their present profits. At the same time, it must be allowed that it is these profits of the agent or middleman that represent a considerable factor in Indian prices, and that they would be reduced on a system of through booking. The success of the arrangement on the North-Western Railway has not been so far encouraging as regards goods traffic, and at the present time (1893) is



practically confined to the occasional transactions of one firm.

The table given at the end of this chapter affords information that may be of interest as regards the third or lowest class of passenger traffic on Indian railways, and shows that while the charge per mile is generally $2\frac{1}{2}$ pies, the average cost of haulage, including all charges, on both the standard and the metre gauge is less than one pie per mile.

TABLE RELATING TO THE LOWEST CLASS PASSENGER TRAFFIC
ON INDIAN RAILWAYS, 1892-93.

RAILWAY.	Average length of lowest class journey.	Lowest class fares.	Average number of lowest class passengers in a train.	Average number of vehicles in a train.	Average number of passengers in a vehicle.	Cost of hauling a passenger vehicle one mile.	Cost of hauling a lowest class passenger one mile.
<i>Standard Gauge Lines.</i>	Miles.	Pies per mile.			Full load = 60.	Pies. ¹	Pies. ¹
East Indian	60.00	2.5	235.45	10.77	21.86	10.43	0.48
Bengal-Nágpur	41.80	2.5	227.46	11.90	19.11	21.19	1.11
Indian Midland	69.88	2.5	126.96	6.26	20.28	21.89	1.08
North-Western (State).	42.03	2.5	192.40	8.97	21.45	21.29	0.99
Oudh and Rahilkund (State)	47.62	2.5	230.35	10.18	22.63	13.81	0.61
Eastern Bengal (State) and Bengal Central	23.04	2.5	165.08	8.08	20.43	15.45	0.75
Great Indian Peninsula Bombay, Baroda, and Central India	36.87	2.4	132.20	6.34	20.85	22.10	1.06
Madras	17.75	2.3	178.12	6.84	26.04	23.31	0.89
The Nizam's Guaranteed (State)	27.30	1.5	260.36	10.41	25.01	21.28	0.85
	54.72	2.0	194.54	10.75	18.10	21.22	1.17
Average	42.1	...	...	...	21.58	19.20	0.90
<i>Metre Gauge Lines.</i>					Full load = 32.		
Bengal and North-Western and Tirhoot	37.78	1.7	290.06	19.21	15.10	7.33	0.48
Rajputana-Malwa	48.70	2.0	235.08	13.26	17.72	10.15	0.57
Southern Mahratta	41.81	2.3	171.91	9.30	18.48	22.55	1.22
South Indian	33.60	2.0	246.19	13.71	17.96	15.28	0.85
Eastern Bengal (State)	24.81	2.5	157.10	11.15	14.09	12.82	0.91
Burma (State)	35.84	3.0	235.71	16.94	13.91	14.29	1.03
Bhávnagar-Gondal-Junágarh-Porbandar	39.09	2.7	187.31	11.97	15.65	23.48	1.50
Average	37.38	...	...	...	16.13	15.13	0.93

¹ One pie at present rate of exchange may be said to be equal to one-twelfth of a penny.



CHAPTER VI

INDIAN RAILWAY LEGISLATION

It is intended in this chapter to give a brief account of the legislation that has been carried out from time to time in India for the control of railways, and for defining the responsibilities of railway servants and the public generally. The first enactment was applicable to railways in British territory only, and to those only "under Government control," viz. Act xviii. of 1854. This practically did little more than give legal effect to regulations such as were then in force on English railways, as for instance the prepayment of fares, tickets, smoking, fraud, and the liability of companies as to luggage and valuable property. The usual clauses as to carriage of goods, trespass, and obstruction were also included, and every railway was required to erect and maintain good and sufficient fences on each side of the line, and failing therein, to be liable to a fine of fifty rupees for every offence, the procedure for the recovery of fines and other penalties being laid down at length. The Act gave no list of "definitions," nor was any procedure laid down as to the inspection of railways, or as regards inquiry into accidents. On the latter point, all that a railway company was required to do was to report the occurrence of accidents to the local Governments, and to submit a return of the same in such form as the Government might deem necessary. The last clause required that a copy of the Act, of the general regulations, the time-tables, and tariff of charges, should be



published and exhibited in English and the vernacular of the district at all stations.

The first difficulty of any importance in the working of this Act is disclosed in a circular letter ¹ from the Government of India to local Governments, in which it is shown that there was a defect in the Act as to the recovery of fines from a railway company, and that an amendment of the Act on this point was necessary. The opinion of local Governments was invited with regard to this, and to any other defects that may have appeared in the working of the Act, and a proposed draft for the amendment of the same accompanied this circular letter. Many suggestions were submitted in reply to this, the substance of the principal of which were referred to in a resolution of Government of India in the Public Works Department in August 1865.² The main points which seemed to need attention in a new Act were as follows :—That it should be applicable to all railways of every description, including tramways worked by steam ; that it should apply to railways in foreign as well as British territory. That whereas the old Act made companies liable for loss or injury only when such had been “caused by the gross negligence or misconduct” of their servants, it should be laid down that loss or injury was held sufficient proof of negligence somewhere, and that the companies should be liable in all such cases. More stringency was suggested also as to dealing with accidents, and for procedure in preventing the opening of a railway for traffic before it had been declared fit for such purpose. There was also a strong feeling shown in the correspondence as to the need for more severe measures in dealing with cattle trespass, and the provision of a sufficient number of level crossings. In a brief Act passed in 1871 (Act xxv. of 1871), this question of cattle trespass was dealt with among some other minor matters ;

¹ No. 836-9 of the 3rd March 1862, from Government of India Public Works Department.

² Resolution 704-14, Railway, of 19th August 1865.

and previously to this, in 1870, another short Act was passed giving certain requisite definitions for the Act of 1854. An important clause was inserted in the first of these Acts (1871), in which "the officers for the time being intrusted with the control of a railway" (meaning the principal officer or agent of a company), should make "general rules and regulations for the use, working, and general administration" of a railway, and might vary these from time to time; but that all such rules, etc., should be submitted for the sanction of the Governor-General in Council, and when sanctioned, published for general information. Breach of such rules rendered persons liable to a fine not exceeding fifty rupees, or in default, to imprisonment which might extend to two months.

Another resolution of Government on the same subject had been issued in November 1866,¹ but meanwhile a draft Bill for a new Act had been sent home for opinion to the Secretary of State (then Lord Cranborne), viz. in March of the same year, who replied commenting on it in December.² He fully agreed in the necessity for a fresh enactment, and in having "one comprehensive digest to refer to, instead of numerous and fragmentary enactments." He held that one essential consideration had been originally overlooked, which was that all the existing railway companies had very extensive rights and privileges secured to them under their contracts, and that legislative interference with such contract rights might, independently of any question of justice, not improbably subject the Home Government to serious legal liability. One way of meeting this, he suggested, was the insertion of a clause saving existing contracts, but that this would impair the efficiency of the Bill, and afford a large scope for litigation; yet that it was not easy to suggest any other course, unless the companies would engage to be consenting parties. Another important

¹ No. 1096, Railway, of 3rd November 1866.

² No. 44, of December 1866, from Secretary of State to Government of India.

point was that as the new Act was to apply to all Indian railways, whether already sanctioned or hereafter to be constructed, it might be well to reserve the right to Government of determining the gauge of a line, of having troops and mails conveyed at convenient times, of reducing rates and fares, and of "insisting on specially cheap trains for poor passengers." He also thought it might be possible to adopt such clauses of the English Act regulating the Clearing-House system as would be suitable for India. This despatch was accompanied by the opinions of the Home Boards of the different Indian railway companies on the proposed Bill. The Government of India replied in January 1868,¹ sent a fresh draft of the proposed Bill, and explained the grounds for the principal alterations. The new Bill as modified proposed a far more complete and inclusive enactment than that of 1854. There were clauses for the acquisition of land, for mines under railways, for the provision of sufficient crossings, the inspection and opening of new lines, the carriage of troops and of mails, and revision of the procedure for the recovery of fines. The amended Bill was published in India for opinion generally, and in October 1869² the Government of India suggested to the Home Government, that as there was likely to be delay in passing the Bill, certain parts of it might be dealt with separately, as being more or less urgently required. No action was, however, taken in this direction, and correspondence continued mainly on the question of the competency of the Government to traverse the rights of the companies in any new legislation.

In the meantime the Government of India had resolved on a new and important departure in the direction of the construction and working of State railways, and this materially altered the position of affairs. The result was the issue of a Government resolution in 1871,³ in which this point was

¹ No. 1, Railway, of 3rd January 1868, to Secretary of State for India.

² No. 109, Railway, dated 12th October 1869, to Secretary of State.

³ No. 407, Railway, of 12th March 1871.



particularly referred to. It stated that it was evident that "the law of the land relating to railways should be the same to whomsoever such railways may belong, and that the law which governs the companies' lines must also govern the railways of the State." Thus, such points as to the general liability of railway administration as distinguished from that of their servants, the imposition of fines, and other matters, which were manifestly inapplicable to the State as the Bill then stood, rendered it necessary to reconsider, and indeed to reconstruct the greater portion of it. The resolution contemplated what was termed "partial legislation" to begin with, in the revision of the old Act, and indicated that this could probably be carried out without difficulty, if it did not injuriously affect the position of the companies under their contracts. It was subsequently arranged that the desired Bill should be drawn in England, in communication with the companies, but it was stated by the Government of India later on,¹ that there did not appear to be any pressing need for further legislation, considering that urgent points had been met by the short Acts of 1870 and 1871, and that it might be as well to wait for further experience in the working of State railways before further consideration of the new Railway Act. It seemed also desirable that, as a matter of policy, any change in railway law should not be promoted by the State just at the time its own railways were about to be opened; while it still stood as the controlling authority over the guaranteed lines. The subject was consequently allowed to remain in abeyance for some time.

~ In 1875 an incident occurred on one of the guaranteed lines (the Oude and Rahilkund Railway) which appears to have led to a reopening of the question of further legislation, more especially as the point involved was important. It appears that a village near the railway was set on fire by, it was

¹ Despatch No. 22, Railway, of 27th January 1873, to Secretary of State for India.

alleged, the sparks from a locomotive engine, and the company was sued for compensation by one of the sufferers. Damages were decreed against the company, on the ground that it had no statutable powers to use locomotives on the line, and that, without such powers, it was liable for injury caused by engines in setting fire to adjoining property, or otherwise. The judgment was upheld on appeal in India, and the directors of the company contemplated a further appeal to the Privy Council. This was, however, deprecated by the Secretary of State, who said that the point would be dealt with in the new Railway Act.

In 1876 a new Bill was introduced in the Viceroy's Council by Sir Andrew Clarke, then member in the Council for Public Works, and on this further comments and suggestions were received in due course; but it was not until the 13th March 1879 that the Bill became law.¹ Its provisions extended to the whole of British India, and to the subjects of the Queen in Native States. It came into force on the 1st July 1879, the Acts of 1854, 1867, 1870, and 1871 being repealed, and it was laid down that nothing in the Carriers' Act of 1865 should apply to carriers by railway. The term "railway" was, under certain clauses, to cover the case of lines under construction, and a "railway administration" was to cover the case of the managers of State lines, lines worked by Native States or by companies. The difficulty above referred to as to the powers to run locomotives, was dealt with in a short clause, making it lawful to use "locomotive engines, or other motive power," with the previous sanction of the Governor-General in Council. Under Clause 5 no railway was to be opened for the public carriage of passengers (not of goods) until the railway administration gave notice of intention to open, until the line had been duly inspected by an officer appointed for the purpose, and until he had reported that the opening could be allowed without danger to the public.

¹ As Act No. iv. of 1879.

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Rules were also laid down for reporting accidents, and defining the classes into which they should be divided. The power of a railway administration to frame general rules for working a line was repeated from the old Act of 1854, the sanction of the Governor-General in Council being still required. Under the head of "offences and procedure" the provisions were considerably amplified, and amongst these was a clause providing for the punishment of hackney carriage and omnibus drivers at railway stations, in case of obstruction or misbehaviour. The Act gave power to the Governor-General in Council to extend it, or any portion of it, to "any tramway worked by steam."

The above Act was defective as regards the inspection of railways, both before and after opening, and it was found necessary to pass a short Act amending it in this respect in 1883;¹ but as the provisions of this Act were subsequently modified and enlarged in the Act of 1890² (now in force) detailed notice of them may be deferred until later. The principal object of the Act was to empower the Governor-General in Council to take action for the protection of the public against dangers arising from the inefficient maintenance of a railway, and to appoint officers for the purpose of making periodical inspections with this object. The absence of powers of this nature in other countries, and especially in the United Kingdom, has yet to be recognised by the travelling public. The provisions of Sections 5 and 5B of this Act enabled definite rules to be issued for the first time under legal authority in a resolution of Government,³ for the inspection of all railways instead of for State lines only prior to their being opened for passenger traffic. One month's notice was to be given, the inspecting officer was to be supplied at the same time with full information regarding the manner of

¹ Act iv. of 1883.

² Act ix. of 1890.

³ Circular No. 19, Railway, of 30th August 1883.

construction of the line, and certificates as follows were required to be given at the time of inspection :—

1. That no infringement in structures had been made of the standard dimensions prescribed for the gauge of the line by the Government.
2. That no engine or vehicle exceeded the maximum moving dimensions prescribed.
3. That no infringement of such dimensions would be made in future without due sanction.
4. That no more than two engines would ever be allowed at one time on any one track of a bridge.
5. That no alterations in the loads of rolling stock which would involve line loads on bridges in excess of those which might from time to time be prescribed for the gauge by the Government would be permitted.

The resolution concluded by prescribing the nature of the tests on girder bridges.

✓ The above sketch leads up to the period more closely antecedent to the Act of 1890, which, being now in force, deserves to be noticed at some length. ✓ The need for further legislation in the shape of a general railway law had been recognised before the passing of the Act of 1883, mainly owing to the questions which arose in the interchange of traffic, and in the settlement of the differences which arose on this account. So much had this been felt that some of the leading railways had pressed for a special enactment for arbitration. A draft Bill was eventually prepared, and sent home for approval and criticism to the Secretary of State in November 1884, the draft being at the same time freely circulated in India for opinion.¹ The principal feature in this first draft was the introduction of clauses allowing for the settlement of disputes between railways by means of arbitration, but besides this, the Bill of 1879 was more or less modified in nearly every clause. The collection of opinion, criticism, and

¹ Circular No. 1036, Railway Traffic, of 5th November 1884.

suggestion forms some bulky volumes extending over the years 1885 to 1890. The passing of the "Railway and Canal Traffic Act" of 1888 for the United Kingdom, or rather the discussions and debates on the measure before it had become law, led to a substitution of the machinery of a Commission for that of arbitration in the draft Bill, and to the renewal of discussion on this important alteration. In discussing the draft as it stood in July 1890,¹ the Secretary of State appears to have had misgivings as to the applicability of this method under the peculiar conditions of the Indian railway system, and in consideration of this fact that the Government had large powers of control over all the lines, while being the absolute owners of many of them, which would give exceptional scope for dealing with the action of the companies. On this, and on other grounds, the Secretary of State gave a somewhat partial sanction to the proposal. The Home Boards of the guaranteed lines viewed it from the point of its infringing their rights under their contracts, and that from the fact that the Bill provided for a temporary and not a standing tribunal, composed possibly to some extent of Government officials, it was to be feared that questions in dispute might not always be treated in the impartial and judicial way which characterised the proceedings of the English Railway Commission.

The objections on the above grounds, together with the multifarious proposals and modifications suggested from all sides, were disposed of ultimately by a Select Committee appointed for the purpose by the Government of India, and on the 21st March 1890 the Bill was passed as Act ix. of 1890, and was to come into force on 1st May of that year. The Act as it stands represents so largely the policy of the Indian Government as regards railways, that it has been considered advisable to give it *in extenso* in the appendices. Some comment may be offered also on its leading features. The first

¹ See Secretary of State's despatch, No. 75, Railway, 4th July 1889.

chapter merely consists of the usual and any necessary definitions. The second chapter, on the Inspection of Railways, differs but little from the provisions of the Act of 1879. It will be observed that Sub-section E (a) gives powers to make periodical inspections of any railway; while Sections 23 and 24 of the fourth chapter gives power to close a railway for traffic if it is held to be unsafe, and to forbid the use of rolling stock on similar grounds. The third chapter is practically new. It establishes the powers and responsibilities of railway administrations as regards the construction and maintenance of the lines and the provision of accommodation works. The want of enactment on this latter point was much felt by both the railways and the public, more especially as regards road crossings of a railway, either on the level or by over or under bridges. The fourth chapter, relating to the opening of railways for traffic, will be observed to refer only to passenger traffic. For goods traffic a railway administration may open a line on its own responsibility. Section 22 has been amplified by detailed rules for inspections, and for the procedure with regard to them. Sections 23 and 24, which are extremely important for the public safety, have been referred to above.

The fifth chapter is wholly new. It establishes railway commissions for the settlement of disputes or claims between companies, or between them and the public, and provides for what are known as "traffic facilities." The provisions in this chapter are largely copied from "The Railway and Canal Traffic Act" of 1888 of the United Kingdom, the prominent difference being that the Indian Commissions are to be merely temporary tribunals, as already mentioned, which are to be appointed as occasion may require, and only if the Governor-General in Council may think fit. The contrast between this and the standing Railway Commission in England is very marked, and is, moreover, characterised by the anomaly that in the Indian Act the decisions as to the necessity for appointing a Commission, as also the selection of its members,



is left in the hands of the Executive. As the owner of most of the lines, and copartner in others, the Government in India could hardly be regarded, from a legal point of view, as able to exercise strictly impartial judgment in these important initiatory steps, more particularly if, as might well happen, the case to be dealt with was one in which the interests of the State were involved. But although this view might be advanced theoretically, it is not likely that there would be the slightest ground for apprehension on this score, should it be found necessary to put in force this portion of the Act.

The sections of the sixth chapter deal with the working of railways, and confer powers on a railway administration to make general rules with this object, which rules must be sanctioned by the Governor-General in Council. The sections on this head are practically similar to those in the Act of 1879, but new sections have been added, giving powers to the State to determine arrangements or disputes regarding a common terminus or junction, and the proportion of the cost of the same to be borne by each line. The chapter also provides for the making of working agreements between railways, for the establishment of ferries, for providing roadways for cart traffic on bridges, and even for the construction of approach roads to railway stations, and for charging tolls on these works. A very important section provides that every railway shall submit returns in prescribed forms regarding its capital and revenue transactions, and its traffic. The remaining sections in this chapter refer to the carriage of goods and passengers. Under the former head some of the provisions, such as Section 61, are copied or modified from the English Act of 1888.

Chapter VII. defines the responsibilities of railways as carriers, and it is to be noticed that Section 82 exempts a railway from responsibility for loss or damage in case of contracting to carry by sea, under the conditions of the ordinary bill of lading. The eighth chapter prescribes the duties of a

railway administration in the case of accidents, and under Section 84 detailed rules have been laid down defining the duties of all concerned and the classes of accidents which are to be recognised. Chapter IX. deals with penalties and offences of railway companies, railway servants, and travellers or traders, and it is to be noticed that in Sections 87 to 98 the penalties refer to railway companies only, and thus exclude the officials of State lines, whose misdemeanours are, it is to be presumed, to be dealt with by the Government. Chapter X. contains supplementary provisions, in which is to be noticed specially Sections 137 and 138. On the whole the Act appears to be a thoroughly workable and carefully-considered piece of legislation, and so far no material defects or omissions have been noticed.

The effect of the Act upon the position of the guaranteed companies, in respect to their contracts with the Secretary of State, had been duly considered by the Select Committee which was appointed by the Government of India to advise on the new provisions. They had arrived at the conclusion that any saving clause regarding these contracts should not be inserted in the Bill. They held that such a clause might bring each company under a different law, and would certainly cause grave inconvenience. "Each company might claim to interpret the Act according to its view of its rights under the contract, and the attempt to do this, even if not successful, might very seriously impair the operation of those parts of the proposed Act which deals with the creation of traffic facilities and the prevention of undue preference." As soon, however, as the Bill became law, four of the companies, three of them being the only remaining of the old guaranteed companies, lodged protests with the Secretary of State against the infringements of their rights, and declared (under legal advice) that the passing of the Act, as regards the guaranteed companies, was *ultra vires* on the part of the Governor-General in Council. Their principal objection was

to Chapter V. of the Act, which dealt with the subject of traffic facilities, undue preference, and the institution of a Railway Commission for the settlement of claims or disputes arising from these subjects ; while one company¹ held that the Act was incompatible with the relations between the Secretary of State and the railway companies, and was “an ill-advised attempt to transplant into India legislation not adapted to its conditions.” It was held, on the other hand, that the “Railway and Canal Traffic Act” of the United Kingdom was compatible with the conditions under which British railway companies existed, as they were merely statutory commercial concerns, “with which the Government have neither privity nor contract.” These representations of the companies were forwarded to the Government of India by the Secretary of State,² together with opinions on the same by the legal adviser to the India Office. In replying to this in 1891,³ the Government of India took a firm position. They traversed the view that the Act was *ultra vires*, and considered that unless it could be shown that very unreasonable interference with the companies’ contracts had been enacted, the companies had no reason to complain, and that they were satisfied that no such interference could be shown, or would be likely to occur. They deprecated the suggestion that a further reference on the subject should be made to the law officers of the Crown, and believed that the companies would soon be led to the conclusion that the provisions of the Act were no less beneficial to them than to the public. Up to the present (1893) no further action on the general question has been taken on either side.

✓ The application of the Act to railways belonging to or passing through Native States was a matter of more difficulty and delicacy. In the case of a railway wholly isolated in one

¹ The Madras Railway Company.

² No. 95, Railway, of 28th August 1890, from Secretary of State for India.

³ Despatch 36, Railway, 29th April 1891, from Government of India.

State, the Government of India had no direct concern, other than as the paramount power, with what was in fact administration within foreign territory. But when, as in many cases, such lines formed part of through routes, it became evident that civil and criminal jurisdiction for damage, or offences under the Act, must lie with the Government of India, and more particularly when a line passed through several contiguous States. After considerable negotiation, conducted on the part of nearly every Native State in the most friendly and loyal spirit, this end has now been attained.

— The general tenor and perhaps intention of railway legislation in India has been to follow more or less closely the example of the United Kingdom in this respect, and there are but few indications, either in the enactments or in the proceedings of the Government, of any desire to go beyond this, or to regard the circumstances and habits of the people as requiring any special treatment, whether of restraint or protection in their dealings with railway administrations. If we bear in mind the position of the Government of India as the owner or potential owner of the whole of the Indian railways, and remember that it holds far closer and more defined relations with the people than is the case with any European Government, while possessing the complete initiative in legislation, we may be surprised that it has not been tempted to venture on exceptional measures. This abstention is to be accounted for, however, in great degree by the fact that the Government is possessed of ample executive power in the control of its railways, and that thus many matters which elsewhere might need to be supported by legal sanction, are dealt with promptly and easily by a circular or resolution of the Supreme Government. The only direction in which special legislation is noticeable, and that not wholly with reference to railways, is to be found in the Act relating to the acquisition of land for this and other public purposes,¹ but in this—a

¹ The Land Acquisition Act, 1870.



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measure of the greatest benefit to both buyer and seller—the Government is the principal party in the transactions covered by the enactment, and indeed may be regarded in most cases as selling itself in one department and buying in another, the only point to be dealt with being the equitable compensation of the tenants.



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CHAPTER VII

CONCLUSION

It will have been gathered from the foregoing chapters that railway policy in India has passed through some important changes, and that it is even yet far from having reached finality. To some extent the various phases of policy have been due to the influence of changes in the *personnel* of the Government, but the main cause is to be found in the serious financial difficulties resulting from a silver standard, which have made it necessary to have recourse to one expedient after another in order to avoid any serious curtailment of operations. The charge of weakness and vacillation which from time to time has been laid at the door of Government is, when all the circumstances have been duly weighed, not only unreasonable, but unjust, and it would be much nearer the truth to credit it with unusual courage and persistence in having pushed on railway communication in the face of embarrassments which might well have daunted others in a similar position. The whole story, and more especially the result so far, afford a striking testimony to the ability, and above all the honesty of purpose of our Anglo-Indian statesmen. The motive throughout has been to obtain the much-needed railway extension on terms the least burdensome to the revenues of the Empire, and in avoiding as far as possible the undue relief of the present taxpayer at the expense of his successors.

Beginning in 1849, under Lord Dalhousie, with a system of broad gauge lines under guaranteed companies, no material change was made until the end of Lord Lawrence's tenure of office in 1869-70, and when the trunk lines were virtually completed. Then at length, and somewhat tardily, we find that the burden of the contracts with the companies is clearly recognised, and for the next ten years there is an era in which the extension of the railway system is carried out entirely and directly by State agency, and the metre gauge introduced. From 1880, again, and up to the present time, the policy of the Government has been forced by circumstances to be constantly changing, and in the financing of railways, in the agencies for construction or working, and on the question of gauge and other matters, there has been no evidence of settled aim. The complication which now exists in the methods of constructing and working Indian railways is not, as already noticed, entirely owing to financial reasons. It is almost as largely referable to the frequent divergence of opinion as to the relative advantages of direct State agency compared with that of companies, coupled with a distinct tendency, both in India and at home, to abandon the former and relieve the Government as far as possible of the commercial part of its administration of the railways, while reserving full powers of general supervision and control.—

The various alterations in railway policy are well exemplified in the list given in the Appendix C, which shows the different agencies that are now employed both for construction and management in the Indian railway system. They may be classed as follows :—

1. State lines worked by the State.
2. State lines worked by companies.
3. Lines constructed and worked by guaranteed companies.
4. Lines constructed and worked by assisted companies.
5. Lines owned by Native States and worked by companies.

6. Lines owned by Native States and worked by the Government of India.
7. Lines owned and worked by Native States.
8. Foreign lines.

These comprise mileage under four different gauges, viz. the standard gauge of $5\frac{1}{2}$ feet, the metre gauge, the $2\frac{1}{2}$ feet gauge, and the 2 feet gauge—the two latter being characterised as “special gauges”; but the $2\frac{1}{2}$ feet gauge is now regularly recognised, and standard dimensions for it will be found in the appendices. The total mileage open for traffic at the end of 1892 on each gauge was as follows:—

	Miles.
Standard gauge	10,346
Metre gauge	7,451
Special gauge	245
Total	<u>18,042</u>

And in addition to this there was a small mileage, $53\frac{1}{2}$ miles only, of steam tramways outside municipal limits. The total sum expended on Indian railways up to the end of 1892 was 23,408 lakhs of rupees.¹ The average cost per mile of the lines on each gauge is given in rupees in the table in the appendices, together with other data relating to them.

Had it not been for the serious loss by exchange, the Government of India might claim that the Indian railway system is an unparalleled instance of successful national investment, for the average return on the capital expenditure on all the railways in 1892 was 5.43 per cent, but unfortunately, partly owing to the cause above mentioned, this is only the statistical result of working, the net loss to the State in the financial years 1892-93 being about 135½ lakhs of rupees, which, however, includes interest on lines under construction. Had silver remained at par, the Indian railways would have afforded a magnificent source of revenue to the Government,

¹ A “lakh” of rupees is 100,000, equivalent at 2s. to the rupee to £10,000.

as the loss on exchange alone is estimated in that year to be on 153½ lakhs. The principal cause of loss at present is in the payment of interest at figures varying from 5 to 3 per cent in sterling, on the guarantees, the older guaranteed lines being entitled to payment at an exchange of rs. 10d., while it has steadily fallen since 1872, and in 1892 the average rate has been but little over rs. 4d. The sterling interest charges now payable on Indian railways by the Government, which have to be remitted to England, are equivalent to a payment of interest of over 7.6 per cent on the total capital raised, if converted into rupees at par. The load of the guarantee will, however, be greatly lightened within the next twelve years by the expiry of the contracts of two of the most important of the older guaranteed lines, and in 1907 the last of them, the Madras railway, will fall into the hands of the State. Further relief is to be hoped for from the recent currency legislation, and if the exchange value of the rupee can be got to rs. 6d. the outlook will be good indeed.—

Were, however, the direct loss to the Government far larger than it is now, it could not be held to be serious for so vast a country, and especially for a railway system which has shown steady and even rapid growth in its traffic and its receipts. But it is not sufficient to estimate the value of Indian railways to the State by their direct results. We must attach an equal if not greater importance to their indirect benefits. Those which are obvious to every one are the increased facilities they afford in the general administration of the country, in the greater mobility they give to our military forces, the firmer grasp they allow to our tenure of the country as a whole, and, lastly, in the protection they insure against famine; but they do more than this, they are sweeping away the mental cobwebs of centuries, they are binding together in unity, in sympathy, and in trade, what scarcely more than 100 years ago were isolated kingdoms in constant strife and enmity with each other, and slowly but surely spreading peace

and prosperity over the land. The value of such results may be soberly said to be incalculable. It must be observed, however, that the considerable figure on the wrong side on the account which the working of the Indian railways as a whole now shows, would have been largely reduced had it not been for large mileage of unproductive lines which it has been necessary to make for military and famine protective reasons, and would have been still further reduced were it not that so large a proportion of the railways has been made over to working companies which share in the net profits.

In all the contracts and engagements between the Government and the working companies, the share of the State in surplus profits is carefully guarded, and is always considerable, varying between one-half and four-fifths; but, nevertheless, the annual sum paid or surrendered to the companies is in the aggregate very large. In the year 1891-92 this amounted, together with contributions to provident funds, to nearly 122 lakhs of rupees. It would not, however, be right to view this as being an absolute loss to the State; indeed, it might be held to be a part only of the additional earnings of the lines due to the zeal and capacity of the officers of the working agencies, to their development of the traffic, and by the exercise of due economy in administration. In this light it may be regarded as a measure, or as some proportion of the measure, of the advantages to be derived from the operation of such lines on more rigorously commercial conditions than could be expected at the hands of State officials. This can clearly be no more than an assumption, which could only be tested in the most crude way; but judging from such data as bear on the question, it might safely be asserted that if the surrender of profits to the companies rested solely on this ground it could not be fully justified. The really weighty reason in support of this policy must be found in the desire on the part of the Government to free itself from the details and commercial phases of railway working and

administration, and more remotely, perhaps, in the recognition of the political advantage of attracting the investments and interests of English capitalists in this direction.

The share of the State in the net profits of the lines worked by companies, and the whole of the profits from lines belonging to and directly worked by the Government, are absorbed in the general revenues of the country. Doubts have been expressed from time to time as to the propriety or equity of this procedure, and it has been urged that the profits from the best paying lines are thus devoted, and at the expense of the trading classes in their vicinity, to the assistance of lines in less favoured localities. The present exigencies of Indian finance would forbid the serious consideration of this question, and the time seems as yet far distant when it can be held to be within the sphere of practical politics; but were it otherwise, and if it was not necessary to husband and absorb every possible source of income to meet the cost of the general administration of the country, it would not be difficult to establish a strong *prima facie* case against the present policy. There are instances, such as that of the East Indian and other railways, which are exceptionally profitable concerns, and are paying a large revenue to the State. The trading and travelling public from whom this revenue is derived might contend, and not without reason, that the surplus profits of such railways should not be considered as revenue for general purposes, or to be devoted as it might be to the support of railways elsewhere, but should be held apart for the promotion of railway extension within the sphere of the lines concerned, or regarded as indicating that rates and fares should be reduced. The first of these courses would be supported by the shareholders in the working companies, but they would not so readily agree to the latter, being equally interested with the Government in obtaining as large profits as possible from the lines they are operating, or, in other words, to take "all that the trade will bear," so long as the rates are within the maxima agreed upon.

This question cannot, however, be viewed in India from the same standpoint as that which would be allowable in a country where the railway system has been but little indebted to the State for its existence or support. In India, on the contrary, the railways have been financed almost entirely by the assumption by the State of responsibility from their results as investments ; and thus while the risk is an Imperial one, the disposal of their surplus revenues must be considered, not in the light of local interests, but in that of the Empire as a whole, and as, moreover, a set off against the losses incurred by the State in the early days of such railways. The whole country paid its share for many a year of the interest on the capital of the guaranteed lines, and with only the most remote benefits from them, while the public who then used and profited by them were indebted to the country at large. It would thus seem fair enough that in the days of their prosperity they should contribute towards helping in other directions. The commercial classes and the shareholders must, consequently, be content with the facilities and possibilities which the Indian railways afford them under existing conditions, and bear steadily in mind that without them their investments in the country would either have been impossible or at least far less profitable.

But whatever may be the views taken of the policy of the Government in this respect, no intention could in any way be imputed to it of having encouraged or approved the adoption of high rates as means of increasing profits and obtaining revenue from this source, even upon lines which have had a complete monopoly of the traffic. On the contrary, as has been shown in the preceding chapters, persistent endeavours are evident from the very beginning towards inducing the railway administrations to find their account in the carriage of large quantities or numbers at low rates, rather than in small quantities at high rates, and in recommending or enforcing this policy, the Government has been prepared to forego their own



share of profits, in the hope that the indirect benefits to trade and to the people would justify the temporary loss. ... A steady adherence to this policy has resulted in the attainment of rates, apparently profitable, for the carriage of food-grains, minerals, and the lowest class of passengers, which, it is believed, are lower than in any other country. This, it must be borne in mind, has been effected, not on railways of a temporary character, but carried out, as must necessarily be done in a tropical climate, in the most solid and permanent manner, and maintained at the instance of the State, both as to works and rolling stock, with a more rigorous attention to a proper standard of efficiency, and to the safety of the public, than is the case on many of the railways in the United Kingdom.

At the same time, it is by no means to be assumed that rates and fares on Indian railways have yet reached their lowest remunerative level; indeed, there is good reason for the belief, that in the class of goods above mentioned and in the third or lowest class of passenger fares, further reductions are certainly to be expected in the near future, and on sufficiently profitable conditions. The movement in this direction must be necessarily slow, however, and in the case of those railways which have been made over to working companies, their copartnership with the Government and the responsibility of their agents for showing adequate returns render it necessary to proceed with great caution.

Upon the question of gauge the action of the Government will have been noticed to have shown less stability of policy than in other directions. This may be accounted for, as in other matters, from the frequent changes in the *personnel* of the higher officials, and to a less degree from changes in the Home Government. What is fully and apparently finally discussed in one decade, is rediscussed, remodelled, or even wholly altered in the next. This inevitable condition of things in Indian affairs has both its advantages and disadvantages. New men bring new ideas, and change must be always expected



in the light of experience ; while India, linked as her fortunes are to the changing phases of a representative Government, has no reason to expect immunity from such influences. As a whole the fluctuations in policy on the gauge question have been distinctly beneficial to the country, and although the alterations of view which were exhibited during the period of the introduction of the metre gauge led to some waste of money, it was in one sense justifiable waste, and in any case was no great penalty for India to pay for a decision of such importance. If, for instance, the standard $5\frac{1}{2}$ feet gauge, which was first adopted on Indian railways by Lord Dalhousie in 1849, had been persistently adhered to throughout the Empire for all further extension, we must have had, for financial reasons, either a very much smaller system than at present, or, with our existing mileage, have found our railways a crushing burden on the revenues of the State. The introduction of the metre gauge by Lord Mayo in 1870 was undoubtedly a move in the right direction, the only doubt that has been expressed being, whether it would not have been wise to have made a still greater reduction from the broad gauge, and to have fixed the narrow gauge at say 2 feet 9 inches or 2 feet 6 inches, the latter being now recognised as one for purely feeder lines. The narrow gauge would then have been so clearly suited only for lines of limited traffic, that mistakes might have been avoided of laying them down in areas where there was good reason for expecting an ultimate development of traffic that would require the standard gauge. However, the metre gauge was a distinct boon to the country. It afforded a sufficient and much needed means of communication to poorly populated and backward districts, it was made more cheaply mile for mile than the broad gauge, and it swept away the bugbear of the evils of break of gauge which threatened to inflict on India a permanent source of embarrassment.

In admitting the metre gauge as a secondary standard for feeder and subsidiary railways, it was not supposed that the

during this period, has been about 557 lakhs of rupees, representing at a mean exchange of say 12 rupees to the pound sterling a little over $4\frac{1}{2}$ millions. With a population, which may be taken to have averaged 260 millions, this would mean no more than an addition of one mile yearly for every 430,000 persons, and if the present open mileage be taken, of all gauges, we have still only one mile of railway for every 16,000 persons. The estimate of the Famine Commission referred only to the needs of the country in the event of the failure of crops in any large area, and represented no more than the framework of the structure. The rest has yet to be filled in. On a moderate computation there are at least 3000 miles of trunk lines on the broad gauge which have still to be made, without counting branch lines, and an almost indefinite extension seems possible on the metre and $2\frac{1}{2}$ feet gauges. In the North-West Provinces, in Bengal, and in Burma, from four to five millions sterling could be laid out in each on narrow gauge lines, which would with almost absolute certainty show an early return of at least 4 per cent. In fact, if India can only obtain some stability in her currency, and a more certain figure of exchange, the field for the investment of English capital in railways in that country would be second to none in the world. All that would then be needed is that projects should be taken up on sound advice, and carried out with strict economy in the first instance, leaving them to be improved in character and capacity as the traffic increased. It may, moreover, be safely assumed that the policy of the Government will be directed in the future towards definite and hearty encouragement of *bona-fide* private enterprise in Indian railways, and that no schemes will be countenanced that do not show reasonable prospect of being remunerative.

There is one particular and almost unique feature in the relations of the Government with the railways in India. They are, fortunately, free from the evil influences of political or party jobbery; even favouritism or bias from this source is

entirely absent, and the machinery of "wire-pulling" and "log-rolling," which seems destined to accompany the adoption of any important measure under representative governments, have no existence. The fate of a policy or a project is decided on no other ground than that of the best interests of the State at large, and the history of Indian railways is thus happily free from any trace of the imputations of bad faith or official dishonesty which in some countries have disgraced and embittered the connection between the Government and private enterprise. The reins have been held, whether in high or in low places, by men who could justly lay claim to a high standard of ability and rectitude, and who, both in spirit and in action, have deserved, if they have not earned, the respect of the English investor. The charges not unfrequently made against the Government of dilatoriness and vacillation in the disposal of the proposals of promoters have doubtless had some foundation, but it should be borne in mind that this defect is largely and yet inevitably traceable to the system of dual control by the Home and Indian Governments, and also to the fact that the only motive which actuates official discussions is the anxious and honourable desire to arrive at decisions based on a complete investigation of the claims of all concerned. The alleged, and perhaps in some cases the real, evils of the State-ownership of railways, of which such highly coloured pictures have been drawn, have happily as yet not been exhibited in India, nor does it seem in any way likely that they will be in the future. It has there been fully established that under certain conditions this system can be adopted without involving elements which are either undesirable or impolitic, and so as to offer equal benefits both to the State and to the investor. —

—The one serious defect of direct State action, whether in the construction or the working of railways, lies in the almost inevitable tendency to over-centralisation—a defect indeed which, more or less, is to be observed in every form of

growth of traffic on them would have been so pronounced, nor perhaps was it foreseen that they would, as has been the case, be formed up into large systems, as important competing and through routes. That this has happened, however, does not afford fair ground for the condemnation of the principle they represent, nor can it be rightly asserted, except perhaps in one instance, that these lines have as yet been unable to accommodate the business which has been drawn to them. To have insisted on a uniform gauge of 5 feet 6 inches for the whole Indian railway system would have been a very serious mistake, and the advantages it would have offered were more theoretical than practical. The great bulk of the traffic on railways in India can be amply well accommodated by moving it at slow speeds, while breaks of gauge, especially at comparatively long intervals, whether for goods or for passengers, is in no respect considered as an inconvenience by the mass of the people, so long as it implies cheapness. This gauge question is the only point on which railway policy in India has been seriously attacked, and no little ability has been exhibited and wasted in the advocacy of uniformity. The character of the earlier discussions was, though often evidently biassed by surroundings, merely academic and certainly disinterested, but some recent revivals of the controversy bear indications of being prompted, or at least coloured, by the aims of competing railways, and the arguments put forward have been duly discounted in India on this ground. But in England the opposition to break of gauge is always sure of an appreciative audience, and there it may be readily conceded it would be an evil incontestably serious; but there also, unfortunately, the tendency is to test every measure by an insular standard, and to imagine that what is admirably suited to the conditions of the United Kingdom must be equally applicable over the whole Empire. Those who insist on the necessity of a uniform gauge are perhaps inclined to overlook the fact, that the English railway system offers (and only recently) one of the few



exceptions in this respect, and that in applying their arguments to India they either ignore or do not realise its enormous extent, the striking differences of conditions between its provinces, and still greater contrast in the habits and aims of the people compared with those of advanced European countries. Their principles may be sound as applied to the circumstances of a small, rich, and populous country, where the value of time and the meaning of comfort and convenience are fully understood, but they are unsound and misleading if sought to be extended to widely different surroundings. Fortunately for India and for Indian finance, this is the view that has been taken by her statesmen.

In claiming that the Government of India can show a good account of its stewardship in the matter of railway communication, it is not intended that their work in this respect should be considered as approaching completion, on the contrary, the task is still far from being fulfilled, and many thousands of miles, on the three gauges, have yet to be made. The estimate of the Famine Commission of 1880 was that India needed 20,000 miles of railway in order to effectually protect the country against famine. This figure has not even yet been reached, and the province of Orissa, where over one million lives were lost in the famine of 1865-66, is still unprovided with a single mile of railway. During this terrible time ships laden with grain lay off the coast unable to land their cargoes, while the people were dying of starvation, and no sufficient help could reach them from the interior. Progress has, in fact, been slow, but the Government has been forced to pursue a cautious policy, and to keep steadily before them the necessity that investment in this direction should not reach such limits as might endanger the credit of the country, or even disturb the financial equilibrium from year to year. Taking the period from 1850 to 1892, it will be found that the yearly average of new lines opened for traffic is no more than 430 miles; while the average annual expenditure on railways from all sources



Government administration. It depresses the zeal of local officers, weakens their sense of responsibility and the habit of prompt decision, and involves inordinate and often serious delay in the despatch of public business. But tolerable as this may be in the ordinary work of civil government, its effects are far more injurious in the conduct of such essentially commercial undertakings as railways. At the outset of State railway operations in India this evil was certainly very pronounced, and it was some time before it was recognised that the State official should be endowed with no less powers than those who were conducting the companies' lines. To the public the effects of centralisation on State lines were equally objectionable, and it would not be far wrong to refer the reversion from purely State agency to the combination of this with the agency of companies to this cause. Of late years a great deal has been done to remove this objection to State railway administration, and at present, indeed, the Government railway manager is probably under less restrictions than the agent of a railway company. There is, nevertheless, a lingering suspicion among the commercial classes that the State lines are worked with less sympathy for the trader than is the case on the railways worked by companies—that there is less desire to stimulate traffic, or to meet business competition half-way. Placed as the Government officer is on the safe pedestal of permanent service, and secure of this and of a pension whatever may be the financial results of the line he is operating, there may be some sort of ground for comparing him unfavourably with his *confrère* in the service of a company, but on the whole the difference must be more theoretical than practical, and could scarcely amount to any sensible effect on individual profits.

One point of importance must be noted before concluding this chapter. The Government of India has been urged for many years past to extend the construction of railways with the main object of finding fresh markets for the English



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manufacturer. This must be held to imply that the Indian taxpayer is to incur all the risk, and that the manufacturer is to reap all the profit. It may also mean that the progress of manufactures in India, which is now steadily increasing, will be more or less retarded by the introduction of cheap European products. But it cannot be expected that the Government of India should be prepared to further railway extension on such grounds. As the custodian of the finances of India, and of the interests of its people, it is bound rather to look for new outlets for Indian produce than for new markets for English manufactures. Their duty is to administer the resources of the country for its benefit, and to regard the advantages to other countries as of strictly secondary importance. In short, if the expansion of English trade is to be dependent on a more rapid or reckless extension of the Indian railway system, the money should be found by those who expect to profit by it. If we are to allow our Indian Empire to become a happy hunting-ground for the iron and cotton manufacturers of England, we must abandon the aims and principles which have guided us hitherto in governing that great possession, and be prepared to admit that we are no longer worthy to hold the great trust that has been bequeathed to us by our predecessors.

RAILS—

	Ft.	In.
(15) Maximum clearance of guard rail for points and crossings	0	1 $\frac{7}{8}$
(16) Minimum clearance of guard rail for points and crossings	0	1 $\frac{3}{4}$
(17) Minimum clearance of guard rail for curves and level crossings	0	2
<i>N.B.</i> —The <i>maximum</i> clearance for curves and level crossings will vary according to the radius of curve.		
(18) Minimum depth of space for wheel flange, from rail level	0	1 $\frac{1}{2}$

III. FIXED STRUCTURES—IN STATIONS

(See also Diagram No. 1)

PLATFORMS—

(19) Standard horizontal distance from centre of track to face of platform wall or nosing (if any)	5	6
<i>N.B.</i> —The upper edge of the nosing or coping to platform wall is to be finished to form an arris without any rounding or chamfer.		
If the platform be on a curve, the horizontal distance from centre of adjacent track is to be increased as follows :—		
For a curve of 8 degrees (716 ft. rad.) allow 5 $\frac{1}{4}$ in. extra		
“ 6 “ (955 ft. rad.) “ 4 in. “		
“ 4 “ (1432 ft. rad.) “ 2 $\frac{1}{2}$ in. “		
“ 2 “ (2865 ft. rad.) “ 1 $\frac{1}{4}$ in. “		
and for other curves in proportion.		
(20) Standard height above rail level for passenger platforms	3	0
(21) Alternative height above rail level for passenger platforms at minor stations	1	0

N.B.—Where passenger platforms are provided their height above rail level must be either 3 feet 0 inches or 1 foot 0 inches as specified above, no other height being permissible. At places where passengers are intended to get into or out from trains, but at which no platform is provided, a piece of ground for a length of not less than 800 feet, and for a width of not less than 20 feet from outer rail, is to be brought to a smooth even surface at rail level, and properly finished with gravel or similar material.



DIAGRAM No. 1.

STANDARD DIMENSIONS IN STATIONS.

The height above rails is to be taken to the upper surface of board with buffer centres at the maximum height of 3 ft. 7½ in. above rail level.

For a curve of 8 degs. (716 ft. rad.)	allow 51 in. extra.
" " 6 degs. (655 ft. rad.)	" 4 in. "
" " 4 degs. (513 ft. rad.)	" 21 in. "
" " 2 degs. (386 ft. rad.)	" 11 in. "

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Scale $\frac{1}{4}$ Inch to 1 Foot.

APPENDIX A

STANDARD DIMENSIONS TO BE OBSERVED ON RAILWAYS IN INDIA

5 feet 6 inches Gauge

NOTE.—The maximum, minimum, and fixed dimensions and loads given in this schedule may not be infringed under any circumstances without the special sanction of the Government of India. Where it is proposed to execute any work or to procure bridge girders, station machinery, rolling stock, or other railway material which will infringe these dimensions or loads, the sanction of the Government of India is to be obtained before such work is commenced or order given.

I. FORMATION

		Ft.	In.
SINGLE LINE—			
	Minimum width of formation—		
(1)	In embankment	20	0
(2)	In cutting (<i>excluding side drains</i>)	18	0
DOUBLE LINE—			
	Minimum width of formation—		
(3)	In embankment	34	0
(4)	In cutting (<i>excluding side drains</i>)	32	0
(5)	Standard distance centre to centre of tracks (out of stations)	14	0



CURVES—

Maximum angle of curvature—

- | | | | |
|-----|----------------------|-------|-------------------|
| (6) | In ordinary country | 3° 0' | (rad. = 1910 ft.) |
| (7) | In difficult country | 6° 0' | (rad. = 955 ft.) |

N.B.—The angle of curvature is taken as the angle at the centre subtended by an arc of one hundred feet in length. Thus the radius for a one degree curve is 5729.578 feet.

The maximum angle of curvature should *only be worked to in special cases* where the adoption of an easier curve would be impracticable or involve considerable extra expense. Under very exceptional circumstances, where it may appear necessary that this rule should be relaxed, the matter should be referred to the Government of India for orders.

The maximum angles of curvature given above do not apply to curves in station yards.

II. BALLAST AND PERMANENT WAY

BALLAST—

- | | Ft. | In. |
|---|-----|-----|
| (8) Minimum width of ballast at rail level | 11 | 0 |
| (9) Minimum depth of ballast below sleepers | 0 | 8 |

N.B.—These minimum dimensions may be relaxed in the case of a line being opened to traffic before the banks have settled.

SLEEPERS—

Minimum dimensions for timber cross sleepers—

- | | | | |
|------|---|---------|---|
| (10) | Length | 9 | 6 |
| (11) | Breadth | 0 | 9 |
| (12) | Depth | 0 | 5 |
| | | Sq. in. | |
| (13) | Minimum area in cross sections | 50 | |
| | | No. | |
| (14) | Minimum number of cross sleepers per mile | 1760 | |

N.B.—On bridges where the cross sleepers rest directly on longitudinal girders, the sleepers are to be spaced not more than 2 feet 6 inches apart, centre to centre, and are to be not less than 6 inches deep exclusive of any notching which may be required on the under side to allow for the cover plates, camber, etc.



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- (22) Standard height above rail level for goods, carriage, and horse landing platforms Ft. In.
3 6

N.B.—The ends of *all* platforms must be ramped, the slope being not steeper than 1 in 6.

BUILDINGS—

- (23) Minimum horizontal distance of any building from the edge of a *passenger* platform 30 0

N.B.—For an island platform, where it would be undesirable to allow the full width here specified, a plan showing the arrangements proposed is to be submitted to the Government of India for special sanction.

- (24) Minimum horizontal distance from centre of track to any structure in the vicinity of a *passenger* platform (but not *on* a platform), within a height of 12 feet from rail level 9 0

N.B.—This rule does not apply to point levers between tracks, to water cranes, or to loading gauges. (*See items Nos. 38, 45, and 77.*)

For extra allowance on sharp curves, see item No. 19.

- (25) Minimum horizontal distance from centre of track to any structure not in the vicinity of a *passenger* platform, from platform level, if any, or from 1 foot above rail level if there be no platform, to a height of 11 feet 6 inches above rail level 7 0

N.B.—Under the last entry, coal or any material stacked by the side of any track is to be considered a structure in the sense in which the word is here used.

A projecting overhanging roof is permissible in the case of a goods shed on a siding, if such roof extends over the centre of a track at a height of not less than 14 feet 6 inches above rail level; or if it does not infringe the outline of the figure for minimum fixed structure out of stations. (*See Diagram No. 2.*)

For extra allowance on sharp curves, see item No. 19.

PILLARS, LAMPS, ETC.—

- (26) Minimum horizontal distance from edge of platform to pillars, columns, lamps, or



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- (32) Minimum height above rail level for telegraph wires crossing the line, or above surface of road where carried over roads at level crossings

Ft. In.

20 0

N.B.—The minimum horizontal distance, from the centre line of nearest track, at which a telegraph post may be erected, is the total height of the post plus 7 feet. Also, where the line is in cutting, a telegraph post erected on the berm must be at a distance from the edge of the cutting of not less than the total height of the post.

TUNNELS—

- (33) For minimum dimensions, see Diagram No. 3.

V. STATION YARDS

SPACING OF TRACK—

- (34) Minimum distance centre to centre of tracks

15 6

POINTS AND CROSSINGS—

The following (items Nos. 35, 36, and 37) are recommended for general use, and are to be adopted on all State railways :—

- (35) *Minimum radius of curve* 800 0

- (36) *Standard crossings* $\left\{ \begin{array}{l} 1 \text{ in } 6 \\ 1 \text{ in } 8\frac{1}{2} \\ 1 \text{ in } 12 \end{array} \right.$

- (37) *Standard lengths for tongue rails* $\left\{ \begin{array}{l} 12 \text{ 0} \\ 15 \text{ 0} \end{array} \right.$

- (38) Minimum horizontal distance from centre of track to point handle, indicator, or any part of point apparatus above rail level 7 0

N.B.—A point handle may not, in any position, be within 7 feet of the centre line of nearest track ; a clear distance of 7 feet is also to be preserved from centre of nearest track to any part of the point apparatus, fixed or movable, above rail level. An arrangement involving the placing of a point handle between tracks should be avoided as far as practicable ; but where this arrangement is adopted, the point handle must work parallel with the rails, not at right angles thereto.

ACCOMMODATION—

- (39) Minimum length for passenger platform (if provided)

600 0



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similar isolated structures within a height of 12 feet from rail level .	Ft.	In.
	6	0

ROOFS, OVER-BRIDGES, ETC.—

(27) Minimum height above rail level, at centre of track, of tie-rods or underside of any continuous roof or covering in <i>passenger</i> stations .	20	0
(28) Minimum height above rail level at centre of track for passenger foot-bridges crossing the line in stations .	18	6
(29) Minimum height above rail level for telegraph wires crossing the line, or above surface of road where carried over roads within the boundary of a station .	20	0

IV. FIXED STRUCTURES—OUT OF STATIONS

(See also Diagram No. 2)

BUILDINGS, ETC.—

(30) Minimum horizontal distance from centre of track to any structure, out of stations, from 1 foot above rail level to a height of 11 feet 6 inches above rail level. (See Diagram No. 2)	7	0
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N.B.—Under this entry any material stacked by the side of the line is to be considered a structure in the sense in which the word is here used.

Where the line is on a curve the horizontal distance of a fixed structure from the centre of adjacent track is to be increased as follows :—

For a curve of 8 degrees (716 ft. rad.)	allow	5½ in. extra
“ 6 “ (955 ft. rad.)	“	4 in. “
“ 4 “ (1,432 ft. rad.)	“	2½ in. “
“ 2 “ (2,865 ft. rad.)	“	1½ in. “

and for other curves in proportion.

OVER-BRIDGES, ETC.—

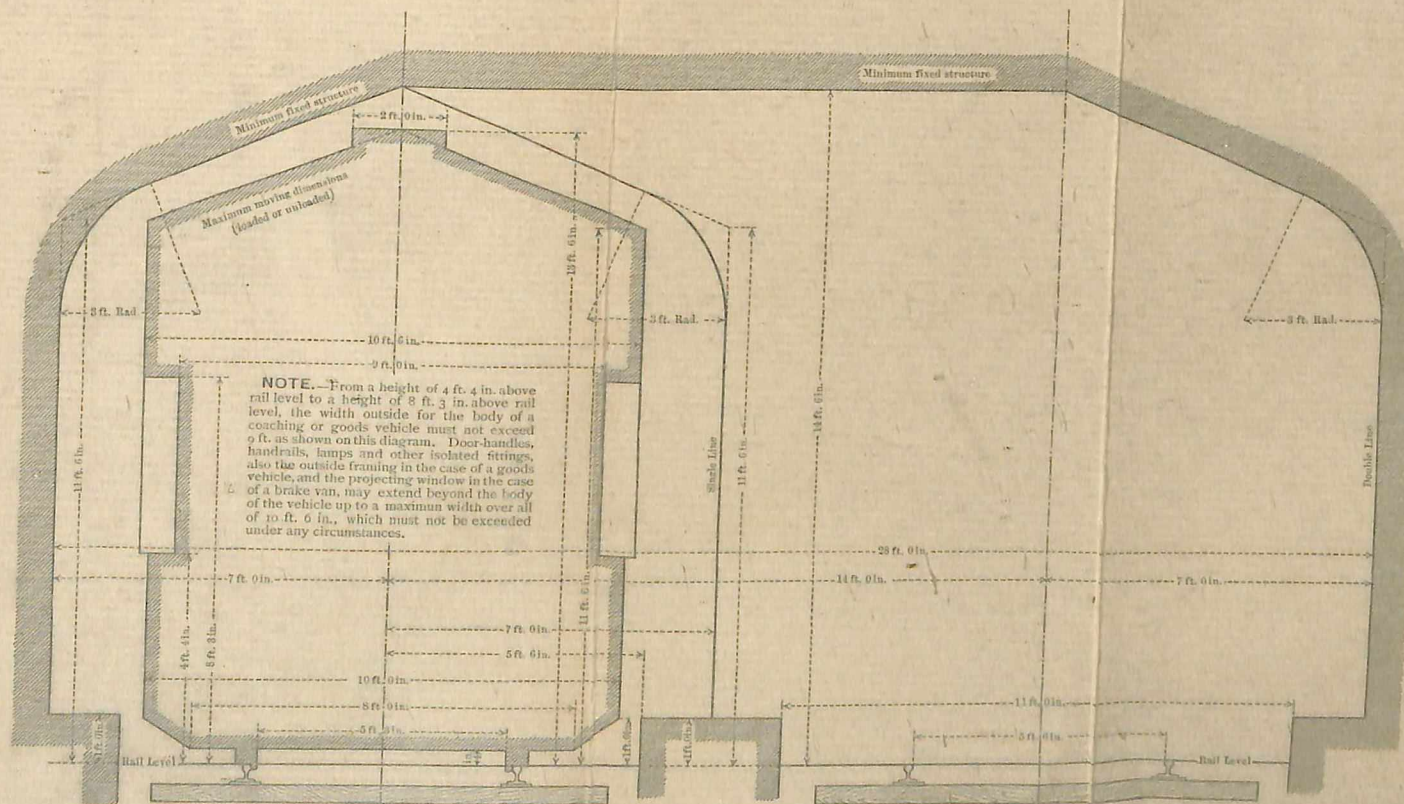
(31) Minimum height above rail level at centre of track for over-bridges out of stations	14	6
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3 FT 6 IN. GAUGE.

DIAGRAM No. 2.

STANDARD DIMENSIONS.

STANDARD DIMENSIONS OUT OF STATIONS.



NOTE.—From a height of 4 ft. 4 in. above rail level to a height of 3 ft. 3 in. above rail level, the width outside for the body of a coaching or goods vehicle must not exceed 9 ft. as shown on this diagram. Door-handles, handrails, lamps and other isolated fittings, also the outside framing in the case of a goods vehicle, and the projecting window in the case of a brake van, may extend beyond the body of the vehicle up to a maximum width over all of 10 ft. 6 in., which must not be exceeded under any circumstances.

Where the line is on a curve, the horizontal distance of a fixed structure from the centre of adjacent track is to be increased as follows:—

For a curve of 8 degs. (716 ft. rad.) allow 5 1/2 in. extra.
 " " 6 degs. (955 ft. rad.) " 4 in. "
 " " 4 degs. (1,430 ft. rad.) " 2 1/2 in. "
 " " 2 degs. (2,865 ft. rad.) " 1 1/4 in. "

Scale 1/4 Inch to 1 Foot.

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