

MODERNISATION
AND
RE-EQUIPMENT
OF
BRITISH RAILWAYS

BRITISH TRANSPORT COMMISSION

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I. INTRODUCTION

1. The British Transport Commission are convinced that an efficient and modernised railway system is essential to the economy of the country, and that it should be able to attract and retain sufficient traffic to make it economically self-supporting for many years to come. For reasons which are too well known to require repetition here, British Railways today are not working at full efficiency, mainly owing to their past inability to attract enough capital investment to keep their physical equipment fully up to date.

2. This Plan aims to produce a thoroughly modern system, able fully to meet both current traffic requirements and those of the foreseeable future. It is based on the premise that its main components shall be capable of being started within five years, and completed within fifteen years. For special reasons, which are stated, certain parts of the Plan will take rather longer to complete.

3. The main technical details of the Plan are the result of six months' intensive work by a Planning Committee set up by the Commission in May. This Committee was composed of headquarters and Regional officers, and worked in conjunction with the Chief Regional Managers. It should be understood that behind this brief presentation of the Plan there lies a mass of detailed study.

II. OUTLINE OF THE PLAN

4. 'An equipment, in the widest sense of that word, of modern design and fit to give reliable and speedy transport service on a large scale' was the second of the main objectives enumerated by the Commission in their last Annual Report. To no part of their undertaking does this apply with greater force than to British Railways, and in no other direction is a large-scale programme of investment likely to produce such fruitful results.

5. The Plan will involve an outlay of approximately £1,200 million. Of this amount, however, almost half would be required in any case for the

normal maintenance of the railway services on their present basis, including the necessary replacements of rolling stock and so forth. But no one could seriously contemplate such a restricted objective; the only possible course, if railways are to continue in being, is to bring them properly up to date.

6. The aim must be to exploit the great natural advantages of railways as bulk transporters of passengers and goods and to revolutionise the character of the services provided for both—not only by the full utilisation of a modern equipment but also by a purposeful concentration on those functions which the railways can be made to perform more efficiently than other forms of transport, whether by road, air or water.

7. There need be no doubt about the main components of the expenditure under the Plan, but while it is possible to estimate in round figures the costs involved, obviously any calculations that look so far ahead must be qualified by some reserve. All the figures and estimates given below are based upon conditions ruling in the autumn of 1954. Subject to this, the heads of the Plan may be summarised as follows:

First, the track and signalling must be improved to make higher speeds possible over trunk routes, and to provide for better utilisation of the physical assets; there will be an extended use of colour-light signalling, track circuits and automatic train control, the further introduction of power-operated signal boxes, and the installation of centralised traffic control where conditions are suitable; and the extended use of modern telecommunication services £210 million

Secondly, steam must be replaced as a form of motive power, electric or diesel traction being rapidly introduced as may be most suitable in the light of the development of the Plan over the years; this will involve the electrification of large mileages of route, and the introduction of several thousand electric or diesel locomotives £345 million

Thirdly, much of the existing steam-drawn passenger rolling stock must be replaced, largely by multiple-unit electric or diesel trains; the remaining passenger rolling stock, which will be drawn by locomotives (whether electric, diesel or steam), must be modernised; the principal passenger stations and parcels depots will also require considerable expenditure £285 million

Fourthly, the freight services must be drastically remodelled. Continuous brakes will be fitted to all freight wagons, which will lead to faster and smoother operation of freight traffic; marshalling yards and

goods terminal facilities will be re-sited and modernised, and in particular the number of marshalling yards will be greatly reduced. Larger wagons will be introduced, particularly for mineral traffic, and loading and unloading appliances will require extensive modernisation in consequence £365 million

Fifthly, expenditure will be required on sundry other items, including improvements at the packet ports, staff welfare, office mechanisms, etc.; and a sum of at least £10 million for development and research work will be associated with the Plan, making a total of £35 million

TOTAL £1,240 million

SAY £1,200 MILLION

8. The result will be a transformation of virtually all the forms of service now offered by British Railways. In particular:

- (i) as regards passenger services, remodelling of the operations will provide fast, clean, regular and frequent services, electric or diesel, in all the great urban areas; inter-city and main-line trains will be accelerated and made more punctual; services on other routes will be made reasonably economic, or will be transferred to road:
- (ii) as regards freight services, there will be a complete re-orientation of operations designed to speed up movement, to reduce its cost, and to provide direct transits for main streams of traffic; and to attract to the railway a due proportion of the full-load merchandise traffic which would otherwise pass by road.

9. The economic benefit to be derived will be of a decisive order. In the Commission's view the expenditure will ultimately attract a return amounting to at least £85 million a year. This must be viewed in relation to the annual turnover of British Railways, which is now approaching £500 million. There will, in addition, be many benefits which cannot be so quantified, but which in the long run will exercise a powerful influence upon the financial results. These include the public goodwill that will follow from improved services, and the tonic effect upon staff morale of working with thoroughly modern and efficient apparatus. Indeed the question in the Commission's mind is the amount by which the total returns on the outlay will exceed the minimum figure of £85 million a year, and this without praying in aid the benefits accruing to the public direct, such as better service, lower charges than would otherwise prevail, and a major contribution to relief of road congestion.

10. The final answer will of course depend not only on working efficiency, but also on the additional amount of remunerative traffic that can be attracted to the railway system. As regards passenger services, the remarkable growth in the volume of personal travel during the last few decades seems likely to continue, so that the market for passenger travel, urban or long-distance, private or business, should continue to expand. Despite air transport and the private car, therefore, and notwithstanding the fact that the total volume of travel includes a great deal of movement for which railways cannot be competitive, there will remain a large pool in which the railways will take a larger share, once the quality and cost of the services are transformed. At the same time as the railways attract further traffic which they are inherently suited to carry (provided that the most modern equipment is available), certain other traffics, which are now carried at disproportionately high costs and are inherently more suited for road transport, will be gradually transferred to road.

11. As to freight transport, the available forecasts of industrial development seem to show that, even after allowing for some rationalisation of production to save transport, the total demand will continue to grow. The extent to which the railways will be able to share in this demand will depend on their ability to provide improved services at lower cost; but the possibilities in this direction are great. The normal trend of increased production should of itself assist the railways, and some of the ground that has been lost to other forms of transport over the past thirty years should be recovered. On balance, these increments of traffic should more than counterbalance any local falling-off in traffics that may follow changes in the pattern of industrial development, or the handing over to road of traffics that are better suited to road transport.

12. The general questions of economics and finance affecting the Plan are considered in more detail below (Section VI). Suffice it to say here that the expenditures proposed are not visionary; that they are not unduly large in relation to the investment already in existence; that they are supported by reliable commercial and technical opinion; and that the yield to be expected from the Plan in due course, after fructification of the expenditures, is such as to make it an economic venture of the most promising sort.

III. THE PLAN

1. *Way and Works, Signalling and Telecommunications*

13. The 20,000 route miles of British Railways rank among the greatest of our national assets. Although the main trunk lines were constructed over a century ago, their engineering standards are still among the best in the world, and though many routes between important centres were built during the period of inter-railway competition, with some duplication and overlapping in consequence, as a whole they were well planned in relation to traffic flows and in this respect they still meet the requirements of the twentieth century. Nevertheless, the railway network is sorely in need of improvement and replanning to meet the needs of the future, and fortunately it can be modernised at a total cost that is relatively modest in relation to the benefits to be realised. Under the Plan £210 million is allocated to the track and its associated works such as bridges and tunnels, and to signalling and telecommunications.

WAY AND WORKS

14. The need to improve the permanent way and structures falls under several headings. First, the conditions brought about by the war and its aftermath have prevented the railways from keeping pace with the renewal of bridges at a rate proportionate to their increasing age. Renewal programmes during the next twenty years must therefore be greatly accelerated to prevent the dislocation to traffic which would occur if arrears were left to accumulate, resulting in the simultaneous life-expiry or weakening of large numbers of bridges.

15. Over the whole period of the Plan a sum of about £20 million has therefore been allocated for bridge renewals, over and above the present rate of expenditure.

16. Secondly, train operation over various sections of important trunk routes is handicapped by permanent speed restrictions imposed by sharp curves, junctions, inadequate track facilities at stations and other physical features. Existing speed restrictions have been reviewed and schedules prepared of all cases where it is thought that operating benefits would justify the cost of their removal. This work is estimated to cost around £25 million. It would be carried out in an order of priority arranged to give the earliest and the maximum benefit to the most important traffics.

17. The aim is to achieve on the main lines speeds of at least 100 m.p.h. where conditions will permit.

18. Next, changes in forms of motive power and the increased speed of movement of all types of traffic will necessitate strengthening the track structure by re-ballasting and relaying on a number of lines where, in the past, speeds and traffic density have been less. It is estimated that about £35 million will be required for this work.

19. Lastly, an expenditure of £25 million will also be required on the provision of new and additional lines, improvement to permanent way layouts, provision of flyover junctions, etc., partly to meet projected developments in the needs of various industries, partly to provide greater line capacity and improved traffic operation.

20. The total cost of the foregoing improvements to the track and its structures is put at £105 million.

SIGNALLING AND TELECOMMUNICATIONS

21. The faster and in some cases more intensive train services envisaged will necessitate a substantial investment in the most modern methods of controlling rail traffic, to secure both efficient operation and the highest degree of safety. Provision must be made for the widespread replacement of semaphore signals by colour-light signalling, which in many cases will be automatic in operation. There must also be a considerable extension of track-circuiting, whereby the presence of a train upon any individual section of line is automatically indicated to the signalman and appropriate safeguards applied. The provision of power-operated signalboxes in replacement of mechanical operation of points and signals will be widely extended, and in many cases one modern power box will replace several manual boxes.

22. On certain sections of line, where conditions are favourable, the system of centralised traffic control, already widely used in America and certain other countries, will be applied to British Railways. This makes possible the operation from a central control of all the points and signals over a considerable route-mileage of line; it offers considerable advantages as compared with conventional methods of signalling where conditions are favourable for its employment.

23. An expenditure of £20 million upon the progressive introduction of automatic train control has been assumed for the purposes of the Plan.

24. Efficient telecommunications also constitute a vital service for railways. The existing telegraph and telephone systems must be considerably modernised, and advantage taken of all available developments in telecommunications.

25. The estimated expenditure for signalling and telecommunications, including automatic train control, amounts to some £100 million, making the total for this section of the Plan, with an allowance of £5 million for sundry items, about £210 million.

2. *Methods of Traction*

26. The Commission have decided that major changes in the forms of motive power on British Railways must be effected, involving a widespread changeover from steam to electricity and diesel power. These motive-power developments are a prerequisite of the improved quality of service that will be required by industry and the travelling public in future, and which the Commission are determined to provide. Equally, however, the changes will lead to major economies in operation, some direct and immediate, some only coming to fruition gradually. There is much evidence from abroad of the all-round increase in railway efficiency that has stemmed from new forms of motive power, whether from dieselisation in North America or electrification in Europe and elsewhere.

27. The Commission accordingly propose to build no new express passenger or suburban steam locomotives after the 1956 programme, and to terminate the building of all new steam locomotives within a few years. The changeover in the shops of British Railways will be arranged to cause the minimum dislocation to the staff affected by it.

THE CHOICE OF MOTIVE POWER

28. In reaching this decision the Commission gave careful consideration to the merits of all the various forms of traction. The steam locomotive has in the past served the railways well. It has the virtues of low first cost, simplicity, robustness and long life. On the other hand, many factors combine to indicate that the end of the steam era is at hand. These include the growing shortage of large coal suitable for locomotives; the insistent demand for a reduction in air pollution by locomotives and for greater cleanliness in trains and railway stations; and the need for better acceleration.

29. It is also a characteristic of steam operation that it involves hard manual labour for such tasks as the firing, cleaning and servicing of locomotives. Not only is much of this work unattractive by present-day standards, in comparison with that offered by other industries, but it also represents an inherently wasteful use of labour resources.

30. The main scope for development at present rests with electricity and diesel traction. In many ways electricity is the ideal, since it meets the requirements of reliability, good acceleration, cleanliness and (where the traffic is sufficiently heavy) economy in operation. Under electrification, moreover, the direct cost of train movement is considerably reduced as compared with steam, though owing to the increased capital investment a certain minimum traffic density is required before electrification can compare favourably as regards total costs of operation.

31. As traffic density increases, however, the comparison becomes increasingly favourable to electricity.

32. The main disadvantage of electrification is that it frequently involves substantial engineering works on track and structures, signalling and telecommunications. In consequence, converting a length of line to electric traction is a complex operation, involving a considerable period of preliminary planning and co-ordination of effort between various railway departments and outside contractors, and some disturbance of the services during the execution of the work.

33. A further consideration is that in some cases in the past the riding qualities of electric multiple-unit stock have not equalled those of modern vehicles hauled by a separate locomotive. Research has however been undertaken into the design of bogies for electric multiple-unit vehicles, and it is confidently expected that future designs will provide an entirely satisfactory standard of passenger comfort.

34. Diesel traction offers many of the advantages of electricity in the shape of cleanliness, acceleration and uniform standard of performance. It has a further advantage in that the changeover from steam to diesel working generally does not involve important civil engineering or signalling works, and can be effected as quickly as the diesel units can be built.

35. On the other hand, on the lines of heaviest traffic the potential economies are less with diesel traction than with electrification. The present cost of a diesel locomotive is about two-and-a-half to three times that of a

steam locomotive of equivalent power and, to yield economic results, diesel locomotives must achieve a very high degree of utilisation, approaching closely to their theoretical availability, in order to spread the capital charges over a sufficient total volume of remunerative work.

36. The use of atomic power in relation to railways seems likely to be indirect, namely through the use of nuclear energy at electric power stations, rather than through the development of atomic-powered locomotives. The extension of railway electrification will enable the Commission to take advantage of the possibilities flowing from the introduction of atomic power.

37. With these considerations in mind, the Commission are agreed that, in broad terms, it is not a question of choosing between electricity and diesel traction, but rather of combining the two to the best advantage. The Plan is, moreover, flexible enough to enable advantage to be taken of any technical developments, including gas-turbine propulsion, that may become available and economically justified as the work progresses.

38. There is a wide and accepted field for electrification in suburban services, and proposals for substantial schemes are set out below. There is also a wide range of main-line services upon which the density of traffic indicates that there is a good economic case for electrification. But the key factor, as indicated above, is the volume of civil and signal engineering works that are involved; and there is therefore a limit to the amount of main-line electrification that it appears practicable to complete within the period covered by the Plan. This amount of work has been provided for. As regards the remainder of the principal main-line services, it is intended to introduce diesel traction as quickly as possible. Conversion to diesel traction will be carried out through annual building programmes, and the rate of investment can thus be accelerated or slowed up according to circumstances. If it should be subsequently decided that it is practicable to electrify a section upon which diesel traction has already been introduced, the diesel units would be used elsewhere.

39. The above paragraphs indicate the general strategy of the proposed changeover. The details are set out below.

SUBURBAN ELECTRIFICATION

40. At the moment, work is proceeding with the extension of the Liverpool Street–Shenfield electrification to Chelmsford and Southend (Victoria). Various other schemes have been under consideration, and planning upon

them has reached different stages of development. It is proposed that under the Plan all these schemes should be adopted, unless any unforeseen difficulties should emerge as planning proceeds. The list is as follows:

	<i>Approximate route mileage</i>	<i>Estimated cost of fixed equipment</i>
		£ million
London, Tilbury & Southend line ..	85	11
Liverpool Street to Enfield and Chingford	20	2
Liverpool Street to Hertford and Bishop's Stortford	35	4
King's Cross and Moorgate ¹ to Hitchin and Letchworth, including the Hertford loop	60	5*
Glasgow suburban lines ²	190	18
TOTAL	390	£40 m.

*This estimate excludes signalling.

EXTENSIONS OF SOUTHERN REGION ELECTRIFICATION

41. In addition, it has always been the intention that, as soon as circumstances permit, all the main routes of the Southern Region east of a line drawn from Reading to Portsmouth should be electrified. This will extend to the coast the electrified zone which now terminates at Gillingham, Maidstone and Sevenoaks, and carry the electric train services to Ramsgate, Dover, Folkestone and (via Ashford) to Hastings. In conjunction with the diesel services to be introduced (referred to later), this will effect the elimination of steam traction from all the lines of the Southern Region in the area mentioned.

¹The choice of route for the Finsbury Park–Moorgate section has not yet been decided.

²The figures quoted for the Glasgow suburban lines are based upon the Inglis Report of 1951 on Passenger Transport in Glasgow & District. The adoption, scope and staging of the scheme are dependent upon further study and discussion with the Glasgow Corporation regarding future co-ordination of road and rail services in the area.

42. This programme will entail electrifying about 250 route miles of line at a cost of approximately £25 million for the fixed equipment.

ELECTRIFICATION OF MAIN TRUNK ROUTES

43. It is the intention to electrify two major trunk routes, and one of lesser traffic density, under the Plan. The main line of the Eastern and North Eastern Regions from King's Cross to Doncaster, Leeds and (possibly) York, and the main line of the London Midland Region from Euston to Birmingham, Crewe, Liverpool and Manchester, will comprise the two major schemes. The subsidiary main-line scheme will consist of the extension of the existing electrification from Liverpool Street (which will soon reach Chelmsford) to Ipswich, including the Clacton, Harwich and Felixstowe branches. By these schemes there will be a virtual elimination of steam from important areas of the country.

44. The estimated cost of the fixed installations for all these schemes is around £125 million, and the cost of some 1,100 electric main-line locomotives will be about £60 million. (The cost of the multiple-unit electric trains is included under 'passenger carriages' in paragraph 74.)

45. This represents a very large programme; and the Commission are taking expert advice as to the capacity of the available technical staff and of the electrical manufacturing industry to carry it out as proposed. Should it appear necessary to limit the programme, one of the main routes concerned would in the meantime be converted to diesel traction—without prejudice to its eventual electrification, when the diesel units would be transferred elsewhere.

DIESEL MULTIPLE-UNIT TRAINS

46. It is now accepted that, where the traffic is within their capacity, a considerable improvement in net revenue can be secured from the replacement of steam services by diesel-powered trains, ranging from single units to six-coach trains. A start has already been made with the introduction of this type of train in various parts of the country.

47. Under the Plan a much wider extension of diesel multiple-unit working is envisaged. This will include three principal types of service:

- City-to-city express services
- Secondary and cross-country routes
- Branch lines.

48. The total number of multiple-unit diesel vehicles that can be employed on British Railways for the services listed above is estimated at about 4,600, including the 300 now in use or on order. The cost of the 4,300 vehicles to be built under the Plan is included under 'passenger carriages' in paragraph 74.

DIESEL SHUNTING AND TRIP LOCOMOTIVES

49. The present programme for the construction of diesel shunting units in replacement of steam locomotives will be completed in 1957, and a further programme is in course of preparation. It is considered that the complete elimination of shunting and trip working by steam locomotives should be achieved over the next fifteen years. The total number of steam locomotives that will be displaced by this conversion is approximately 1,500. They will be replaced by about 1,200 diesel locomotives, additional to those already authorised, at a total cost of about £25 million.

DIESEL MAIN-LINE LOCOMOTIVES

50. Diesel traction, then, may be regarded as a half-way house to electrification. It yields many of the advantages of electricity, and in addition it can be introduced more quickly. It is essentially a flexible form of traction, with a wide range of utility. A very substantial investment is accordingly proposed in diesel main-line locomotives, commencing forthwith, with the object of achieving as soon as possible a complete changeover from steam to diesel traction in specified areas. By this means the maximum economies will be obtained through the closing of steam motive-power depots, and it will also be possible to obtain experience of the operating costs of diesel units without mixed working involving two forms of traction. It is intended to standardise design as much as possible.

51. By the end of the period covered by the Plan about 2,500 main-line diesel locomotives should be in use. For example, on the Western Region it is intended to eliminate all steam working beyond Newton Abbot and also to employ diesel units based in that area for hauling a large proportion of the passenger and freight trains from the West to London and Bristol and back. On the Southern Region the greatest early advantage will be secured by employing diesel locomotives to replace steam services between Waterloo and Exeter, and Waterloo, Southampton, Bournemouth and Weymouth. In these two schemes some 200 main-line diesel locomotives will be required, which will displace over 300 steam locomotives. Changes to diesel traction in other areas will be progressively effected.

52. The total cost of the main-line diesel locomotives to be built under the Plan is £125 million.

53. Hitherto, the diesel main-line locomotives on British Railways have comprised a handful of prototypes, and various 'teething troubles' have been experienced. Much useful experience has, however, been gained and, in view of the high degree of reliability attained in other countries where diesel traction has been widely adopted, there is no reason to doubt that equally satisfactory results will be realised here, once the decision has been taken to make diesel traction a standard feature. It will be necessary to take full advantage of the high availability for work of the diesel units when preparing the 'diagrams' of scheduled duties for locomotives, and it will be possible to reorganise train timetables, both for the greater convenience of the public and for more economic working, when allowance no longer has to be made in timing trains for locomotives to be changed or to proceed to depots for servicing, as under steam traction.

THE RESIDUE OF STEAM TRACTION

54. Although it is proposed shortly to bring to an end the building of new steam locomotives, there are at present some 19,000 steam locomotives on British Railways, a substantial proportion being of modern design. The steam locomotive has a useful life in service of some forty years, and obviously careful planning will be required to ensure that, as the existing stock is gradually replaced by diesel or electric power, it is still used to the best advantage. There will accordingly be careful selection of types for the condemnation programme, designed to eliminate as quickly as possible the less efficient types and small classes for which it would not be economical to maintain spares.

55. As regards steam motive-power depots, many of these require to be rebuilt or substantially modernised; and if no change in the present types of motive power were contemplated there is no doubt that a considerable expenditure would have to be incurred on essential improvements. In view of the proposals here referred to, however, all schemes for the provision or modernisation of depots designed to service steam locomotives will need to be re-examined in the light of the new developments and altered requirements. The maximum financial advantage is to be secured where it is possible to effect a complete changeover in the form of motive power, but some capital expenditure on steam depots will be inescapable to meet essential requirements, particularly at large freight depots. In the main, however, it

will be the object to eliminate complete steam depots as soon as possible after the electric or diesel maintenance centres have been constructed in the areas selected for complete conversion. It is estimated that a sum of £10 million should cover the expenditure on steam motive-power depots.

SUMMARY OF PROPOSALS

56. The total expenditure proposed on new methods of traction can be set out as follows:

	<i>Structures etc.</i>	<i>Locomotives and rolling stock</i>	TOTAL
	£ million	£ million	£ million
<i>Electrification</i>			
Main lines			
London Midland Region ..	40	35*	75
Eastern Region	20	25*	45
Total Main lines ..	60	60*	120
Suburban lines	40	*	40
Southern Region extensions ..	25	*	25
<i>Diesel Traction</i>			
Main-line locomotives	125	125
Multiple-unit trains	*	*
Shunting and trip locomotives	..	25	25
<i>Steam Motive-power depots</i> ..	10	..	10
TOTAL ..	135	210	345

*Multiple-unit vehicles, whether electric or diesel, have been taken into account under 'passenger carriages' (paragraph 74).

3. *Passenger Traffic*

PASSENGER AND PARCELS STATIONS

57. Proper station amenities are an important part of a comprehensive railway service. The introduction of the plans outlined above for electrification and diesel traction opens great possibilities for the improvement of station premises and amenities and may well demand increased capacity to meet the requirements of additional traffic.

58. An improved quality of train service may fail to make its proper impact on the public if the standards of accommodation and amenities provided at passenger stations lag behind, and railway passengers are entitled to expect the improved standards which are provided for in the Plan.

59. It has therefore been thought right to include a substantial sum for the reconstruction of passenger and parcels stations. Part of this capital expenditure will involve increased annual charges, which should be offset to some extent by an improvement in gross receipts which cannot, however, be calculated. In other cases operating economies will be realised to offset the additional annual charges—for instance, where train delays can be reduced. And the improvement of stations and station approaches, together with the introduction of cleaner forms of motive power, should lead to the development of property on sites owned by the Commission from which additional revenue will accrue.

60. Improvements at many major stations will involve new methods of parcels handling and its segregation from the other work of the station, and this is a field in which substantial operating economies can be realised.

61. A programme for carriage-cleaning and servicing depots has also been prepared. As with station improvements, the main justification is a commercial need—to provide the public with rolling stock which is thoroughly clean, inside and outside. Dirty carriages are the cause of frequent complaints against the railways. In present conditions the only solution to the problem is the construction of more depots where the highest possible degree of mechanisation in carriage cleaning can be employed.

62. The total expenditure upon passenger and parcels stations and carriage-cleaning and servicing depots is estimated at £55 million.

PASSENGER CARRIAGES

63. British Railways have some 42,000 passenger-carrying vehicles. The Plan provides for important changes in both the total number and the types of passenger carriages.

64. In the first place, the changes in forms of motive power will involve a large carriage-building programme, since many steam-hauled vehicles will be replaced by multiple-unit diesel or electric vehicles.

65. Secondly, it is expected that some reduction in the total stock will be achieved through more intensive use. The re-casting of timetables and adjustment of services is being studied with a view to achieving economies in the use of rolling stock and at the same time providing an equivalent or better service.

66. Next, the changing requirements of the public, and the higher standards of amenity that will be expected in future, will influence the building programmes.

67. Lastly, the study of comparative costs of different types of passenger service has revealed that certain stopping and branch-line steam services are carried on at a heavy loss. For the most part the carriages employed on these services are of the non-corridor compartment type. Broadly speaking, it must be accepted that these services will either be replaced by diesel multiple-unit trains (which will normally be the case where there is a reasonable prospect of stimulating sufficient additional traffic), or by appropriate road services.

68. The effect will be that by the end of the period of the Plan all the steam-hauled non-corridor compartment carriages will have been replaced. The non-corridor type will only be retained for certain electric suburban services where its high seating capacity and ability to load and unload quickly are important advantages.

69. So far as changes in motive power are concerned, the main-line and suburban electrification schemes, including the extensions in the Southern Region, will involve the construction of some 3,600 multiple-unit electric vehicles.

70. As stated in paragraph 48, the total number of multiple-unit diesel vehicles required is about 4,600.

71. With regard to catering vehicles, large-scale experiments are being made at present to ascertain the preferences of passengers for different kinds of service. They may lead to considerable changes in the design of catering vehicles operated on the railways; but for the purpose of the Plan no alteration in the total number has at present been assumed.

72. After taking account of all the factors listed above, it is estimated that the total required stock of passenger-carrying vehicles, including the units

needed to provide an adequate margin for standby purposes, the strengthening of trains at peak periods, excursions and so forth, is some 36,000 vehicles. This compares with a present figure of around 42,000.

73. The short comparison of present and future stocks is:

	<i>Approximate numbers</i>	
	<i>Present</i>	<i>Ultimate</i>
Locomotive-hauled vehicles	37,200	23,200
Electric multiple-unit vehicles	4,800	8,400
Diesel railcars and multiple-unit vehicles	300	4,600
TOTAL	42,300	36,200

74. Over the period of the Plan, the total number of new passenger carriages to be built will be about 31,000, at a cost of approximately £230 million. The Plan is essentially a flexible one, however, and within the total expenditure proposed changes can be made to meet variations that may become necessary as detailed planning proceeds.

4. *Freight Traffic*

MARSHALLING YARDS

75. British Railways must provide a freight service which gives shorter transit times than at present, with greater reliability and punctuality in deliveries. Speeding up the service and improving punctuality will at the same time reduce operating costs. Reference is made below to the contribution towards realising these objectives that will be made by improved forms of motive power and the adoption of continuous brakes. There are, however, other major factors, including the re-siting and modernisation of marshalling yards which constitute an essential part of the system under which freight is distributed throughout the country. The existing yards for the most part were constructed in the time of the individual companies. They reflect a system of routing designed to ensure that the company that accepted the traffic could keep it on its own system for the longest possible distance, and were not specially designed to facilitate through

working. This means that there are often two or more yards, of old-fashioned design, situated close together, traffic being 'staged' between them.

76. Rational methods of operating, based on the use of facilities without regard to previous company ownership, require the elimination of many of these old yards and their replacement by a smaller number of modern yards. In such cases there will almost always be direct savings of considerable magnitude, and there will also be indirect savings, resulting from the greater fluidity of movement and the reduction in total transit times.

77. A survey has therefore been made of the scope for resiting and modernising marshalling yards. The majority of the yards in this country are of the flat type, many being both small and inconveniently sited. The more modern yards generally employ the gravitational effect of an inclined plane for supplying the necessary force for the movement of wagons into and along the sorting sidings.

78. Modernisation of yards therefore generally involves the provision of suitable gradients to ensure that wagons pass into and along sorting sidings at the most appropriate speed (i.e. at the maximum possible speed at which full control can be obtained over wagon movement and the requisite point clearance between 'cuts' can be obtained); the provision of power-operated points controlled from one central position; and the provision of mechanical means of retarding the speed of the wagons as they pass into the sidings, the retarders again being operated from a central position.

79. The plan provides for the construction or reconstruction of some fifty-five marshalling yards, which would result in the total or partial closure of about 150 existing yards. It is broadly estimated that these proposals would cost about £80 million.

GOODS STATIONS

80. The introduction of modern methods of handling goods is an important component in the quicker and more punctual freight service which the railways desire to offer their customers. Many schemes for the reconstruction or improvement of goods stations are also expected to yield substantial economies, principally derived from the more effective use of labour. Economies can also be realised through speeding up the turnround of wagons.

81. In planning for the future it will be necessary to close various old depots and concentrate their work in a smaller number of large modern

depots. This will reduce shunting and 'trip' working of trains, improve transits and concentrate sufficient tonnage at stations to justify capital expenditure on mechanical handling appliances.

82. These depots will be so constructed and laid out as to provide for the expeditious exchange of full-load traffic between road transport and rail.

83. The total cost included in the Plan for new and reconstructed goods stations is £50 million.

84. Associated with the improvements at freight terminals there will be requirements for expenditure upon cranes and other mechanical handling devices; additional collection and delivery road vehicles; and improved repair and maintenance depots for road vehicles. The additional expenditure involved for these items will be of the order of £10 million.

FITTING OF CONTINUOUS BRAKES TO WAGON STOCK

85. A high proportion of the costs of railway operation is related to time rather than to distance. Accordingly, higher speeds of movement can often achieve major economies and increase the productivity both of the labour and of the capital assets employed. It is, however, important to raise the average speed of movement, not just that of a few passenger trains, and in particular to narrow the gap between the fastest and the slowest-moving trains. This must be done by increasing the average speed of the freight trains.

86. Great Britain is the only major industrial nation in which a large proportion of the freight traffic on the railways is still carried in loose-coupled wagons not fitted with continuous brakes. The absence of continuous brakes on freight trains necessitates slow timings and, consequently, undue occupation of the track. The additional headway required by the faster-moving trains introduces a further serious source of delay to the slower-moving loose-coupled trains. As a result, not only are the running times of the latter unduly protracted, but the trains have to be set aside in refuge sidings or running loops awaiting a margin to precede a faster-timed train.

87. The chief advantages of fitting continuous brakes are increased line capacity for all services, passenger and freight, because of more uniform speeds; better transit times for freight traffic; improved punctuality; and greater safety in train movement.

88. The fitting of continuous brakes will also result in a considerable increase in the proportion of productive time to total booked time worked by train crews. In addition, it will lead to a saving in the number of sets of relief enginemen.

89. In the running of unbraked trains, the railways must provide catch points upon gradients more severe than 1 in 260. Continuous brakes would enable these points to be dispensed with, and eliminate the delays and expense that arise through having to use these safeguards. There are approximately 1,000 places on British Railways where wagon brakes must be pinned down before trains proceed over severe falling gradients; the trains have to be brought to a stand for the wagon brakes to be pinned down, and subsequently have again to be stopped for the brakes to be released. The total time occupied in carrying out this regulation is about 10,000 hours a week, which would all be saved if the wagons were fitted with continuous brakes.

90. The higher average speeds of train movement and the better punctuality will lead to a reduction of about 2,000 in the number of locomotives, with a saving in interest, depreciation and maintenance costs.

91. On the other hand, the increased speed of freight trains will impose additional demands on the locomotives, and it will be necessary to design the motive power for working heavy mineral trains with some modification compared with the present characteristics. The introduction of continuous brakes will also mean extra time occupied in sidings and marshalling yards for attaching and detaching wagons. In addition, fuel consumption will rise to some extent owing to the higher train speeds, only partially offset by the reduction in the standing time of locomotives. These factors will involve additional cost.

92. On balance, however, the adoption of continuous brakes is one of the most important single steps forward that can be taken by British Railways in the near future to improve the standard of their service, and it will be of material assistance in getting the best results from new forms of motive power. The estimated gross outlay on the provision of continuous brakes of the vacuum type is £75 million.

WAGONS

93. British Railways at present own over 1,100,000 freight wagons. Clearly there is a very substantial field for economies if the size of this wagon fleet can be reduced. One way of reducing the number of wagons required for a given volume of traffic is to increase their average size. There

are, however, certain external factors to be taken into account, including the trading habits of the community. In this country many classes of merchandise are generally despatched in relatively small consignments and on a retail rather than a wholesale scale. In order to give prompt delivery, wagons must often be despatched without waiting for a full load to be obtained. While, therefore, the Commission intend to develop full-load traffic by all means in their power, the scope for increasing the average size of merchandise wagons is limited. It is, however, proposed to increase substantially the number of covered merchandise wagons, with a corresponding reduction in open wagons, to meet traders' requirements.

94. More scope for the use of larger wagons exists in mineral traffic where, as is widely known, the Commission have recently introduced the largest coal wagon that can run on two axles on British Railways, with a capacity of $24\frac{1}{2}$ tons. The problem of replacing the existing wagons of lower capacity by the new $24\frac{1}{2}$ -ton wagon is a complex one, involving the adaptation at considerable cost of terminal facilities and loading appliances, many of which are outside the Commission's ownership. The Commission have, however, decided that by 1974 half the coal-carrying capacity on British Railways should be provided in $24\frac{1}{2}$ -ton wagons.

95. The second method of reducing the wagon stock is the reduction of round journey time, leading to an increase in the amount of revenue-earning work performed by each wagon in the course of a year. It is not possible to assess with accuracy the improvement in the rate of movement that will become possible through the completion of the Plan, including the reorganisation of marshalling facilities, the fitting of continuous brakes and the modernisation of freight terminals. It will, however, be substantial. Unfortunately the proportion of time spent travelling under load is not high in relation to the proportion of time spent at terminals, in marshalling yards, or awaiting loading. Accordingly, whilst improvements in freight train operation will contribute to a reduction in loaded journey time of wagons, a substantial contribution will also have to be sought through the co-operation of traders and through improved operating methods, in order to achieve a reduction in standing time.

96. For the purpose of this Plan the Commission have assumed an overall reduction of about 30 per cent in wagon turnround time. A more drastic reduction should be possible and every effort will be made to secure it. A conservative percentage has been adopted because a further reduction will

depend upon fundamental changes in operating practices, which in turn are partly dependent upon co-operation from the users of transport.

97. The wagon stock, on completion of the present authorised yearly programmes, up to and including the 1955 programme, will be divided as follows:

Open (merchandise)	..	309,700
Covered (merchandise)	..	148,000
Mineral	606,900
Special	2,300
Cattle	12,600
Steel-carrying	47,100
Brake vans	14,900
		<u>1,141,500</u>

98. The important group of open and covered merchandise wagons totals 457,700. It is calculated that by 1974, owing to the expected improvement in turnround time, this total will have fallen by between a quarter and a third, though the proportion of covered wagons in the total will have risen.

99. In calculating the fleet of mineral wagons required by the end of the Plan, the total tonnage capacity of the present fleet was assessed. After making provision, as was felt to be necessary, for at least some increase in traffic, the ultimate number of wagons required was calculated taking into account, first, the planned replacement of old wagons and the progressive introduction of larger wagons, generally of 24½ tons' capacity; and secondly, the expected reduction in turnround time. These calculations produced a mineral wagon stock in 1974 as much as 40 per cent below the present figure of 606,900.

100. The final stock of all classes of wagons forecast at 1974 will fall from 1,141,500 to approximately 752,000.

101. The total number of wagons to be built to reach this position is 297,000, at a cost of £177 million. In the period 1956-70, 255,000 wagons will be built at a cost of £150 million, and this latter expenditure has been included in the Plan.

102. This wagon-building programme will yield important benefits to efficient operation, through the elimination of the older wagons, particularly

those with grease lubrication, which require frequent repair. It is impossible to estimate separately in money terms all the savings that will arise from the modernisation of the wagon fleet; but the contribution made to the overall operating efficiency will undoubtedly be great.

103. There will also be a substantial expansion in container transport, and other technical developments for the transfer of traffic between road and rail. It is, however, proposed that these requirements be dealt with in the ordinary annual programmes, and this document does not therefore contain any forecasts on the future stock and types of containers.

5. *Sundry Items*

104. In addition to the main items of expenditure, it will be necessary to provide under the Plan for a number of other developments, of which the principal are described below:

- (a) The shipping services operated directly in connection with the railways are for the most part based on specialised packet ports, which are either owned by the Commission or in which the Commission have a substantial interest. Various improvements are required at the Commission's packet ports and, despite the growth of air services, the trend of traffic fully justifies the expenditure.

Provision is made in the Plan to spend about £12 million on packet ports in Great Britain. In some instances, complementary port works may have to be undertaken by the responsible authorities on the Continent, in Ulster, and in the Republic of Ireland, but it is reasonable to assume that they would be prepared to act in concert with the Commission.

The works required relate to the Continental services, the Irish traffic, and to various estuarial services. In some cases, in addition to improvements at the ports themselves, additional works will be required inland, such as goods stations and inland customs depots both for freight and registered baggage. Account has been taken in the Plan of the fact that electrification is proposed for the railway lines serving both Dover and Harwich. Provision is not, however, included for new ships, since these in general would fall to be built as renewals of existing vessels.

- (b) The execution of the Plan will involve the recruitment of a substantial number of technical staff, and obviously some office accommodation

will have to be provided for them. A notional sum has accordingly been included in the Plan for this purpose.

- (c) A sum has also been included for the purchase of mechanical office appliances. It is proposed to take full advantage of recent developments, since there appears to be considerable scope in railway work for the use of electronic computing machines.
- (d) It will also be essential to incur expenditure upon staff welfare. The term welfare covers a wide variety of items, including such things as mess-rooms, canteens and hostels; lavatory and washing facilities; and social and recreational activities. The standards of accommodation and working amenities have a powerful influence on staff recruitment. Whilst much has been done to improve staff welfare standards in recent years, and expenditure since 1951 has been running at a level of £1½ million a year, at many places the standards will have to be improved considerably if the railways are to be able to attract and keep staff of a suitable kind against the competition of other industries.
- (e) Research and development work in connection with various aspects of the Plan will be essential, although its shape cannot be forecast here. A sum of at least £10 million must be envisaged.

105. The total expenditure under the headings mentioned above amounts to approximately £35 million.

IV. PROVISION OF STAFF

106. The adoption of the Plan will involve, on an unprecedented scale, heavy demands on industry, which will be asked to share fully in the work envisaged. In addition, there will be exacting demands upon British Railways technical, traffic and administrative staff. The various industries over which the load will be spread should be able to increase output capacity if necessary to meet these increased demands. But, to enable all these activities to be properly directed, and to cope with the detailed planning, drawing and estimating, and the supervision and execution of the physical works that must be undertaken by British Railways themselves, there will clearly have to be a substantial increase in the Commission's technical staff.

107. There are at present technical staff shortages, and thus an energetic policy of recruitment will have to be adopted. The Commission are fully apprised of the need for this, and intend to secure that shortage of expert staff shall not constitute an obstacle to the achievement of the Plan.

108. Part of the difficulty of attracting young engineers to the railway service in the past has been a fear on their part that no major development work was likely to be undertaken, and that their prospects and experience in consequence would be limited. In future, the best possible advertisement for a career on the railways should be the Plan itself.

109. A successful recruiting campaign will bring to the railways a large number of men with basic technical knowledge but with no railway experience, and others straight from school. Further expansion of staff will require rapid promotion of younger engineers to positions of responsibility.

110. Training will therefore have to be undertaken both for recruits and junior staff, to fit them in the minimum time to take their full share of designing and control of works; and also for potential senior engineers, to enable them to take key positions.

111. In addition to an intensive drive for recruitment, outside assistance will be enlisted wherever possible. In particular the service of consultants will be sought; though there are limits to their extensive use, since the work of the consultants must still be directed by senior railway engineering staff.

112. While the development of the Plan will create a special staff problem in the technical departments, it will concurrently create a problem, though differing in character, in the traffic departments. Almost all new-works schemes proceed from plans which require to be founded on the operational requirements. This foundation involves not merely a routine task of analyses of traffic operations, but the judgement of experienced officers as to the means best calculated to provide for the situation, and upon which the plans should be based.

113. The Commission will accordingly embark upon the recruitment of trainees to strengthen the traffic staff, and will at the same time train men already in the service for the special work which will flow from the requirements of the Plan.

V. EXECUTION OF THE PLAN

114. As soon as the Plan has been approved in principle the administrative machine will be geared to it, and no departure from its main outlines will be contemplated. On the other hand, the Plan is flexible, and adjustments can be made in its component details in the light of experience without departing from the overall conception.

115. Individual projects will be submitted for authorisation as soon as planning upon them reaches a sufficiently advanced stage of development. It has not so far been possible in the time available to work out detailed priorities for individual works within the railway Regions. Machinery will be set up for the determination of priorities, the proposals being worked out by Regional officers in consultation with headquarters technical experts. The final decisions will be taken by the Commission in consultation with the Area Boards.

116. It is not possible at this stage to forecast the completion dates for the major components of the Plan; they will depend largely upon the priorities that are assigned to the work, and upon the results of consultation between the technical staff and the industries involved in the execution of the Plan. In any case, the preliminary detailed planning will occupy a considerable period, and large-scale results from major schemes such as main-line electrification cannot be expected until the Plan has been under way for some years. On the other hand, there will be some comparatively early benefits from those parts of the Plan to be carried out through annual building programmes, such as the construction of diesel multiple-unit trains and locomotives.

117. In any case the Commission are clear that, provided no excessive costs are incurred thereby, the work as a whole must be pushed on at the fastest pace practicable.

VI. ECONOMICS OF THE PLAN

118. It is obviously difficult to forecast in detail the economic effects of the Plan. The precise outcome will be influenced by many factors, including the industrial and social situation of the country as a whole. The more important

results to be expected are clear, however, and can be calculated in round terms.

BASIC CONSIDERATIONS

119. Certain basic considerations govern the investment of resources proposed under the Plan. It would for instance be useless, or worse than useless, to limit the Plan so that the investment incurred would do no more than enable the railway services to continue in more or less their present shape and form. This would still require almost half the investment now proposed; the main reason being that substantial capital expenditure will arise in meeting the difference between the original cost and the current replacement cost of the great volume of assets falling due for renewal. Yet this outlay would not be offset by improved results, nor would the trend towards obsolescence of the railways be arrested. In a world which has seen the technical revolution of the last few decades and widespread changes in the social and industrial structure, the railways cannot hope to survive unless the transport services they provide keep pace with the demands of a changing environment.

120. At the same time, the existing railway system, even when allowance is made for its acute need of modernisation, represents a national asset of great value. It is important to relate the proposed expenditure upon the railways both to what can be afforded, from a national point of view, and to the results to be achieved. If the total outlay of £1,200 million were spread evenly over fifteen years it would represent an annual investment of £80 million. This is no more than about five per cent of the gross capital formation of the country in 1953, and a high proportion will be devoted to rolling stock and equipment rather than to building and civil engineering work. Having regard to the rate of return that is expected, and to the fact that it will unlock much potential earning capacity latent in existing assets that are not fully or not suitably employed, it can be claimed that the rate of expenditure proposed is attainable in practice and that the programme is realistic.

121. Of the total outlay of £1,200 million, it is estimated that some £400 million will be provided from internal sources such as depreciation provisions and so forth; the annual charge for interest and redemption on the external borrowings of £800 million may be put at approximately £40 million. In addition to this financial charge, it will gradually become necessary to meet increased depreciation charges amounting to about £15 million arising from the need to base these provisions on the replacement cost of new assets instead of on the book values of the assets they replace. In addition, to

put the railways into a healthy state and rectify the present inadequacy of net earnings, the current net traffic receipts ought to be increased by about £25 million.

122. These three requirements—namely, the service of the new capital, the additional depreciation charges, and the rectification of the inadequacy of current net traffic receipts—amount to some £80 million a year. As already stated, the Commission are of opinion that the actual return from the investment should be of the order of £85 million a year and might conceivably be much greater.

123. It may therefore be of interest to indicate in general terms how this minimum economic improvement of £85 million is expected to accrue from among the various services operated by British Railways.

PASSENGER SERVICES

124. In 1954 some 216 million loaded train miles are being run in passenger services, divided as follows:

Fast and semi-fast	..	72	million
Suburban	..	54	„
Stopping and branch-line		90	„
		216	„
		<hr/>	

The train mileage predicted for 1970 will not be very different in total, being estimated at 204 million. On the other hand the character of the service will change. Additional fast and semi-fast long-distance services will be provided, with a considerable increase in suburban train miles, but there will be a marked reduction in the stopping and branch-line services which are little used by the public and which, on any dispassionate review of the situation, should be largely handed over to road transport.

125. Apart from the benefit obtained by reducing the mileage of such services, the major economic improvement effected under the Plan lies in the reduction of the direct costs of train movement, chiefly as a result of the changes to be made in motive power and, consequently, in methods of operation. Some improvement is also to be expected from the modernisation of important stations, and through the closing of little-used wayside stations or their conversion to halts.

126. The substitution of diesel power will greatly reduce the operating costs of those slow and stopping train services, other than suburban, which are retained to rail, and it will enable faster and more frequent services to attract new traffic. The reduction in movement cost from electrification of the suburban services likewise will enable more train miles to be run with improved loadings, the margin between movement cost and receipts being improved in consequence; and whereas the reduction in movement cost will not be so significant in the case of the fast and semi-fast long-distance trains, at least some measure of improved traffic can be expected from a faster, cleaner, and more punctual service. In sum total, an improvement evaluated at something over £30 million a year should be effected in the margin between movement costs and the receipts of the passenger services—this combined with a marked improvement in the quality of the service offered to the public.

127. Some reduction is also to be expected in the costs of terminal and commercial services. If the volume of slow and stopping train services is reduced, it should be possible to eliminate a number of passenger stations, to develop others and to turn yet others into halts. By these and other measures a total improvement of several million pounds is to be expected. Accordingly by 1970 British Railways should have escaped from the un-sound and indeed unjustifiable position under which they are obliged to retain unremunerative stopping-train services that have to be subsidised by the fare receipts from express and other services. Provided that the passenger service as a whole can be overhauled, and that improved and highly competitive services are offered in those fields for which the railway has the natural advantage, the remaining services being either turned over to new forms of motive power or transferred to road, there should be an overall improvement in working results of around £35 million a year.

FREIGHT SERVICES

128. The picture of the freight services cannot be outlined in such simple terms, but in general the economic effects are not dissimilar. That is, the greatest saving is in the movement cost, though it is estimated that there will also be important savings in the terminal and documentary costs of freight handling.

129. The reduction in the movement cost will be brought about under several headings. In the first place, the higher speeds expected (derived principally from the adoption of continuous brakes) will reduce the haulage

cost per train mile. Secondly, there will be a smaller number of wagons to be maintained, due to higher average capacity and faster turnround. Lastly, there will be a reduction in the costs of shunting and marshalling and also a reduction in short-distance 'trip' working between marshalling yards, arising from the resiting and modernisation of marshalling yards and terminal facilities. It is estimated that these changes will lead to a net improvement of some £30 million a year.

130. There will be additional savings in the operation of freight terminals, arising partly from mechanisation of goods handling and partly from other improvements such as more modern methods of documentation, which are expected to yield a total benefit of about £10 million a year.

131. In addition to the reductions in working costs listed above, it is estimated that, even after allowing for a substantial reduction in many of the competitive rates now quoted, and for the transfer to road of certain traffics which cannot be carried economically by rail, the receipts will increase by about one-sixteenth of the present takings by the end of fifteen to twenty years, or at the rate of about £1 million a year over the whole period.

132. Adding together these figures, the total improvement to be expected from the freight services approaches the order of £60 million.

TRACK COSTS, ETC.

133. The principal items of railway expenditure which are common to the passenger and freight services consist of maintenance and renewals of the track and its associated structures; costs associated with the signalling of trains; and overhead items such as general administration. In general these cost items must be expected to increase. The maintenance of track and signalling will rise because of the improved standards and of electrification. The all-round speed-up required by this Plan from all departments will place much more exacting demands on management at all levels, and some additional expense to improve the quality and efficiency of the management is inevitable. Nevertheless, the extra expenditure under all these heads will be trifling compared with the benefits to be derived from the speedy and effective implementation of the Plan.

TOTAL ECONOMIC EFFECT

134. It will be seen that, in general terms, the total economic effect of the Plan, so far as it relates to the Commission's situation in isolation and

so far as it can be expressed in figures, is an improvement of the order of £85 million a year. This is made up of an improvement assessed at £35 million on the passenger services and £60 million on the freight services, less about £10 million for increased expenses, mostly upon those items which are common to both.

135. An even more important result will be that each of the major groups of services will be made reasonably self-supporting and the element of cross-subsidisation which now exists between various groups of services will be considerably reduced. This does not mean that all the traffics will be covering the direct costs involved in their movement and will be contributing towards the common or overhead costs on the same scale; but there will be very few traffics that will not be covering at least the direct costs of their movement. The importance of this towards setting the Commission's finances on a healthier basis can hardly be exaggerated.

136. It is not possible to say how quickly the expenditures made under the Plan will fructify, but since they are all interdependent the full benefit will not be reaped for many years ahead. A question arises as to what the policy is to be meanwhile. Experience shows that once traffic has been lost to a particular form of transport it is very difficult to attract it back again. The position must be faced that certain traffics may have to be carried for some years to come although they are considered to be unremunerative, because ultimately under the Plan the new operating methods to be introduced will make them remunerative and it would be unwise, to say the least, to discard them in the meantime. Accordingly, until the Plan comes to fruition, the economic burden created by certain unremunerative traffics must continue to be carried.

137. When a large investment takes place in the modernisation of British Railways it will be necessary to realise that, in the conditions of the middle of the twentieth century, the financial treatment of these new assets must be different from that which applied in the middle of the nineteenth century. In the rapidly changing world of today we must provide for a much faster rate of replacement in order to keep pace with the technical and commercial framework within which the railways operate. This means that future capital expenditure must be written down more quickly than has been the practice in the past in order that the railways shall remain in a healthy condition after they have submitted to the major surgical operation which is proposed.

VII. CONCLUSION

138. The technical re-equipment of the railways is long overdue. The need for it became acute during the difficult years between the wars, but at that time the railways were hard hit financially by road competition and prolonged depression in the heavy industries. The railways' problem was accentuated by the overworking of their assets in the Second World War. But whatever the causes, the need for re-equipment is so obvious that it need not be controversial. Despite the growth of alternative forms of transport it is clear that the country must continue to look to the railways to carry the main flows of bulk traffic, both passenger and goods, for many years to come.

139. So far British Railways have not been given a share of post-war capital investment comparable with that allocated to railways in many other countries; now at last there is the opportunity to put this right. It is not so much a question of whether the nation can afford to undertake the new investment in its railway system here proposed, as whether it can afford not to do so and thereby continue to carry the economic burden of a public transport system that lags far behind the standard of efficiency technically possible. This Plan aims at providing the country with a railway system which will not only be fully efficient and economic when the Plan is achieved, but will also be adaptable to meet the requirements of many years to come thereafter.

December 1954